GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, JHAJJAR
An Autonomous Institute | NAAC 'A' Grade Institute | Affiliated to MDU, Rohtak

Ref. No. **GITAM/AC/004/2026/**151–174 Dated: 20/03/2026

To

All the members of the
Academic Council,
Ganga Institute of Technology and Management, Jhajjar

Subject: Agenda for the 4th meeting of the Academic Council

Sir/Madam,

It is to inform you that 4th meeting of the Academic Council will be held on Wednesday, the 25th March, 2026 at 03:00 P.M. in the Board Room of the Institute. A copy of the agenda is enclosed.

You are requested kindly to make it convenient to attend the meeting.

Encl: As above.

Member Secretary
Academic Council

Endst. No. GITAM/AC/004/2026/175 Dated: 20/03/2026

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Member Secretary
Academic Council

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, JHAJJAR

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GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, JHAJJAR

AGENDA OF THE 4TH MEETING OF THE ACADEMIC COUNCIL TO BE HELD ON 25.03.2026 AT 3.00 PM IN THE BOARD ROOM OF THE INSTITUTE

AC 4.1 **Confirmation of the minutes of 3rd meeting of the Academic Council held on 03.07.2025.**

To confirm the minutes of 3rd meeting of the Academic Council held on 03.07.2026 **(Annexure 4.1, Pages 1-7 already circulated).**

AC 4.2 **Follow-up action report on the decisions taken in the meeting of the Academic Council held on 03.07.2025.**

To note the follow-up action on the decisions taken by the Academic Council in the meeting held on 03.07.2025 **(Annexure 4.2, Pages 8-11 already circulated).**

AC 4.3 **To consider the recommendations of the Board of Studies of Fire Technology and Safety Department in its meeting held on 22.12.2025.**

The Board of Studies of Fire Technology and Safety Department vide Reso. No. 3.3 of its meeting held on 22.12.2025 **(Annexure 4.3a, Pages 12-14)** approved the Scheme of Evaluation and Syllabus of Hons/ Specialization/Minor Degree in Industrial Safety **(Annexure 4.3b, Pages 15-35)** and Hons/ Specialization/Minor Degree in Disaster Management **(Annexure 4.3c, Pages 36-52)** and the eligible students to opt the same are as given below:

Name of the Minor/Honors (Hons.)/Specialization Degree	B.Tech Program whose students are eligible to opt for Minor Degree	B.Tech Program whose students are eligible to opt for Honors (Hons.)/Specialization
Industrial Safety	All Branches except Fire Technology and Safety	---------
Disaster Management	All Branches except Fire Technology and Safety, Civil Engineering	Fire Technology and Safety, Civil Engineering

The Academic Council may consider the recommendations of the Board of Studies of Fire Technology and Safety Department for approval.

AC 4.4 **To consider the recommendations of the Board of Studies of Mechanical Engineering Department in its meeting held on 27.12.2025.**

The Board of Studies of Mechanical Engineering vide Reso. No. 3.3, 3.4 and 3.5 of its meeting held on 27.12.2025 **(Annexure 4.4a, Pages 53-55)** approved the

(A) Scheme of Examinations and Syllabus of Certificate Course on "CNC Machines and Part Programming" from Academic Session 2025-26 **(Annexure 4.4b, Pages 56-58)**

(B) Scheme of Examinations and Syllabus of Minor Degree/Honors (Hons.)/Specialization in "Robotics" from Academic Session 2025-26 **(Annexure 4.4c, Pages 59-76)** and the eligible students to opt the same are as given below:

Name of the Minor/Honors (Hons.)/Specialization Degree	**B.Tech Program whose students are eligible to opt for Minor Degree**	**B.Tech Program whose students are eligible to opt for Honors (Hons.)/Specialization**
Robotics	All Branches except Mechanical Engineering, Electronics and Communication Engineering, Electrical Engineering	Mechanical Engineering, Electronics and Communication Engineering, Electrical Engineering

(C) Minor correction in the Course Title of B. Tech Mechanical Engineering 2nd Year from Academic Session 2025-26.

Course Code	**Existing Course Title**	**Corrected Course Title**
PEC-ME-216A	CNC Machining	CNC Technology

The Academic Council may consider the recommendations of the Board of Studies of Mechanical Engineering mentioned above at (A)-(C) for approval.

AC 4.5 **To consider the recommendations of the Board of Studies of Electronics and Communication Engineering in its meeting held on 27.12.2025.**

The Board of Studies of Electronics and Communication Engineering vide Reso. No. 3.3 and 3.4 of its meeting held on 27.12.2025 **(Annexure 4.5a, Pages 77-79)** approved the

(A) Scheme of Examinations and Syllabus of Minor/ Honors (Hons.)/ Specialization in VLSI Design and Technology from Academic Session 2025-26 **(Annexure 4.5b, Pages 80-97)**

Name of the Minor/Honors (Hons.)/Specialization Degree	**B.Tech Program whose students are eligible to opt for Minor Degree**	**B.Tech Program whose students are eligible to opt for Honors (Hons.)/Specialization**
VLSI Design	All Branches except Electronics and Communication Engineering	Electronics and Communication Engineering

(B) Scheme of Examinations and Syllabus of Certificate Course on "IOT Fundamentals and its Applications" from Academic Session 2025-26 **(Annexure 4.5c, Pages 98-101)**.

The Academic Council may consider the recommendations of the Board of Studies of Electronics and Communication Engineering mentioned above at (A)-(B) for approval.

AC 4.6 **To consider the recommendations made by the Board of Studies of Computer Science and Engineering in its meeting held on 27.12.2025.**

To consider the recommendations made by the Board of Studies of Computer Science and Engineering vide Reso. No. 3.3, 3.4 and 3.5 of its meeting held on 27.12.2025 **(Annexure 4.6a, Pages 102-105)** approved the

(A) Scheme of Examinations and Syllabus of Certificate Course on "Generative Artificial Intelligence" from Academic Session 2025-26 **(Annexure 4.6b. Pages 106-112)**.

(B) Scheme of Examinations and Syllabus

a. Minor/Honors (Hons.)/Specialization in "Cyber Security" **(Annexure 4.6c, Pages 113-130)**
b. Minor Degree in "Data Science" **(Annexure 4.6d, Pages 131-148)**
c. Minor Degree in "Artificial Intelligence and Machine Learning" **(Annexure 4.6e, Pages 149-167)** from Academic Session 2025-26.

Name of the Minor/Honors (Hons.)/Specialization Degree	**B.Tech Program whose students are eligible to opt for Minor Degree**	**B.Tech Program whose students are eligible to opt for Honors (Hons.)/Specialization**
Cyber Security	All Branches except Computer Science and Engineering, Computer Science and Engineering (Data Science), Computer Science and Engineering (Artificial Intelligence and Machine Learning)	Computer Science and Engineering, Computer Science and Engineering (Data Science), Computer Science and Engineering (Artificial Intelligence and Machine Learning)
Data Science	All Branches except Computer Science and Engineering, Computer Science and Engineering (Data Science), Computer Science and Engineering (Artificial Intelligence and Machine Learning)	-------

Artificial Intelligence and Machine Learning	All Branches except Computer Science and Engineering, Computer Science and Engineering (Data Science), Computer Science and Engineering (Artificial Intelligence and Machine Learning)	-------

(C) Amendment in the Course Objectives and Course Outcomes for Course Code PCC-CSE-210A 2nd Year from Academic Session 2025-26.

Course Code PCC-CSE-210A	
Existing Course Objectives	**Revised Course Objectives**
The objectives of this course are • To introduce Python programming basics, including syntax, data types, and control structures. • To develop skills in Python data structures, functions, and recursion. • To explore Python's graphical programming, image processing, and GUI development. • To explain object-oriented programming, exception handling, and multithreading concepts.	The objectives of this course are • To introduce the fundamental concepts, history, and problem-solving nature of artificial intelligence. • To provide an understanding of core AI techniques for search, knowledge representation, reasoning, planning, and learning. • To develop the ability to apply appropriate AI methods to solve representative computational problems. • To familiarize students with modern AI systems, expert systems, neural networks, and emerging trends in artificial intelligence.
Existing Course Outcomes	**Revised Course Outcomes**
CO1: Recall fundamental Python programming concepts including syntax, data types, control structures, functions, object-oriented principles, and multithreading. **CO2:** Explain the use of Python data structures, file operations, graphical libraries, and GUI components for developing structured programs. **CO3:** Solve real life problem by developing Python programs using logic, functions, graphics, OOP, and multithreading. **CO4:** Analyze programming constructs and design techniques for efficient Python applications.	**CO1:** Define fundamental concepts of artificial intelligence, problem characteristics, knowledge representation, learning paradigms, and current AI trends. **CO2:** Explain search strategies, knowledge representation schemes, reasoning under uncertainty, planning approaches, and learning methods used in artificial intelligence. **CO3:** Apply appropriate AI techniques such as search algorithms, logical reasoning, probabilistic methods, and learning models to solve representative AI problems. **CO4:** Analyze AI problems to select suitable problem-solving, reasoning, planning, or learning approaches and evaluate their effectiveness.

The Academic Council may consider the recommendations of the Board of Studies of Computer Science and Engineering mentioned above from (A)-(C) for approval.

AC 4.7 **To consider the recommendations made by the Board of Studies of Electrical Engineering in its meeting held on 26.12.2025**

To consider the recommendations made by the Board of Studies of Electrical Engineering vide Reso. No. 3.3, 3.4 and 3.5 of its meeting held on 26.12.2025 **(Annexure 4.7a, Pages 168-170)** approved the

(A) Scheme of Examinations and Syllabus of Certificate Course on "Solar PV Installation and Maintenance" from Academic Session 2025-26 **(Annexure 4.7b, Pages 171-173).**

(B) Scheme of Examinations and Syllabus of Minor Degree/Honors (Hons.)/Specialization in "Electric Vehicles" from Academic Session 2025-26 **(Annexure 4.7c, Pages 174-188)**

Name of the Minor/Honors (Hons.)/Specialization Degree	**B.Tech Program whose students are eligible to opt for Minor Degree**	**B.Tech Program whose students are eligible to opt for Honors (Hons.)/Specialization**
Electric Vehicles	All Branches except Electrical Engineering, Mechanical Engineering	Electrical Engineering, Mechanical Engineering

(C) Minor correction in the Course Codes of two courses of B. Tech Electrical Engineering 2nd Year from Academic Session 2025-26

Course Code	**Course Title**
PCC-EE-209A	Electrical Engineering Materials
PCC-EE-201A	Analog Electronics

The Academic Council may consider the recommendations of the Board of Studies Electrical Engineering mentioned above from (A)-(C) for approval.

AC 4.8 **To consider the recommendations made by the Board of Studies of Civil Engineering in its meeting held on 23.12.2025**

The Board of Studies of Civil Engineering vide Reso. No. 3.3 and 3.4 of its meeting held on 23.12.2025 **(Annexure 4.8a, Pages 189-191)** approved the

(A) Scheme of Examinations and Syllabus of Certificate Course on "Building Drawing, Drafting and Quality Estimation" from Academic Session 2025-26 **(Annexure 4.8b, Pages 192-194).**

(B) Scheme of Examinations and Syllabus of Minor Degree/Honors (Hons.)/Specialization in "Green Technology and Sustainability Engineering" from Academic Session 2025-26 **(Annexure 4.8c, Pages 195-210)**

Name of the Minor/Honors (Hons.)/Specialization Degree	**B.Tech Program whose students are eligible to opt for Minor Degree**	**B.Tech Program whose students are eligible to opt for Honors (Hons.)/Specialization**
Green Technology and Sustainability Engineering	All Branches except Civil Engineering	Civil Engineering

The Academic Council may consider the recommendations of the Board of Studies Civil Engineering mentioned above from (A)-(B) for approval.

AC 4.9 **To consider the recommendations made by the Board of Studies of Applied Science and Humanities in its meeting held on 11.02.2026**

The Board of Studies of Applied Science and Humanities vide Reso. No. 3.3 and 3.4 of its meeting held on 11.02.2026 **(Annexure 4.9a, Pages 211-213)** approved the

(A) Examination Pattern (Examiner note for paper Setting **(Annexure 4.9b, Page 214).**

(B) Minor Correction in the Syllabus, Course Code, Course Objectives and Course Outcomes of Engineering Mathematics-III for B.Tech Electrical Engineering 4th Sem **(Annexure 4.9c, Pages 215-219)**.

The Academic Council may consider the recommendations of the Board of Studies Applied Science and Humanities mentioned above from (A)-(B) for approval.

AC 4.10 **To consider the recommendations made by the Board of Studies of Management in its meeting held on 26.12.2025**

The Board of Studies of Management vide Reso. No. 3.3, 3.5 (a)-(c), 3.7 (a)-(b) and 3.8 of its meeting held on 26.12.2025 **(Annexure 4.10a, Pages 220-224)** approved the

(A) Scheme of Examinations and Syllabus of 4th Semester of MBA Programme from Academic Session 2025-26 **(Annexure 4.10b, Pages 225-334)**

(B) (i) Amendment in Credit Structure and Course Category under Scheme-A (BBA, BBA (Honours), and BBA (Honours with Research).

Existing Credit Structure of the BBA (A-Scheme) Program for 2024-25				
Sr. No.	Category	Breakup of Credits		
		BBA	BBA (H)	BBA (With Research)
1	Discipline-Specific Courses (DSC) /Major Course	76	116	104
2	Minor (MIC)/ Minor Vocational (MICV)/ Skill Enhancement Courses (SEC)/Internship	37	45	45
3	Multidisciplinary Courses	09	09	09
4	Ability Enhancement Course	08	08	08
5	Value Added Course	06	06	06
6	Research Project/Dissertation			12
	Total Credits	**136**	**184**	**184**

Amended credit structure of the BBA (A-Scheme)Program w.e.f. 2025-26				
Sr. No.	Category	Breakup of Credits		
		BBA	BBA (H)	BBA (Honors with Research)
1	Discipline-Specific Courses (DSC)/Major Course	76	116	104
2	Minor (MIC)/ Minor Vocational (MICV)/ Skill Enhancement Courses (SEC)/Internship	37	45	45
3	Multidisciplinary Courses	09	09	09
4	Ability Enhancement Course	08	08	08
5	Value Added Course	06	06	06
6	Research Project/Dissertation	04	04	16
	Total Credits	**140**	**188**	**188**

(ii) Scheme of Studies and Examinations of BBA (A-Scheme), BBA (Honours), and BBA (Honours with Research) from 4th Semester onwards and syllabus of BBA 4th semester **(Annexure 4.10c, Pages 335-366).**

(iii) Scheme of Examinations of BBA (B-Scheme) from 1st - 8th Semester and Syllabus of 2nd Semester BBA (B-Scheme) **(Annexure 4.10d, Pages 367-401).**

(C) (i) Scheme of Examinations and Syllabus of Certificate Course on "Digital Marketing" from Academic Session 2025–26 **(Annexure 4.10e, Pages 402-404).**

(ii) Scheme of Examinations and Syllabus of Certificate Course on "Tally ERP 9" from Academic Session 2025–26 **(Annexure 4.10f, Pages 405-407).**

(D) Ordinance of MBA Programme from Academic Session 2025-26 **(Annexure 4.10g Pages 408-416).**

The Academic Council may consider the recommendations of the Board of Studies Management Department mentioned above from (A)-(D) for approval.

AC 4.11 **To consider the recommendations made by the Board of Studies of Computer Science and Applications in its meeting held on 26.12.2025**

The Board of Studies of Computer Science and Applications vide Reso. No. 3.3, 3.4, 3.7 (a)-(b) and 3.8 of its meeting held on 26.12.2025 **(Annexure 4.11a, Pages 417-420)** approved the

(A) Scheme of Examinations and Syllabus of Certificate Courses on "Blockchain Application Development" and "Web Development & Marketing" from Academic Session 2025-26 **(Annexure 4.11b, Pages 421-430)**.

(B) (i) Revised Scheme of Examinations of BCA 2nd year and 3rd year and syllabus of Ability Enhancement Course, Value Added Course, Discipline Specific Course-Minor Course and Major Discipline Relevant Course (Vocational)–Minor Course (A-Scheme) w.e.f 2025-26 **(Annexure 4.11c, Pages 431-453)**.

(ii) Approval of the Scheme of Examinations of BCA (1st to 8th Semester) B-Scheme and Syllabus of BCA 2nd semester (B Scheme) w.e.f 2025-26 **(Annexure 4.11d, Pages 454-495)**.

(C) Correction in the Course Code of Open Elective Courses (OEC) MCA 3rd Semester **(Annexure 4.11e, Page 496)**.

The Academic Council may consider the recommendations of the Board of Studies of Computer Science and Applications Department mentioned above from (A)-(C) for approval.

AC 4.12 **Any other item with the permission of Chair**

Member Secretary
Academic Council

Annexure 4.1

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, JHAJJAR
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MINUTES OF THE 3rd MEETING OF THE ACADEMIC COUNCIL HELD ON 03.07. 2025 AT 11.00 AM IN THE BOARD ROOM OF THE INSTITUTE

Members Present

1.	Prof. Aman Aggarwal	Chairperson Director, GITAM
2.	Prof. Yudhvir Singh	Member (University Nominee)
3.	Prof. Rajeev Kumar	Member (University Nominee)
4.	Prof. Seema Singh	Member (University Nominee)
5.	Prof. Gian Bhushan	Member (Academia)
6.	Mr. Rajesh Sharma	Member (Industry Expert)
7.	Dr. Anurag Jain	Member
8.	Dr. Punam Devi	Member
9.	Dr. Rakesh Joon	Member
10.	Dr. Nitin Kumar	Member
11.	Dr. Jitender Kumar	Member
12.	Mr. Joginder Singh	Member
13.	Mr. Vivek	Member
14.	Mr. Jitender Singh	Member
15.	Mr. Virender Singh Rana	Member
16.	Ms. Suman Singh	Member
17.	Dr. Dipika	Member
18.	Dr Hari Parshad	Member
19.	Ms. Upasna	Member
20.	Mr. Parvesh	Member
21.	Dr. Hitanshu Saluja	Member
22.	Dr. Vivek Arora	Member Secretary

At the outset, the Director, GITAM welcomed the members to the 3rd Meeting of the Academic Council. After that, with due permission of the chair, the agenda was taken up by the Registrar.

AC 3.1 **Confirmation of the minutes of meeting of the Academic Council held on 25.01.2025.**

RESOLVED THAT THE MINUTES OF MEETING OF THE ACADEMIC COUNCIL HELD ON 25.01.2025 (ANNEXURE 3.1, PAGES 1-5 ALREADY CIRCULATED) BE CONFIRMED.

AC 3.2 **Follow-up action report on the decisions taken in the meeting of the Academic Council held on 25.01.2025.**

RESOLVED THAT THE FOLLOW-UP ACTION ON THE DECISIONS TAKEN BY THE ACADEMIC COUNCIL IN ITS MEETING HELD ON 25.01.2025 (ANNEXURE 3.2, PAGES 6-8 ALREADY CIRCULATED) BE NOTED.

AC 3.3 **Considered the recommendations of Board of Studies of Fire Technology and Safety made vide Reso. 2.3 and 2.5 of its meeting held on 26.05.2025 (Annexure 3.3 Pages 9-12) that**

(A) Scheme of Examinations and Syllabus of 2nd Year B.Tech Fire Technology and Safety **(Annexure 3.4 Pages 13-59).**

(B) Proposal to start the Certificate Course on Environmental, Social and Governance (ESG) with an Intake of 30 seats **(Annexure 3.5 Pages 60-62).**

RESOLVED THAT THE RECOMMENDATIONS MADE BY BOARD OF STUDIES OF FIRE TECHNOLOGY AND SAFETY DEPARTMENT AS MENTIONED AT (A) AND (B) BE APPROVED.

AC 3.4 **Considered the recommendations of Board of Studies of Mechanical Engineering Department made vide Reso. 2.3, 2.4, 2.5, 2.6, 2.7 and 2.8 of its meeting held on 24.05.2025 (Annexure 3.6, Pages 63-66) that**

(A) Minor changes in the Scheme of Examinations and Syllabus of 1st Year M.Tech Machine Design and M.Tech Manufacturing and Automation *w.e.f.* 2025-26

(a) M.Tech Machine Design 1st Year

Name of the Course	Existing Course Code	Amended Course Code
Materials Management	PEC-MTMD-114A	PEC-MTME-116A
Finite Element Methods	PEC-MTMD-118A	PEC-MTME-118A
Design of Pressure Vessels	PEC-MTMD-116A	PEC-MTME-114A
Seminar-I	SM-MT-115A	SM-MTMD-115A
Seminar-II	SM-MT-110A	SM-MTMD-110A

b) M.Tech Manufacturing and Automation 1st Year

Name of the Course	Existing Course Code	Amended Course Code
Artificial Intelligence in Manufacturing	PEC-MTMA-116A	PEC-MTMA-114A
Finite Element Methods	PEC-MTMA-114A	PEC-MTME-118A
Seminar-I	SM-MT-115A	SM-MTMA-115A
Seminar-II	SM-MT-110A	SM-MTMA-110A

(B) Addition of one Professional Elective Course on *"Materials Management"* in 2nd Semester of M.Tech Manufacturing and Automation *w.e.f.* 2025-26 **(Annexure 3.7, Pages 67-68).**

(C) Scheme of Examinations and Syllabus of 2nd year M.Tech Manufacturing & Automation for *w.e.f.* 2025-26 **(Annexure 3.8, Pages 69-89).**

(D) Scheme of Examinations and Syllabus of 2nd year M.Tech in Machine Design *w.e.f.* 2025-26 **(Annexure 3.9, Pages 90-114).**

(E) Multidisciplinary Open Elective-II Courses (Offered by Mechanical Engineering Department for various PG Programs running in the Institute) *w.e.f.* 2025-26 **(Annexure 3.10, Pages 115-118)**.

(F) Scheme of Examinations and Syllabus of 2nd year B.Tech Mechanical Engineering *w.e.f.* 2025-26 **(Annexure 3.11, Pages 119-171)**.

RESOLVED THAT THE RECOMMENDATIONS OF THE BOARD OF STUDIES OF MECHANICAL ENGINEERING DEPARTMENT AS MENTIONED AT (A)-(F) BE APPROVED.

AC 3.5 **Considered the recommendations of Board of Studies of Electronics and Communication Engineering Department made vide Reso. 2.3, 2.4, 2.5 and 2.6 of its meeting held on 24.05.2025 (Annexure 3.12, Pages 172-175) that**

(A) Amendment in the Course Titles and Course Contents of 1st Year M.Tech Electronics and Communication Engineering *w.e.f.* 2025-26 **(Annexure 3.13, Pages 176-183)**.

(B) Scheme of Examinations and Syllabus of 2nd year M.Tech Electronics and Communication Engineering *w.e.f.* 2025-26 **(Annexure 3.14, Pages 184-210)**.

(C) Multidisciplinary Open Elective-II Courses (Offered by Electronics and Communication Engineering Department for various PG Programs running in the Institute) *w.e.f.* 2025-26 **(Annexure 3.15, Pages 211-213)**.

(D) Scheme of Examinations and Syllabus of 2nd year B.Tech Electronics and Communication Engineering *w.e.f.* 2025-26 **(Annexure 3.16, Pages 214-267)**.

RESOLVED THAT THE RECOMMENDATIONS OFTHE BOARD OF STUDIES OF ELECTRONICS AND COMMUNICATION ENGINEERING DEPARTMENT AS MENTIONED AT (A)-(D) BE APPROVED.

AC 3.6 **Considered the recommendations of Board of Studies of Computer Science and Engineering Department made vide Reso. 2.3, 2.4, 2.5 and 2.6 of its meeting held on 28.05.2025 (Annexure 3.17, Pages 268-272) that**

(A) Scheme of Examinations and Syllabus of 2nd year M.Tech Computer Science and Engineering *w.e.f.* 2025-26 **(Annexure 3.18, Pages 273-298).**

(B) Scheme of Examinations and Syllabus of 2nd year M.Tech Cyber Forensics and Information Security *w.e.f.* 2025-26 **(Annexure 3.19, Pages 299-324).**

(C) Multidisciplinary Open Elective-II Courses (Offered by Computer Science and Engineering Department for various PG Programs running in the Institute) *w.e.f.* 2025-26 **(Annexure 3.20, Pages 325-327).**

(D) Scheme of Examinations and Syllabus of 2nd year B.Tech Computer Science and Engineering common with B.Tech Computer Science and Engineering (Artificial Intelligence and Machine Learning) and B.Tech Computer Science and Engineering (Data Science) *w.e.f.* 2025-26 **(Annexure 3.21, Pages 328-381).**

RESOLVED THAT THE RECOMMENDATIONS OF THE BOARD OF STUDIES OF COMPUTER SCIENCE AND ENGINEERING DEPARTMENT AS MENTINED AT (A)-(D) BE APPROVED.

AC 3.7 **Considered the recommendations of Board of Studies of Electrical Engineering Department made vide Reso. 2.3, 2.4 and 2.6.2 of its meeting held on 27.05.2025 (Annexure 3.22, Pages 382-384) that**

(A) Scheme of Examinations and Syllabus of 2nd year B.Tech Electrical Engineering *w.e.f.* 2025-26 **(Annexure 3.23, Pages 385-436)**

(B) Scheme of Examinations and Syllabus of 2nd year M.Tech Electrical Power Systems for *w.e.f.* 2025-26 **(Annexure 3.24, Pages 437-455)**

(C) Multidisciplinary Open Elective-II Courses (Offered by Electrical Engineering Department for various PG Programs running in the Institute) *w.e.f.* 2025-26 **(Annexure 3.25, Pages 456-459)**

RESOLVED THAT THE RECOMMENDATIONS OF THE BOARD OF STUDIES OF ELECTRICAL ENGINEERING DEPARTMENT AS MENTIONED AT (A)-(C) BE APPROVED.

AC 3.8 **Considered the recommendations of Board of Studies of Civil Engineering Department made vide Reso. 3, 4, 5 and 6 of its meeting held on 25.05.2025 (Annexure 3.26, Pages 460-463) that**

(A) Addition of One Course in 1st Year M.Tech Structural Design w.e.f. 2025-26 **(Annexure 3.27, Pages 464-465).**

(B) Scheme of Examinations and Syllabus of 2nd year M.Tech Structural Design *w.e.f.* 2025-26 **(Annexure 3.28, Pages 466-488).**

(C) Multidisciplinary Open Elective-II Courses (Offered by Civil Engineering Department) for various PG Programs running in the Institute *w.e.f.* 2025-26 **(Annexure 3.29, Pages 489-492).**

(D) Scheme of Examinations and Syllabus of 2nd year B.Tech Civil Engineering *w.e.f.* 2025-26 **(Annexure 3.30, Pages 493-534).**

RESOLVED THAT THE RECOMMENDATIONS OF THE BOARD OF STUDIES OF CIVIL ENGINEERING DEPARTMENT AS MENTIONED AT (A)-(D) BE APPROVED.

AC 3.9 **Considered the recommendations of Board of Studies of Applied Science and Humanities Department made vide Reso. 2.3 and 2.4 of its meeting held on 27.05.2025 (Annexure 3.31, Pages 535-538) that**

Ordinance, Scheme of Examinations and Syllabus of B.Tech 1st year (Scheme-B) as per NEP 2020 *w.e.f.* 2025-26 common for

- B.Tech in Civil Engineering,
- B.Tech Computer Science and Engineering,
- B.Tech Computer Science and Engineering (Artificial Intelligence & Machine Learning),
- B.Tech Computer Science and Engineering (Data Science),
- B.Tech Electrical Engineering,
- B.Tech Electronics and Communication Engineering,
- B.Tech Fire Technology and Safety Engineering
- B.Tech Mechanical Engineering **(Annexure 3.32, Pages 539-636).**

RESOLVED THAT THE RECOMMENDATIONS OF THE BOARD OF STUDIES OF APPLIED SCIENCE AND HUMANITIES DEPARTMENT AS MENTIONED ABOVE BE APPROVED.

AC 3.10 **Considered the recommendations of Board of Studies of Management Department made vide Reso. 2.3, 2.4, 2.5 and 2.7 of its meeting held on 27.05.2025 (Annexure 3.33, Pages 637-640) that**

(A) Changes in the Credit Structure of the Master of Business Administration (MBA) Program *w.e.f.* 2025-26

Existing credit structure of the MBA Program for 2024-25				
Sr. No.	**Category**	**Only Course Work Breakup of Credits**	**Course Work with Research**	**Only Research work**
1	Discipline Specific Courses	80	60	40
2	Skill Enhancement Courses/ Vocational Courses/ Internship/ Project Work/ Thesis	16	36	56
Total Credits		**96**	**96**	**96**
Amended credit structure of the MBA Program w.e.f. 2025-26				
Sr. No.	**Category**	**Only Course Work Breakup of Credits**	**Course Work with Research**	**Only Research work**
1	Discipline Specific Courses	48	44	40
2	Discipline Elective Courses	32	16	-
3	Skill Enhancement Courses/ Vocational Courses/ Internship/ Project Work/ Thesis	16	36	56
Total Credits		**96**	**96**	**96**

(B) Scheme of Examinations and Syllabus of Bachelor of Business Administration (BBA) 3rd Semester (A Scheme) and BBA 1st Semester (B Scheme) *w.e.f.* 2025-26 **(Annexure 3.34, Pages 641-705).**

(C) Scheme of Examinations and Syllabus of Master of Business Administration (MBA) 3rd Semester *w.e.f.* 2025-26 **(Annexure 3.35, Pages 706-818).**

RESOLVED THAT THE RECOMMENDATIONS OF THE BOARD OF STUDIES OF MANAGEMENT DEPARTMENT FROM (A)-(C) BE APPROVED.

AC 3.11 **Considered the recommendations of Board of Studies of Computer Science and Applications made vide Reso. 2.3(a), 2.3(b) and 2.4 of its meeting held on 23.05.2025 (Annexure 3.36, Pages 819-822) that**

(A) Scheme of Examinations and Syllabus of Master of Computer Applications (MCA) 2nd Year *w.e.f.* 2025-26 **(Annexure 3.37, Pages 823-880).**

(B) Amendment in the Course Name of MCA 1st Year (2nd Semester) *w.e.f.* 2025-26

Existing Course Name	Course Code	Amended Course Name	Semester	Course Category
Digital Design & Computer Architecture	DSEC-MCA-111A	Computer Organization and Architecture	I	Elective-I
Computer Networks and Distributed System	DSEC-MCA-116A	Computer Network	II	Elective-IV
Advance Computer Architecture and Quantum Computing	DSEC-MCA-118A	Advance Computer Architecture	II	Elective-IV

(C) Scheme of Examinations and Syllabus of Bachelor of Computer Applications (BCA) 2nd Year (A-Scheme) *w.e.f.* 2025-26 **(Annexure 3.38, Pages 881-918).**

(D) Scheme of Examinations and Syllabus of BCA 1st Sem (B- Scheme) *w.e.f.* 2025-26 **(Annexure 3.39, Pages 919-960).**

RESOLVED THAT THE RECOMMENDATIONS OF THE BOARD OF STUDIES OF COMPUTER SCIENCE AND APPLICATIONS DEPARTMENT AS MENTIONED AT (A) -(C) BE APPROVED.

AC 3.12 **Considered the recommendations of Academic committee of the Institute made vide Reso. 1, 2 and 3 of its meeting held on 17.05.2025 (Annexure 3.40, Pages 961-977) that**

(A) **Proposal to offer B.Tech in Computer Science and Engineering, B.Tech in Fire Technology and Safety Engineering, M.Tech in Computer Science and Engineering, and MBA Programs for with an intake of 60 seats in each course (as supernumerary seats) for working professionals from the Academic Year 2025-26, modalities and guidelines, Infrastructure and Faculty requirements as per AICTE guidelines.**

The Institute got approval for running of under graduate and post graduate programs for working professionals from AICTE vide **F. No. North-West/1-44641001793/ 2025/EOA** on dated 03.04.2025.

Level	Program	Course	Approved Intake 2025-26
UNDER GRADUATE	ENGINEERING AND TECHNOLOGY	COMPUTER SCIENCE AND ENGINEERING	60
UNDER GRADUATE	ENGINEERING AND TECHNOLOGY	FIRE TECHNOLOGY AND SAFETY	60
POST GRADUATE	ENGINEERING AND TECHNOLOGY	COMPUTER SCIENCE AND ENGINEERING	60
POST GRADUATE	MANAGEMENT	MBA	60

And as per **Clause 10.2 (Page No. 15)** of UGC regulations for Autonomous college (Gazetted notification) "*An autonomous college is free to start a new*

degree programme(s) at undergraduate and postgraduate levels with the approval of the Academic Council of the Autonomous College and concerned Statutory Council(s), wherever required, provided the nomenclature of the degree is in consonance with UGC Notification on Specification of Degrees, 2014 as amended from time to time. Such courses shall fulfill the minimum standards prescribed by the parent university/UGC/Statutory Council(s) in terms of number of hours, curricular content and standards, and the parent University shall be duly informed of such courses" **(Annexure 3.40, Pages 961-976).**

RESOLVED THAT THE RECOMMENDATIONS OF THE ACADEMIC COMMITTEE TO START ABOVE COURSES FOR WORKING PROFESSIONALS WITH AN INTAKE OF 60 SEATS IN EACH COURSE BE APPROVED.

(B) **Considered the proposal made vide Reso 4 of its meeting held on 17.05.2025 regarding offering of B.Tech Honours/Minor as per AICTE Guidelines**

RESOLVED THAT THE ABOVE PROPOSAL TO OFFER B.TECH HONOURS/MINOR AS PER AICTE GUIDELINES WILL BE TAKEN UP IN THE NEXT MEETING OF THE ACADEMIC COUNCIL WITH ALL MODALITIES AND GUIDELINES.

(C) **Academic Calendar for the Academic Year 2025-26 proposed by Academic Committee of the Institute vide Reso. No. 5 of its meeting held on 17.05.2025 (Annexure 3.40 Page 977).**

RESOLVED THAT THE ACADEMIC CALENDAR FOR THE ACADEMIC YEAR 2025-26 BE APPROVED.

AC 3.13 **Considered the recommendations of the Examination Cell of its meeting held on 06.06.2025 regarding conduct of Special Examinations in the month of August- September every year for the students who got reappear in the previous examinations (Annexure 3.41, Pages 978-979).**

RESOLVED THAT THE RECOMMENDATIONS OF THE EXAMINATION CELL BE APPROVED.

AC 3.14 **Any other item with the permission of Chair**

Member Secretary
Academic Council

Chairperson
Academic Council

Annexure 4.2

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, JHAJJAR
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Report of the follow-up action on the decisions taken by the Academic Council in its meetings held on 03.07.2025.

Reso. No.	Particulars	Follow-up action taken
AC 3.1	Confirmation of the minutes of 2nd meeting of the Academic Council held on 25.01.2025.	The minutes of 2nd meeting of the Academic Council were confirmed.
AC 3.2	Follow-up action report on the decisions taken in the meeting of the Academic Council held on 25.01.2025.	The Council noted the follow-up action.
AC 3.3	Considered the recommendations of Board of Studies of Fire Technology and Safety Department made vide Reso. 2.3 and 2.5 of its meeting held on 26.05.2025 that A) Scheme of Examinations and Syllabus of 2nd Year B.Tech Fire Technology and Safety. B) Proposal to start the Certificate Course on Environmental, Social and Governance (ESG) with an Intake of 30 seats.	The recommendations of the Board of Studies of Fire Technology and Safety Department were approved vide **Reso. No. AC 3.3 (A) & (B)** of its meeting held on 03.07.2025 and communicated to the concerned department.
AC 3.4	Considered the recommendations of Board of Studies of Mechanical Engineering Department made vide Reso. 2.3, 2.4, 2.5, 2.6, 2.7 and 2.8 of its meeting held on 24.05.2025 that A) Minor changes in the Scheme of Examinations and Syllabus of 1st Year M.Tech Machine Design and M.Tech Manufacturing and Automation *w.e.f.* 2025-26. B) Addition of one Professional Elective Course on "Materials Management" in 2nd Semester of M.Tech Manufacturing and Automation w.e.f. 2025-26 C) Scheme of Examinations and Syllabus of 2nd year M.Tech Manufacturing & Automation for w.e.f. 2025-26 D) Scheme of Examinations and Syllabus of 2nd year M.Tech in Machine Design w.e.f. 2025-26 E) Multidisciplinary Open Elective-II Courses (Offered by Mechanical Engineering Department for various PG Programs running in the Institute). F) Scheme of Examinations and Syllabus of 2nd year B.Tech Mechanical Engineering w.e.f. 2025-26.	The recommendations of the Board of Studies of Mechanical Engineering Department were approved vide **Reso. No. AC 3.4 (A)- (F)** of its meeting held on 03.07.2025 and communicated to the concerned department.
AC 3.5	Considered the recommendations of Board of Studies of Electronics and Communication Engineering Department made vide Reso. 2.3, 2.4, 2.5 and 2.6 of its meeting held on 24.05.2025 that	The recommendations of the Board of Studies of Electronics and Communication Engineering Department were

	A) Amendment in the Course Titles and Course Contents of 1st Year M.Tech Electronics and Communication Engineering *w.e.f.* 2025-26. B) Scheme of Examinations and Syllabus of 2nd year M.Tech Electronics and Communication Engineering w.e.f. 2025-26. C) Multidisciplinary Open Elective-II Courses (Offered by Electronics and Communication Engineering Department for various PG Programs running in the Institute) w.e.f. 2025-26. D) Scheme of Examinations and Syllabus of 2nd year B.Tech Electronics and Communication Engineering w.e.f. 2025-26.	approved vide **Reso. No. AC 3.5 (A)- (D)** of its meeting held on 03.07.2025 and communicated to the concerned department.
AC 3.6	Considered the recommendations of Board of Studies of Computer Science and Engineering Department made vide Reso. 2.3, 2.4, 2.5 and 2.6 of its meeting held on 28.05.2025 that A) Scheme of Examinations and Syllabus of 2nd year M.Tech Computer Science and Engineering w.e.f. 2025-26. B) Scheme of Examinations and Syllabus of 2nd year M.Tech Cyber Forensics and Information Security w.e.f. 2025-26. C) Multidisciplinary Open Elective-II Courses (Offered by Computer Science and Engineering Department for various PG Programs running in the Institute) w.e.f. 2025-26 D) Scheme of Examinations and Syllabus of 2nd year B.Tech Computer Science and Engineering common with B.Tech Computer Science and Engineering (Artificial Intelligence and Machine Learning) and B.Tech Computer Science and Engineering (Data Science) w.e.f. 2025-26.	The recommendations of the Board of Studies of Computer Science and Engineering Department were approved vide **Reso. No. AC 3.6 (A)- (D)** of its meeting held on 03.07.2025 and communicated to the concerned department.
AC 3.7	Considered the recommendations of Board of Studies of Electrical Engineering Department made vide Reso. 2.3, 2.4 and 2.6.2 of its meeting held on 27.05.2025 that A) Scheme of Examinations and Syllabus of 2nd year B.Tech Electrical Engineering w.e.f. 2025-26. B) Scheme of Examinations and Syllabus of 2nd year M.Tech Electrical Power Systems for w.e.f. 2025-26. C) Multidisciplinary Open Elective-II Courses (Offered by Electrical Engineering Department for various PG Programs running in the Institute) w.e.f. 2025-26.	The recommendations of the Board of Studies of Electrical Engineering Department were approved vide **Reso. No. AC 3.7 (A)- (C)** of its meeting held on 03.07.2025 and communicated to the concerned department.
AC 3.8	Considered the recommendations of Board of Studies of Civil Engineering Department made vide Reso. 3, 4, 5 and 6 of its meeting held on 25.05.2025 that A) Addition of One Course in 1st Year M.Tech Structural Design w.e.f. 2025-26.	The recommendations of the Board of Studies of Civil Engineering Department were approved vide **Reso. No. AC 3.8 (A)- (D)** of its meeting held on

	B) Scheme of Examinations and Syllabus of 2nd year M.Tech Structural Design w.e.f. 2025-26. C) Multidisciplinary Open Elective-II Courses (Offered by Civil Engineering Department) for various PG Programs running in the Institute w.e.f. 2025-26. D) Scheme of Examinations and Syllabus of 2nd year B.Tech Civil Engineering w.e.f. 2025-26.	03.07.2025 and communicated to the concerned department.
AC 3.9	Considered the recommendations of Board of Studies of Applied Science and Humanities Department made vide Reso. 2.3 and 2.4 of its meeting held on 27.05.2025 that Ordinance, Scheme of Examinations and Syllabus of B.Tech 1st year (Scheme-B) as per NEP 2020 w.e.f. 2025-26 common for B.Tech Civil Engineering, Computer Science and Engineering, Computer Science and Engineering (Artificial Intelligence & Machine Learning), Computer Science and Engineering (Data Science), Electrical Engineering, Electronics and Communication Engineering, Fire Technology and Safety Engineering, Mechanical Engineering.	The recommendations of the Board of Studies of Applied Science and Humanities Department were approved vide **Reso. No. AC 3.9** of its meeting held on 03.07.2025 and communicated to the concerned department.
AC 3.10	Considered the recommendations of Board of Studies of Management Department made vide Reso. 2.3, 2.4, 2.5 and 2.7 of its meeting held on 27.05.2025 that A) Changes in the Credit Structure of the Master of Business Administration (MBA) Program w.e.f. 2025-26. B) Scheme of Examinations and Syllabus of Bachelor of Business Administration (BBA) 3rd Semester (A Scheme) and BBA 1st Semester (B Scheme) w.e.f. 2025-26. C) Scheme of Examinations and Syllabus of Master of Business Administration (MBA) 3rd Semester w.e.f. 2025-26.	The recommendations of the Board of Studies of Management Department were approved vide **Reso. No. AC 3.10 (A)- (D)** of its meeting held on 03.07.2025 and communicated to the concerned department.
AC 3.11	Considered the recommendations of Board of Studies of Computer Science and Applications made vide Reso. 2.3(a), 2.3(b) and 2.4 of its meeting held on 23.05.2025 that A) Scheme of Examinations and Syllabus of Master of Computer Applications (MCA) 2nd Year w.e.f. 2025-26. B) Amendment in the Course Name of MCA 1st Year (2nd Semester) w.e.f. 2025-26. C) Scheme of Examinations and Syllabus of Bachelor of Computer Applications (BCA) 2nd Year (A-Scheme) w.e.f. 2025-26. D) Scheme of Examinations and Syllabus of BCA 1st Sem (B- Scheme) w.e.f. 2025-26.	The recommendations of the Board of Studies of Computer Science and Applications Department were approved vide **Reso. No. AC 3.11 (A)- (D)** of its meeting held on 03.07.2025 and communicated to the concerned department.
AC 3.12	Considered the recommendations of Academic committee of the Institute made vide Reso. 1, 2, 3, 4 and 5 of its meeting held on 17.05.2025 that A) Proposal to offer B.Tech in Computer Science and Engineering, B.Tech in Fire	The recommendations of the Academic committee of the Institute A) Regarding *"Proposal to offer B.Tech in Computer*

	Technology and Safety Engineering, M.Tech in Computer Science and Engineering, and MBA Programs for with an intake of 60 seats in each course (as supernumerary seats) for working professionals from the Academic Year 2025-26, modalities and guidelines, Infrastructure and Faculty requirements as per AICTE guidelines. B) Offering of B.Tech Honours/Minor Degree as per AICTE Guidelines. C) Academic Calendar for the Academic Year 2025-26.	*Science and Engineering, B.Tech in Fire Technology and Safety Engineering, M.Tech in Computer Science and Engineering, and MBA Programs for with an intake of 60 seats in each course (as supernumerary seats) for working professionals from the Academic Year 2025-26, modalities and guidelines, Infrastructure and Faculty requirements as per AICTE guideline"s*, **vide Reso. 3.12 (A)** were approved and the same was communicated to the affiliating University for necessary actions and same was approved by the University. B) The offering of B.Tech Honours/Minor Degree as per AICTE Guidelines was not approved and decided to taken in 4th Academic Council Meeting. C) The Academic Calendar for the Academic Year 2025-26 was approved and uploaded on the Institute website.
AC 3.13	Considered the recommendations of the Examination Cell of its meeting held on 06.06.2025 regarding conduct of Special Examinations in the month of August- September every year for the students who got reappear in the previous examinations.	The recommendations of the Examination Cell regarding *conduct of Special Examinations in the month of August- September every year for the students who got reappear in the previous examinations* were approved and communicated to the examination cell for further necessary actions.

Annexure 4.3 a

DEPARTMENT OF FIRE TECHNOLOGY AND SAFETY
GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, JHAJJAR
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MINUTES OF THE 3RD MEETING OF THE BOARD OF STUDIES HELD ON 22.12.2025 AT 2:00 PM IN THE MEETING ROOM OF THE DEPARTMENT

The 3rd Meeting of the Board of Studies of Fire Technology and Safety Department was held on 22nd Dec., 2025 at 2:00 PM in the meeting room of the Department.

Members Present:

- Dr. Jitender Kumar – Chairperson, BoS, Department of Fire Technology and Safety, GITAM
- Prof. Vineet Singla–Professor, UIET, MDU Rohtak (University Nominee)
- Sh. R.C. Sharma – Professor of Practice, IP University, Delhi (Retd. Director, Delhi Fire Service) Subject Expert outside the parent university
- Dr. Amir Ali Khan, NIDM, Delhi (In online mode)
- Mr. Sujit Kumar– Industry Expert, Vice President, BPTP
- Dr. Paramjeet – Professor (Mathematics), GITAM
- Dr. Dipika – Professor (Management), GITAM
- Dr. Sunil Kadiyan – Associate Professor, GITAM
- Mr. Nikhil Sikka – Assistant Professor, GITAM
- Mr. Manoj Kumar – Assistant Professor, GITAM
- Mr. Bhoop Singh – Assistant Professor, GITAM
- Mr. Vikas Goel – Assistant Professor, GITAM
- Mr. Vishnu – Assistant Professor, GITAM
- Mr. Rajkumar Ruhil, Assistant Professor, GITAM
- Dr. Suman Lata, Associate Professor, GITAM
- Dr. Aarti- Assistant Professor (Chemistry), GITAM

Agenda of the Meeting:

Item 3.1 Confirmation of the minutes of 2nd meeting of the Board of Studies of Fire Technology and Safety Department held on 26.05.2025.

Resolved that the minutes of 2nd meeting of the Board of Studies of Fire Technology and Safety Department held on 26.05.2025 **(Annexure 3.1 Pages 1-4 already circulated)** be confirmed.

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Item 3.2 Follow-up action report on the decisions taken in the 2nd meeting of the Board of Studies Fire Technology and Safety Department held on 26.05.2025.

Resolved that the follow-up action report on the decisions taken by the Board of Studies in the meeting held on 26.05.2025 **(Annexure 3.2 Pages 5 already circulated)** be noted.

Item 3.3 Scheme of Evaluation and Syllabus of Hons/ Specialization/Minor Degree in Industrial Safety and Hons/ Specialization/Minor Degree in Disaster Management

The introduction of Minor Degree programs in Hons/ Specialization/Minor Degree in Industrial Safety and Hons/ Specialization/Minor Degree in Disaster Management alongside the B.Tech. Fire Technology and Safety is academically justified and socially relevant. These minor programs will provide students with interdisciplinary exposure, strengthening their knowledge of hazard identification, risk assessment, industrial regulations, disaster preparedness, mitigation, and emergency response. The integration of these domains will enhance students' analytical, practical, and decision-making skills, thereby improving their employability in industries, infrastructure projects, emergency services, and regulatory bodies. From a societal perspective, the proposed minors will contribute to the development of competent safety professionals capable of reducing industrial accidents, improving disaster resilience, minimizing loss of life and property, and supporting sustainable and safe development.

Name of the Minor/Honors (Hons.)/Specialization Degree	**B.Tech Program whose students are eligible to opt for Minor Degree**	**B.Tech Program whose students are eligible to opt for Honors (Hons.)/Specialization**
Industrial Safety	All Branches except Fire Technology and Safety	---------
Disaster Management	All Branches except Fire Technology and Safety, Civil Engineering	Fire Technology and Safety, Civil Engineering

The Board of Studies considered and approved the Scheme of Evaluation and Syllabus of Minor degree/Specialization in Industrial Safety **(Annexure 3.3, Pages 6-26)** and Minor degree/Hons/Specialization in Disaster Management **(Annexure 3.4, Pages 27-43)** from Academic Session 2025-26.

Item 3.4 Review of Panel of Examiners for B.Tech Fire Technology and Safety

The BOS reviewed and approved the panel of examiners **(Annexure 3.5, Page 44)**.

Item 3.5 Any other item with the permission of Chair

No additional item was presented in the meeting.

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HOD FTS

Dr. Jitender Kumar
Chairperson, Board of Studies
Fire Technology and Safety

~~Annexure 3.3~~

Annexure 4.3 b

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA (JHAJJAR)

An Autonomous Institute

'A' GRADE ACCREDITED BY NAAC

Evaluation Scheme & Syllabus

For

Minor Degree/Specialization

in

Industrial Safety

Department of Fire Technology and Safety

(Effective from the Session: 2025-26)

APPROVED BY AICTE, NEW DELHI AND AFFILIATED TO MDU, ROHTAK

HOD FTS

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA, JHAJJAR (HR.)

Scheme of Studies and Examination

Minor Degree in Industrial Safety

w.e.f. 2025-26

Sr. No.	Semester	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Scheme (Marks)				Exam Duration in
				Lecture (L)	Tutorial (T)	Practical (P)			Assessment	End Semester Examination		Total	
										Theory	Practical		
1	IV	MFTIS201A	Industrial Safety Engineering	3	0	0	3	3	40	60		100	3
2	V	MFTIS301A	Safety in Construction	3	0	0	3	3	40	60		100	3
3	VI	MFTIS302A	Theory of Fire Propagation (Fire Dynamics)	3	0	0	3	3	40	60		100	3
		or											
		MFTIS304A	Offshore Structures under Special Environmental Loads including Fire Resistance										
4	VII	MFTIS401A	Safety and Risk Analytics	3	0	0	3	3	40	60		100	3
5	VII/VIII	MFTIS402A	Chemical Process Safety	3	0	0	3	3	40	60		100	3
		or											
		MFTIS403A	Hydrogen Energy: Production, Storage, Transportation and Safety										
6	V	MLFTIS303A	Fire Ground Operations	0	0	2	2	1	25		25	50	3
7	VI	MPFTIS306A	Project-I	0	0	6	6	3	50		50	100	3
8	VII	MLFTIS404A	Industrial Hygiene Lab	0	0	2	2	1	25		25	50	3
							Total Credits	20				700	

Note: To earn the required credits for the award of B.Tech Minor/Honors (Hons.)/Specialization Degree, students may choose either:

(i) To enroll in courses offered through NPTEL/MOOCs that must be equivalent to the prescribed courses in the approved scheme, subject to availability in any semester.

OR

(ii) To complete the prescribed courses in the same semester as offered by the department under the approved scheme and curriculum structure.

Course Code	MFTIS201A				
Course Title	Industrial Safety Engineering				
Scheme and Credits	L	T	P	Credits	Semester-IV
	3	0	0	3	
Course Objectives	The objectives of this course are • To provide an overview of industrial safety engineering concepts and safety terminology. • To introduce hazard identification, risk assessment and accident causation mechanisms. • To develop understanding of system safety, reliability and human factors in safety. • To expose students to safety management systems and modern tools such as virtual reality for safety applications.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Recall basic concepts, terminology and frameworks of industrial safety engineering and occupational health & safety systems.	Level 1: Remember
CO2	Explain hazard identification methods, risk assessment approaches, system safety concepts and accident causation mechanisms.	Level 2: Understand
CO3	Apply safety analysis tools such as HAZOP, FMEA, FTA, ETA, Bow-Tie analysis and reliability models to solve safety problems.	Level 3: Apply
CO4	Analyze system safety, human reliability and accident data using quantitative and analytical techniques.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction: Introduction to industrial safety engineering, Key concepts and terminologies, Safety domain ontology, Risk assessment and control, Safety engineering and accident-causing mechanisms.

Hazard Identification Techniques: Preliminary hazard list, Preliminary hazard analysis, Hazard and operability study (HAZOP), Failure modes and effects analysis (FMEA), Identification of failure modes, Application of hazard identification techniques, Fault tree analysis (FTA), Event tree analysis (ETA).

Unit-II

Component Reliability and Safety Modelling Techniques: Safety function deployment, Ranking of design

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solutions, Quantification of basic events for non-repairable components, Hazard rate, Exponential distribution, Weibull distribution. Failure to repair process, combined process, Failure & repair intensities, Computation of combined process parameters-Laplace transform analysis, Markov analysis.

Unit-III

Systems Safety Quantification: Quantification of systems safety and reliability block diagram, Truth table approach, Structure function, Minimal cut and minimal path representation using structure function.

Human Error Analysis and Safety: Human error, Classification and causes, Human error identification, Human reliability assessment.

Unit-IV

Accident Investigation and Analysis: Accident investigation, Descriptive analytics, Control chart analysis, Accident data analysis: Regression, Classification tree.

Safety Management: Occupational health & safety management systems (OH&SMS), Occupational Safety, Health and working condition code 2020, OHSAS 18001, Safety performance indicators.

Virtual Reality: Introduction, Geometry of virtual world, VR roadmap - A case study.

Suggested Readings:

- Industrial Safety, Health and Environment Management Systems by R.K Jain (2000), Khanna Publications
- Industrial Safety and Human Behaviour by H.L. Kaila, AITBS Publishers, India
- Handbook on Industrial Fire Safety by D.D. Purandare, Abhay D. Purandare, P&A Publication
- Industrial and Occupational Health by S K Haldar, CBS Publishers & Distributors
- Industrial Safety Management by L M Deshmukh, McGraw Hill Education
- Industrial Safety and Risk Management by K. U. Mistry & J. P. Desai, Elsevier India
- Loss Prevention in the Process Industries (Vol.1 & 2) by Frank P. Lees, Elsevier/Butterworth-Heinemann (Indian Edition)
- Probabilistic Risk Assessment for Engineering and Scientists by Komamoto and Henley, IEEE Press, 1995
- Industrial Accident Prevention by Heinrich et al., McGraw Hill
- Techniques for Safety Management - A systems approach by Petersen D, ASSE 1998.

Corresponding Online Resources:

- https://nptel.ac.in/courses/110105094 Prof. J Maiti, IIT Kharagpur
- https://www.udemy.com/course/industerial-safety

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Course code	MFTIS301A				
Course Title	Safety in Construction				
Scheme and Credits	L	T	P	Credits	Semester-V
	3	0	0	3	
Course Objectives	The objectives of this course are • To develop an understanding of safety challenges, responsibilities and ergonomics in the construction industry. • To familiarize the students with safety practices during various construction operations in compliance with national codes and standards. • To equip students with knowledge related to safe use of construction machinery, tools and temporary utilities. • To create awareness of legal frameworks governing construction labor, health, welfare and statutory safety obligations.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define key safety concepts, ergonomic considerations, construction hazards and relevant terminologies, codes and legal provisions related to construction safety.	Level 1: Remember
CO2	Explain the causes of accidents, safety measures in construction, material handling and legal roles of stakeholders in promoting safe construction practices.	Level 2: Understand
CO3	Demonstrate the application of construction safety procedures, including equipment handling, site layout, evacuation plans and compliance with safety codes and labor laws.	Level 3: Apply
CO4	Analyze construction project scenarios to identify safety gaps, assess risk levels, and recommend improvements aligned with legal standards and operational safety practices.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction to Construction Industry: Safety issues in construction, Human factors in construction safety management, Roles of various groups in ensuring safety in construction industry, Framing, contract conditions on safety, Related matters, Relevance of ergonomics in construction safety.

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Unit-II

Safety in Various Construction Operations: Excavation, Under water works, Underpinning & shoring ladders and scaffolds, Tunneling, Blasting, Demolition, Pneumatic caissons, confined Space temporary structures, Indian standards on construction safety, National building code provisions on construction safety.

Unit-III

Safety in Material Handling and Equipments: Safety in storage & stacking of construction materials, Safety in the use of construction equipments, Vehicles, Cranes, Tower cranes, Lifting gears, Hoists & lifts, Wire ropes, Pulley blocks, Mixers, Conveyors, Pneumatic and hydraulic tools in construction, Temporary power supply.

Unit-IV

Contract Labor (R&A) Act and Central Rules: Definitions, Registration of establishments, Licensing of contractors, Welfare and health provisions in the Act and the rules, Penalties, Rules regarding wages. Building & other construction workers (RE & CS) Act, 1996 and central Rules, 1998: Applicability, Administration, registration, Welfare board & welfare fund, Training of building workers, General safety, Health & welfare provisions, Penalties.

Suggested Readings:

- Construction Safety Management by K.N. Vaid, Tata McGraw Hill Education.
- Construction Safety Handbook by V.J. Davies and K. Tomasin, Thomas Telford Publishing.
- Construction Safety, Security & Loss Prevention by James B. Fullman, John Wiley & Sons.
- Modern Methods of Material Handling by L Linger, CBS Publishers & Distributors.
- Handbook of Temporary Structures in Construction by R.T. Ratay, McGraw-Hill Professional.
- National Building Code of India, 2016 by BIS.
- Relevant Indian Standards published by BIS.
- Contract Labour Act and Central Rules.
- Building and Other Construction Workers (RE & CS) Act, 1996 and Central Rules.

Corresponding Online Courses

- https://onlinecourses.nptel.ac.in/noc21_ce16/preview (Safety in Construction by Prof. J. Uma Maheswari, IIT Delhi)

Course Code	MFTIS302A				
Course Title	**Theory of Fire Propagation (Fire Dynamics)**				
Scheme and Credits	L	T	P	**Credits**	**Semester -VI**
	3	0	0	**3**	
Course Objectives	The objectives of this course are • To understand the fundamental principles of fire dynamics (heat transfer, combustion, flame spread and smoke movement) in compartments and open environments. • To develop ability to use fire dynamics knowledge for performance based fire safety design and incident decision making. • To predict fire growth, flashover and ventilation effects for safe firefighting.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Recall basic concepts of combustion, fire triangle/tetrahedron, fuel properties and fire spread mechanisms.	Level 1: Remember
CO2	Explain flame types, heat transfer in fires, and stages of fire development in open and enclosed spaces.	Level 2: Understand
CO3	Apply fire dynamics principles to estimate heat release rate, fire growth and smoke movement in simple fire scenarios.	Level 3: Apply
CO4	Analyze fire plume and enclosure fire behaviour to assess flashover tendency and fire hazard conditions.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit–I

Fundamentals of Fire Propagation: Introduction to fire dynamics and fire propagation, Fire triangle and fire tetrahedron, Classification of fires and fuels, Physical and chemical properties of solid, Liquid and gaseous fuels, Basics of combustion and chemical kinetics, Ignition and flammability limits, Heat of combustion, Heat release rate (HRR), Fundamentals of heat transfer in fires (conduction, convection and radiation), Stages of fire development.

Unit – II

Flame and Fuel Burning Behaviour: Premixed and diffusion flames, Flame structure and stability, Flame spread over solid fuels, Pyrolysis and thermal degradation of solids, burning of liquid fuels, Pool fires and spray fires, Droplet combustion, burning rate and regression rate, Factors affecting flame spread and fire growth, Extinction mechanisms and suppression fundamentals.

Unit–III

Fire Plumes and Enclosure Fire Dynamics: Buoyant fire plumes and entrainment, Plume temperature and velocity profiles, Ceiling jets, smoke generation and movement, Compartment fire behaviour, Hot gas layer formation, Ventilation-controlled and fuel-controlled fires, Flashover and backdraft, Simple zone models, Effects of openings and ventilation on fire growth and spread.

Unit–IV

Special Fire Scenarios and Fire Safety Applications: Dust and vapour cloud fires, Explosion fundamentals, Industrial and storage fire scenarios, Wildland and urban interface fire propagation, Fire load and fire growth modelling, Fire risk and hazard analysis, Basic principles of fire safety engineering, Performance-based fire design concepts, Fire prevention and control strategies, Case studies of major fires and lessons learned.

Suggested Readings:

- Principles of Fire Safety Engineering: Understanding Fire and Fire Protection by Akhil Kumar Das, PHI Learning Pvt. Ltd., New Delhi.
- Mechanism of Fires: Chemistry and Physical Aspects by Vasudevan Raghavan, OM Publications, India.
- Ignition Sources: Fire, Explosion and Detonation by K. Ramamurthi, Springer.
- Fire & Safety Engineering / Fire Safety in Building Design by V. K. Jain, New Age International (P) Ltd., New Delhi.

Corresponding Online Resources:

- https://onlinecourses.nptel.ac.in/noc23_me142/preview (Theory of Fire Propagation by Prof. V. Raghavan, IIT Madras)

Course Code	MFTIS304A				
Course Title	**Offshore Structures under Special Environmental Loads including Fire Resistance**				
Scheme and Credits	L	T	P	**Credits**	**Semester-VI**
	3	0	0	**3**	
Course Objectives	The objectives of this course are • To make the students familiar to the fundamental concepts of offshore structures and their classifications. • To understand the advanced structural analysis techniques including unsymmetric bending, estimation of shear centre. • To educate students to identify and assess fire hazards in offshore industries.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	**Skills Demonstrated**	**RBT Level**
CO1	Recall the fundamentals of offshore structural systems, special environmental loads and basic concepts of fire-resistant design.	Level 1: Remember
CO2	Describe the mechanisms of fire development and the principles of fire-resistant design in offshore structures.	Level 2: Understand
CO3	Apply engineering problems related to unsymmetric bending, shear centre estimation, curved beams, crane hooks, chain links, rings and marine risers.	Level 3: Apply
CO4	Analyze the structural behaviour of offshore components under combined special loads and fire exposure.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit–I

Novelty of Offshore Structures: Introduction, Novelty of fixed platforms, Novelty of compliant platforms, Novelty of floating platforms.
Environmental loads: New generation offshore platforms, Offshore triceratops, Offshore regasification platforms, Environmental loads.

Unit - II

Special loads: Wind loads, Ice loads, Response spectrum, Uncertainties, Earthquake loads, General design requirements, Impact and non-impact wave loads.

Advanced structural analysis: Unsymmetrical bending, Shear centre, Curved beams, Rings and chain links, Marine risers, Marine risers under VIM.

Unit–III

Fire Safety- Fire safety overview, Explosion, Explosion and fire protection.
Blast Resistance -Blast resistance.

Unit–IV

Material Properties-Material strength.
Fire Resistance Design- Fire resistant design overview, Types of fire, Design approach.

Suggested Readings:

- Design Aids of Offshore Structures Under Special Environmental Loads including Fire Resistance by Srinivasan Chandrasekaran and Gaurav Srivastava, Springer, Singapore ISBN 978-981-10-7608.
- Ocean structures: Construction, Materials and Operations by Srinivasan Chandrasekaran and A.K. Jain, CRC Press Florida, ISBN: 978-149-87-9742-9
- Advanced Marine structures by Srinivasan Chandrasekaran, CRC Press, Florida (USA), and ISBN 978-149-87-3968-9.
- Advanced structural analysis with MATLAB by Srinivasan Chandrasekaran CRC Press, Florida, USA, and ISBN: 978-036-70-2645-5.
- Analysis and Design of Offshore Structures with illustrated examples, Human Resource Development Center for Offshore and Plant Engineering (HOPE Center) by Srinivasan Chandrasekaran and Subrata Kumar Bhattacharyya, Changwon National University Press, Republic of Korea, ISBN: 978-899-63-9155-5, pp. 285.
- Advanced Theory on Offshore Plant FEED Engineering by Srinivasan Chandrasekaran, Changwon National University Press, Republic of South Korea, pp. 237. ISBN:978-899-69-7928-9.
- Dynamic analysis and design of ocean structures by Srinivasan Chandrasekaran, Springer, 2nd Ed., Singapore. ISBN:978-981-10-6088-5.
- Advanced steel design of structures by Srinivasan Chandrasekaran, CRC press, Florida, ISBN 9780367232900
- Design of concrete structures, European Comm for Standardization, EN1992-1-2. 2008, Eurocode
- Design of Steel structures, EN1993-1-2. 2005, Eurocode 3
- Design of composite steel and concrete structures, European Comm. for Standardization, EN-1994-1-2. 2005, Eurocode 4

Corresponding Online Resources:

- https://nptel.ac.in/courses/114106043 (HSE Offshore Structures Under Special Environmental Loads Including Fire Resistance, IIT Madras by Prof. Srinivasan Chandrasekaran)

Course Code	MFTIS401A				
Course Title	Safety and Risk Analytics				
Scheme and Credits	L	T	P	Credits	Semester –VII
	3	0	0	3	
Course Objectives	The objectives of this course are • To provide fundamental understanding of safety science, risk concepts and their analytical frameworks. • To develop the ability to collect, pre-process and manage safety-related databases. • To train students in descriptive, predictive and prescriptive safety analytics for risk assessment and decision-making. • To enable learners to apply data-driven methods for evaluating safety performance, incident reports and behavioural safety.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Recall fundamental concepts of safety, risk management, safety data and safety regulations.	Level 1: Remember
CO2	Explain qualitative and quantitative risk assessment, safety analytics methods and performance indicators.	Level 2: Understand
CO3	Apply data preprocessing, descriptive analytics, Bow-Tie analysis and predictive models to safety data.	Level 3: Apply
CO4	Analyze safety performance, accident scenarios and risk patterns using analytical and probabilistic methods.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Basics of Safety and Risk: Introduction to safety and risk Management, Hazard triangle, Safety ontology, Qualitative risk assessment, Quantitative risk assessment.
Creation of Safety Database: Hazard and risk data, Incident investigation data, Inspection and audit data, Behavioral and organizational safety data.
Safety Data Quality Assessment and Preprocessing: Data dimensions and information quality, Missing data handling, Data transformation, Data reduction.

Unit-II

Descriptive Safety Analytics: Probability distribution, Sample and statistics, Safety data visualization tools, Safety data exploration.
Safety Performance Evaluation and Monitoring: Leading and lagging indicators for measuring safety performance, Control charts for safety performance evaluation and monitoring, Safety capability analysis.
Analysis of Safety Reports and Narratives: Safety reports and use of text analytics, Preprocessing of text data, document classification using KNN, Topic modeling - latent Dirichlet allocation.

Unit-III

Risk Quantification: Bow-tie construction, Bow-tie quantification: Accident scenarios/paths, Accident path quantification, Probabilistic approach using Monte Carlo simulation, Consequence modeling and risk distribution.

Predictive Safety Analytics: Introduction to predictive safety and risk analytics, Logistic regression, Application of logistic regression, Classification and regression tree (CART), Case study.

Predictive Risk Analytics: Support vector machine, Association rule mining, Applications.

Unit-IV

Predictive Risk Analytics: Statistical measures of safety program effectiveness, Intervention design.

Prescriptive Safety Analytics: Risk based decision making, Risk based maintenance.

Behavioral Safety Analytics and Injury Epidemiology: Introduction to behavioral safety, Behavioral safety data collection and preliminary analysis, Causal modelling, Application of path model, Injury epidemiology.

Suggested Readings:

- Probabilistic Risk Assessment and Management for Engineers and Scientists by H Kumamoto and E J Henley, IEEE Press.
- An Introduction to Statistical Learning by James G., Witten, D., Hastie, T. and Tibshirani, R., Springer.
- Pattern Recognition and Machine Learning by Christopher M Bishop, Springer.
- Introduction to Data Mining by Tan, P. N., Steinbach, M. & Kumar, V. (2016), Pearson Education India.
- Safety and Risk Analytics: Data-Driven Approaches by K. K. Ganguly, R. Ray, S. Mukherjee, Elsevier India
- Industrial Safety and Risk Management by K. U. Mistry & J. P. Desai, Elsevier India
- Applied Statistics and Probability for Engineers by Douglas C. Montgomery, Wiley India
- Data Mining: Concepts and Techniques by Jiawei Han, Micheline Kamber, Elsevier India

Corresponding Online Resources:

- https://nptel.ac.in/courses/110105160Prof. J Maiti, IIT Kharagpur
- https://www.coursera.org/learn/introduction-to-process-safety-and-risk-analysis
- https://www.udemy.com/course/risk-assessment-for-safety-and-health/

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Course Code	MFTIS402A				
Course Title	Chemical Process Safety				
Scheme and Credits	L	T	P	Credits	Semester-VII/VIII
	3	0	0	3	
Course Objectives	The objectives of this course are • To familiarize the students with safety, hazard identification, accident analysis, risk assessment and safety systems. • To understand industrial toxicology, industrial hygiene and workplace environmental hazards. • To provide the knowledge of fire, explosion fundamentals and preventive design measures. • To develop an understanding of accident causation, investigation techniques, major disasters and safety management practices.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Recall concepts related to safety statistics, accident types, industrial toxicology, industrial hygiene and safety regulations.	Level 1: Remember
CO2	Explain accident causation mechanisms, risk management principles, toxicological effects, fire and explosion fundamentals and safety systems.	Level 2: Understand
CO3	Apply industrial hygiene evaluation methods, source models, fire and explosion prevention techniques and hazard identification tools such as HAZOP.	Level 3: Apply
CO4	Analyze accident scenarios, workplace hazards, fire and explosion risks and industrial disasters using safety and risk assessment approaches.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Safety, Accident Analysis & Risk Management: Safety and accident loss statistics, Risk management and hazardous substance rules, Nature of accident and major disasters, Fundamental principles: Scale up and runaway reactions, Problems related to safety and accident loss statistics.

Industrial Toxicology & Regulatory Framework: Introduction, routes and exposure, Elimination, Responses, treatment, Dose response relationship, Dose response and threshold dose, Predictive models and extrapolation, Industrial hygiene regulations and identification.

Industrial Hygiene, MSDS & Workplace Environmental Hazards: Material safety data sheet, Industrial hygiene evaluation, Noise, Vibration and radiation, Industrial hygiene control.

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Unit-II

Industrial Hygiene & Source Modeling: Problems related to industrial hygiene, Introduction to source models, Source models for gas, Source models for pool boiling, Source model problems.

Fire & Explosion Fundamentals: Introduction, Flammability characteristics, Explosion and its classification, Fire extinguishers. Problems related to fire and explosion, Designs to prevent fire and explosion, Inerting and purging, Designs to prevent fire and explosion, Static electricity, General design methods to prevent fire.

Unit-III

Sprinkler Systems & Pressure Relief Mechanisms: Sprinklers, Introduction to reliefs, Type of reliefs, relief scenario.
Hazard Identification & Risk Assessment: Introduction, Hazard identification methods and HAZOP, Safety reviews and risk assessment.

Unit-IV

Accident Research, Causation & Investigation: Accident research introduction, accident causation theories and Accident investigation procedure, Jaipur terminal fire, India: October 29, 2009.
Major Industrial Disasters & Case Studies: The flix borough UK, Cyclohexane disaster: June 01, 1974, Seveso accident: July 10, 1976, the Chernobyl nuclear disaster: April 26, 1986, Bhopal gas tragedy: December 03, 1984, investigation.
Safety Management, PPE & Nuclear Hazards: Nuclear radiation, Process safety management, Personal protective equipments and safety: Laws and regulations, Nuclear disaster earthquake.

Suggested Readings:

- Chemical Process Safety and Hazard Management by Ajay Kumar Saxena, IBP (Indian Book Publisher)
- Principles of Fire Safety Engineering (Fire Safety related) by Akhil K. Das, PHI Learning (India)
- Chemical Process Industry Safety by K. S. N. Raju, McGraw Hill Education (India)
- Chemical Process Safety: Fundamentals with Applications by Daniel A. Crowl & Joseph F. Louvar, Pearson Education (India)
- Environmental Pollution and Control in Chemical Process Industries by S.C. Bhatia, Khanna Publishers
- Industrial Safety and Risk Management by K. U. Mistry & J. P. Desai, Elsevier India

Corresponding Online Resources:

- https://nptel.ac.in/courses/103107156 Prof. Shishir Sinha
- https://www.coursera.org/specializations/chemical-hazards-and-process-safety
- https://www.udemy.com/course/chemical-process-safety/

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Course code	MFTIS403A				
Course title	**Hydrogen Energy: Production, Storage, Transportation and Safety**				
Scheme and Credits	L	T	P	**Credits**	**Semester- VII / VIII**
	3	0	0	**3**	
Course Objectives	The objectives of this course are • To provide comprehensive knowledge of hydrogen production methods, including reforming, electrolysis, thermo chemical and renewable routes. • To develop understanding of hydrogen storage, compression, liquefaction and transportation technologies. • To analyze hydrogen utilization systems such as fuel cells and internal combustion engines along with techno-economic aspects. • To understand hydrogen safety, hazard classification, regulations and its role in sustainable energy transition.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	3 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Remember the fundamental properties, production methods, storage and transportation systems of hydrogen.	Level 1: Remember
CO2	Understand the working principles of hydrogen production, storage, utilization and safety systems.	Level 2: Understand
CO3	Apply hydrogen energy concepts to practical energy systems and technologies.	Level 3: Apply
CO4	Analyze the technical, economic and safety aspects of hydrogen energy systems.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit I

Hydrogen Production Fundamentals: Properties of hydrogen, Global status of supply and demand, Methods of hydrogen production, Steam reforming, Advanced methods of steam reforming, Partial oxidation, Auto thermal reforming, Combined reforming, Reforming using alternate energy sources.

Hydrogen production from methane decomposition, From coal and biomass, Hydrogen separation and purification, Thermo chemical cycles for hydrogen production, Fundamentals for electrolysis of water.

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Unit II

Electrolysis & Emerging Production Technologies: Components of electrolytic cell, Configuration of electrolyzer stack, Different electrolyzer technologies, Photo electrochemical hydrogen production, Technical and economic comparison of different production methods and global status, Cost analysis.

Introduction to hydrogen storage, Underground hydrogen storage, Fundamentals of hydrogen compression and expansion.

Unit III

Hydrogen Storage & Compression Technologies: Mechanical and non-mechanical hydrogen compressors, Compressed hydrogen tank types and design considerations.

Hydrogen liquefaction, Liquid state hydrogen storage tanks, Fundamentals of hydrogen storage in adsorption-based materials, Fundamentals and thermodynamics of absorption-based hydrogen storage, Metal hydrides, Types of metal hydrides, Metal hydride-based systems design.

Unit IV

Advanced Storage Materials & Hydrogen Transport: Novel materials for solid state hydrogen storage, Economics of storage, Long distance hydrogen transport via pipelines, Ships and in form of LOHC, Hydrogen transport via road, Hydrogen refueling stations. Use of hydrogen in internal combustion engines, Fuel cells, Hydrogen sensing.

Properties of hydrogen associated with hazards, Classification of hydrogen hazards, Compressed and liquid hydrogen related hazards, Regulation, Codes and standards, Utilization of hydrogen in various sectors, Global status and future directions.

Suggested Readings:

- Hydrogen Fuel: Production, Transport and Storage by R. B. Gupta, CRC Press, Taylor & Francis Group, 2009.
- Hydrogen Production by Electrolysis by Agata Godula-Jopek, Wiley-VCH, Germany, 2015.
- Handbook of Hydrogen Storage by Michael Hirscher, Wiley-VCH, 2010.
- Hydrogen Energy: Production, Safety, Storage and Applications by L.M. Das, Wiley -VCH, 2004
- Hydrogen Energy: Production, Storage and Utilization by D. Sharma and D.A. Khan, CRC Press, Taylor & Francis Group, 2024
- A Text Book of Hydrogen Energy by P. Sharma, Springer Singapore, 2025.

Corresponding online resources

- https://onlinecourses.nptel.ac.in/noc22_ch66/ (Hydrogen Energy: Production, Storage, Transportation and Safety by Prof. Pratibha Sharma, IIT Bombay)
- http://www.digimat.in/nptel/courses/video/103101215/L03.(Hydrogen Energy: Production, Storage, Transportation and Safety by Prof. Pratibha Sharma, IIT Bombay)

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Course Code	MLFTIS303A				
Course Title	**Fire Ground Operations**				
Scheme and Credits	L	T	P	**Credits**	**Semester-V**
	0	0	2	1	
Course Objectives	The objectives of this course are • To provide the basic knowledge of fire ground squad drill, including attention, stand at ease, turning, dressing, marching and saluting. • To develop practical skills in hose drill and hydrant drill, including handling, laying, rolling, testing and operation in different conditions. • To familiarize students with fire-fighting equipment such as branches, monitors, foam equipment, adaptors and their safe operation. • To train students in practical fire ground operations, including open water and close water drills, foam application and risk-area fire protection.				
Assessment	25 Marks				
End Semester Practical Examination	25 Marks				
Total	50 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Explain fire ground drills, commands, marching, saluting procedures and fire-fighting equipment used in emergency operations.	Level 2: Understand
CO2	Perform fire ground drills, hose drills, hydrant operations, branch handling, monitor operations and foam drills correctly.	Level 3: Apply
CO3	Analyze fire ground situations to select appropriate drills, equipment, hose layouts, hydrant systems and foam application methods.	Level 4: Analyze
CO4	Evaluate the effectiveness of fire -fighting drills, equipment deployment and operational techniques for different fire risk scenarios.	Level 5: Evaluate

List of Experiments

1. Basic knowledge of fire ground squad drill, attention, stand at ease, stand easy, dress, order side step, turning, etc.
2. Marching – marching from right, marching from left, disha badal, kadam chal, etc.
3. Type of command – type of command, cautionary command and executive command, fall out, dismiss, etc.
4. Saluting – saluting in front, with letter salute, right salute, bay salute, salute in marching, salute without dress, salute from right hand, salute from left hand.
5. Hose drill – lifting, lowering, laying and rolling, type of rolling method, and type of hoses.
6. Hydrant drills – type of hydrant, operation of hydrant, colour code of hydrant, testing and designing of hydrant in cold area or cold storage.
7. Branch – type of branch, operation of branches, method of handling the branch and testing of branches.
8. Monitors – handling of monitors, type of monitors, operation of monitors, designing of monitors in risky area in godown.

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9. Foam – knowledge of foam, type of foam, foam branches, operation of foam branches, testing of foam, foam drill from open water and close water drill.
10. Adaptors – type of adaptors, collecting head operation from open water and close water, uses of breechings, applying method of adaptors and foam inline inductor, and foam monitors and generators using with suction hose in open water drill.

Other drills and tests can be performed as decided by department depending upon the scope of course.

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Course Code	MPFTIS306A				
Course Title	PROJECT-I				
Scheme and Credits	L	T	P	Credits	Semester-VI
	0	0	6	3	
Course Objectives	The objectives of this course are • To expose students to real-world fire safety, industrial safety and risk management challenges in industries, buildings and infrastructure systems. • To enable students to apply fire protection engineering principles, hazard identification techniques, safety management systems and risk assessment tools effectively. • To develop understanding of safety planning, fire prevention strategies, emergency response systems, disaster management, occupational health and sustainable industrial safety practices.				
Assessment	50 Marks				
End Semester Examination	50 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define and identify fire hazards, industrial safety issues, risk factors and safety regulations in different industrial and commercial environments.	Level 1: Remember
CO2	Explain a systematic process for hazard identification, fire risk assessment, safety audits, emergency planning and safety documentation.	Level 2: Understand
CO3	Apply appropriate fire protection systems, safety management tools and risk mitigation strategies to address industrial safety problems.	Level 3: Apply
CO4	Analyze safety risks, regulatory compliance, environmental impacts, occupational health factors and disaster management strategies in project development.	Level 4: Analyze
CO5	Evaluate and justify safety design decisions based on risk reduction, reliability, cost-effectiveness, regulatory standards and sustainability.	Level 5: Evaluate
CO6	Design and develop an optimized fire safety or industrial safety system/plan to address a defined safety or risk management problem.	Level 6: Design

1. Successful completion of the project work is compulsory for the award of the B.Tech Degree in Fire Technology and Safety / Industrial safety.
2. Securing the minimum prescribed passing marks in this course is mandatory.
3. The course shall be evaluated for 50 marks each for the assessment and end semester examination.
4. Projects may be undertaken individually or in groups of 2–3 students. For large or complex projects, group size may be extended with prior approval of the Guide/HOD.
5. The project must address a clearly defined real-world problem related to fire protection engineering, industrial safety management, occupational health, disaster risk reduction or environmental safety.

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6. The scope of the project may include:
    a. Fire safety system design
    b. Industrial safety audits
    c. Hazard identification and risk assessment
    d. Fire protection system analysis
    e. Emergency evacuation planning
    f. Safety management system development
    g. Disaster preparedness studies
    h. Accident analysis and prevention strategies

7. The project shall follow a systematic methodology including:
    a. Problem identification
    b. Literature review
    c. Hazard and risk assessment
    d. System design or safety strategy development
    e. Implementation or simulation
    f. Testing, analysis, and validation

8. The project shall be undertaken under departmental supervision, either independently or jointly with an approved co-supervisor from industry, fire departments, safety consultancy firms, or R &D organizations, with prior permission of the Guide/HOD.

9. Students are encouraged to prepare and present a research paper or technical report for conference presentation, technical symposium, or journal publication wherever feasible.

10. A comprehensive project dissertation shall be submitted in the prescribed departmental format including:
    a. Introduction
    b. Problem statement
    c. Literature review
    d. Methodology
    e. Risk analysis
    f. Safety design/solution
    g. Results and discussion
    h. Conclusion and recommendations

11. Evaluation shall be conducted through:
    a. Periodic project reviews
    b. Seminar presentations
    c. Safety case study analysis
    d. Project demonstrations (if applicable)
    e. Technical report submission
    f. Final viva-voce examination

Course code	MLFTIS404A				
Course title	Industrial Hygiene Lab				
Scheme and Credits	L	T	P	Credit	Semester –VII
	0	0	2	1	
Course objective	The objectives of this course are • To familiarize the students with industrial hygiene monitoring instruments and calibration techniques. • To provide practical training in sampling and analysis of airborne contaminants. • To develop skills for measuring physical hazards such as noise, illumination and thermal stress. • To understand occupational health effects using models and medical equipment.				
Assessment	25 Marks				
End Semester Practical Examination	25 Marks				
Total	50 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Explain principles of occupational hazard sampling, estimation and workplace environmental measurements.	Level 2: Understand
CO2	Perform calibration, sampling, and measurement of air contaminants, noise, illumination and thermal stress.	Level 3: Apply
CO3	Analyze workplace exposure data to assess occupational health and environmental risks.	Level 4: Analyze
CO4	Evaluate workplace conditions with respect to permissible exposure limits and safety standards.	Level 5: Evaluate

List of Experiment

1. Demonstration and calibration of air sampling instruments.
2. Sampling and estimation of gaseous contaminants in the workplace using calorimetric method.
3. Sampling and estimation of solvent vapours in occupational environment.
4. Sampling and estimation of airborne dust using gravimetric method.
5. Measurement and analysis of occupational noise levels
   a) Measurement of sound pressure level in dB(A) and dB (Linear)
   b) Frequency analysis of noise using octave filter
6. Measurement of illumination levels in workplace environment.
7. Study of human respiratory system using lung models.
8. Study of occupational diseases using visual and photographic models.
9. Demonstration and study of medical laboratory equipment used in occupational health monitoring.
10. Assessment and analysis of thermal stress in work environment.

At least 8 experiments to be studied/performed from the above list and other experiments can be studied/performed depending upon the scope of course as decided by the department.

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Annexure 4.3 c

~~Annexure 3.4~~

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Evaluation Scheme & Syllabus

For

Honors/Minor Degree with Specialization

in

Disaster Management

Department of Fire Technology and Safety

(Effective from the Session: 2025-26)

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GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA, JHAJJAR (HR.)

Scheme of Studies and Examination

Honors/Minor Degree/Specialization in Disaster Management

w.e.f. 2025-26

Sr. No.	Semester	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Scheme (Marks)				Exam Duration in
				Lecture (L)	Tutorial (T)	Practical (P)			Assessment	End Semester Examination		Total	
										Theory	Practical		
1	IV	MFTDM201A	Emergency Response and Management of Disasters	3	0	0	3	3	40	60		100	3
2	V	MFTDM301A	Disaster Management Legislations	3	1	0	4	4	40	60		100	3
3	VI	MFTDM302A	Disaster Recovery and Build Back Better	2	0	0	2	2	40	60		100	3
4	VII	MFTDM401A	Risk Assessment and Vulnerability Analysis	3	0	0	3	3	40	60		100	3
		OR											
		MFTDM403A	Risk Based Engineering										
5	VIII	MFTDM404A	Climate Hazards and Disaster Mitigation	3	0	0	3	3	40	60		100	3
6	VI	MLFTDM303A	Project-I	0	0	6	6	3	50		50	100	3
7	VII	MLFTDM405A	Emergency and Rescue Operations Lab	0	0	4	4	2	50		50	100	3
							Total Credits	20				700	

Note: To earn the required credits for the award of B.Tech Minor/Honors (Hons.)/Specialization Degree, students may choose either:

(i) To enroll in courses offered through NPTEL/MOOCs that must be equivalent to the prescribed courses in the approved scheme, subject to availability in any semester.

OR

(ii) To complete the prescribed courses in the same semester as offered by the department under the approved scheme and curriculum structure.

Course Code	MFTDM201A				
Course Title	**Emergency Response and Management of Disasters**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	0	0	**3**	
Course Objectives	The objectives of this course are • To understand natural and industrial hazards and their mitigation, preparedness and industrial measures. • To study emergency planning requirements under Indian and International legislations and standards. • To understand disaster management practices in chemical industries and the role of insurance, technology and community preparedness.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Recall types of natural hazards such as earthquakes, floods, cyclones, landslides and hazards in arid and semi-arid regions.	Level 1: Remember
CO2	Understand the education, training and identification of vulnerable elements in development planning for natural hazard management.	Level 2: Understand
CO3	Apply principles of emergency planning to develop basic on-site and off-site emergency response procedures.	Level 3: Apply
CO4	Analyze effectiveness of emergency plans and preparedness measures at local and industrial levels.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit–I

Natural Hazards: Potentially hazardous natural phenomena, Earthquakes, Landslides, Flooding, Cyclones, Hazards in arid and semi-arid areas, Nature of the hazard, Hazard management activities, Disaster mitigation, Natural hazard prediction, Emergency preparedness, Disaster, Rescue and relief, Post disaster rehabilitation and reconstruction, Education and training activities, Vulnerable elements to be considered in the development planning for natural hazard management, Applications of remote sensing and GIS in disaster management.

Emergency Planning: Need of plan, Possible approach, Objectives of emergency plan, On-site emergency planning, Formulation of the plan and emergency services, Identification of resources, Actions and duties, Emergency procedure, Mock drills, Off-site emergency planning, Objectives and elements of off-site plan, Role of administrative machinery, Role of major hazard works management, Role of the local authority, Emergency preparedness at local level, Awareness and preparedness for emergencies at local level (APELL), the process and its partners.

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Unit–II

Indian Legislations: Requirements of emergency plan as per Indian legislations like Factories Act, Manufacture, Storage and Import of Hazardous Chemicals Rules, Chemical accidents (Emergency planning, Preparedness and Response) Rules, Emergency planning and preparedness in International standards like ISO 14001, OHSAS 18001 and OSHA's Process Safety Management System, Emergency Planning in Seveso II directive, Elements of emergency planning in IS : 18001, Hazardous Materials / Spills Emergencies, Contingency plans for road transportation of hazardous chemicals, Contingency plans for oil spills in marine environment.

Unit–III

Disaster Management in Chemical Industry: Types of emergencies, Major industrial disasters, Causes and consequences of major industrial disasters like Flixborough, Seveso and Bhopal, Components of a major hazard control system, Identification of major hazard control installations, Purpose and procedures, Safe operation of major hazard installations, Mitigation of consequences, Reporting to authorities, Implementation of major hazard control systems, Group of experts, Training, Checklists, Inspection, Evaluation of major hazards, Information to the public, Manpower requirements, Sources of information.

Unit–IV

Disaster Management Act and Insurance: Role of insurance in disaster management, Role of International co-operation (i.e. NGO & UN Agencies), Effect on environment due to disaster, Need for national capacity building and disaster knowledge network, The Disaster Management Act: Need for technological input in disaster mitigation, Community based disaster preparedness program, Preparation of disaster management, Plan early warning system, Role of information technology (IT).

Suggested Readings:

- Disaster Response and Emergency Management by Alfred Scott, Syrawood Publishing House.
- Industrial Security Management by S.C. Dey, Ashish publication, New Delhi.
- Dangerous Properties of Industrial Materials by Sax's, Wiley–Blackwell.
- Chemical process safety by Daniel A. Crawl, Joseph F. Louver, Pearson.

Corresponding Online Resources:

- https://onlinecourses.nptel.ac.in/noc20_ce07/preview?utm
- https://www.udemy.com/course/basic-emergency-planning/
- https://onlinecourses.swayam2.ac.in/cec19_hs20/preview?utm
- https://www.udemy.com/course/introduction-to-safety-in-the-chemical-process-industries/?couponCode=CM251216G1
- https://www.udemy.com/course/safety-in-storage-and-handling-of-chemicals/

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Course Code	MFTDM301A				
Course Title	Disaster Management Legislations				
Scheme and Credits	L	T	P	Credits	Semester-V
	3	1	0	4	
Course Objectives	The objectives of this course are • To make the students familiar with disaster management laws, regulations and business-related legal frameworks. • To learn about disaster management policies and frameworks at state, national and international levels. • To introduce the strategic management concepts and strategy implementation in organizations.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Recall key provisions of disaster management laws, regulations and International disaster frameworks.	Level 1: Remember
CO2	Explain major disaster management laws, International frameworks and relevant Indian business legislations.	Level 2: Understand
CO3	Apply principles of strategic management and decision-making processes in organizational and disaster-related contexts.	Level 3: Apply
CO4	Analyze disaster management policies and frameworks of selected Indian states and foreign countries.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit–I

Disaster Management Laws & Regulation: Disaster Management Act 2005, Environmental protection act 1986, Hyogo Framework for Action 2005-2015, Bio safety Categena protocol, Kyoto protocol, Montreal protocol, Yokohoma strategies, U.N.O's International decade for Natural Disaster Reduction.

Business Laws: Indian Contract Act 1872, The Company's act 1956, Law of Intellectual Property.

I (D & R) Act: Regulation of scheduled industries, Powers of IDRA, Industrial licensing.

Unit–II

Disaster Policies and Framework: Disaster Management Policy, Concept, Principles, Constitutional elements, Disaster management policies of different states (eg. MP, Gujrat, Orissa, Uttaranchal, Delhi etc.), Countries (Japan, South Asian Countries, USA etc.)

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Unit–III

Meaning, Need and Process of Strategic Management: Business policy, Corporate planning and strategic management, Single and multiple SBU organizations, Strategic decision making processes: Rational/Analytical and intuitive-emotional, Political behavioral, Universality of strategic management, Strategists at corporate level and at SBU level, Interpersonal informational and decision roles of a manager.

Unit–IV

Strategy Implementation: Implementation process, Resource allocation, Organizational implementation plan and policy implementation, Leadership implementation, implementing strategy in International setting.

Suggested Readings:

- Disaster Management Law and Policy by S.L. Deshpande & Priya A. Sondhi (Satyam Books).
- Disaster Law: Principles and Practice & Disaster Law: Emerging Thresholds by Dr. Amita Singh (Routledge, India).
- Disaster Management Act, 2005 by Prakash V. Dhopatkar (Government of India).
- Business Policy and Strategic Management by Lawrence R. Jauch and William F. Glueck, McGraw Hill Book Co., New York.
- Strategic Management: Text and Cases by Glen Boseman and Arvind Phatak, John Wiley and Sons, Singapore.
- International Humanitarian Law by Larry Maybee and Benerji Chakka, Generic.

Corresponding Online Resources:

- https://www.udemy.com/course/law-of-contract-as-under-indian-contract-act-1872
- https://www.classcentral.com/course/swayam-disaster-risks-reduction-and-management-454745?utm
- https://www.udemy.com/topic/crisis-management
- https://nptel.ac.in/courses/110107509?utm
- https://onlinecourses.swayam2.ac.in/nou26_ge51/preview

Course Code	**MFTDM302A**				
Course Title	**Disaster Recovery and Build Back Better**				
Scheme and Credits	L	T	P	**Credits**	**Semester- VI**
	2	0	0	**2**	
Course Objectives	The objectives of this course are • To develop an understanding of risk, vulnerability, culture and build back better (BBB) in disaster risk reduction. • To explain the role of the built environment and community participation in disaster risk governance. • To apply disaster preparedness, pre-disaster planning and reconstruction strategies in different contexts. • To analyze post-disaster recovery, communication and culturally responsive reconstruction for people-centered development.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	**Skills Demonstrated**	**RBT Level**
CO1	Remember risk, vulnerability, culture at risk, climate adaptation and build back better.	Level 1: Remember
CO2	Understand roles of professionals and communities in disaster risk reduction.	Level 2: Understand
CO3	Apply preparedness, planning, shelter and reconstruction strategies.	Level 3: Apply
CO4	Analyze recovery, reconstruction and disaster risk communication.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit- I

Introduction: Understanding risk and vulnerability, Road map of build back better.

Vulnerability Mapping and Culture at Risk: Culture, Climate change adaptation and disaster risk reduction, Ayutthaya at risk, Disaster vulnerability, Cultural heritage- Reassembled, Rock shelters at risk.

Unit- II

The Organizational Set Up and The Role of Built Environment Professions in DRR: Build environment professions in disaster risk reduction response, Community participation in disaster risk governance: Voice from Mumbai and Ghana, Community participation in disaster risk governance: Insight from Mumbai.

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Disaster Risk Reduction and Pre-Disaster Planning: Disaster preparedness from cognitive and heuristic perspectives, Information for disaster preparedness, Diffusion of disaster preparedness, Cities and climate change: Adaptation and mitigation.

Unit- III

Relief Recovery and Transition: Temporary shelter construction in India, Temporary shelter construction in Kenya, build back better in Nepal recovery, Progressive housing in El Salvador.

Post Disaster Reconstruction: Decentralizing (re) construction in Colombia, Tsunami reconstruction in Tamil Nadu, disaster risk, Cultural theory of risk.

Unit-IV

Evaluating Post Reconstruction Development: Guidance to DRR, Self-help housing in Turkey, Production of refugee place in time: Case of Tibetan refugees, designing culturally responsive built environment in disaster context.

Communication and Participation for People Centered Development: Disaster risk communication, CAM and CBDRM, Disaster recovery and build back better in –Built environment education, Source, Message and receiver in disaster risk communication.

Suggested Readings:

- Resilient Post Disaster Recovery through Building Back Better by Sandeeka Mannakkara, Suzanne Wilkinson, Regan Potangaroa, Routledge.
- Build Back Better, Challenges of Asian Disaster Recovery by Toshihisa Toyoda, Jianping Wang, Yuka Kaneko, Springer.
- Resilient Post Disaster Recovery through Building Back Better by Sandeeka Mannakkara, Suzanne Wilkinson, Regan Potangaroa.
- Building back better Delivering people-centered housing reconstruction at scale by Michal Lyons, Theo Schilderman, Camillo Boano, Practical Action Publishing: Rugby 2010.
- Creating an enabling environment for reducing disaster risk: Recent experience of regulatory frameworks for land, planning and building in low and middle-income countries by Johnson C., Global assessment report on disaster risk reduction.
- Habitat mapping of Thrangambadi: a study of Tharangambadi village in connection with tsunami reconstruction project by Kuriakose B., Trivendrum, Kerala: South Indian Federation of Fishermen Societies (SIFFS); 2006.
- ISDR. Indigenous knowledge for disaster risk reduction: good practices and lessons learned from experiences in the Asia-Pacific Region 2008, Available at: ⟨http://www.unisdr.org/we/inform/publications/3646⟩.
- Reducing vulnerbaility through local knowledge: the case of India and Nepal by Jigyasu R, Doctoral research Throendium, Norway: University of Norway; 2002.
- Strategic planning for temporary housing: 1999 earthquakes in Turkey Montreal by Johnson C., Canada,University of Montreal; 2006.
- Truths and myths about community participation in post-disaster housing projects by Johnson C, et al. Habitat International, 2007;31 (1):100–15.

Corresponding Online Resources:

- NPTEL, Disaster Recovery and Build Back Better course by Prof. Ram Sateesh Pasupuleti, IIT Roorkee.
- https://onlinecourses.swayam2.ac.in/ini25_hs32/preview?utm_source
- http://www.unisdr.org/we/inform/publications/3646

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Course Code	MFTDM401A				
Course Title	Risk Assessment and Vulnerability Analysis				
Scheme and Credits	L	T	P	Credits	Semester-VII
	3	0	0	3	
Course Objectives	The objectives of this course are • To explain to students the operations of the upcoming insurance and banking sector, statutory requirements. • To make them familiar with the financial environment and market in which they operate.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Recall the basic concepts of risk, insurance principles and insurance procedures.	Level 1: Remember
CO2	Explain life and general insurance products and their features.	Level 2: Understand
CO3	Apply insurance principles to choose suitable policies and manage claims.	Level 3: Apply
CO4	Analyze the role of IRDA and insurance regulations in India.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit–I

Insurance and Risk Management: Introduction to risk, Nature and types of risks, Risk management process, Risk and its relation with insurance, General principles of insurance, Insurance terminology, Insurance application and acceptance procedure.

Unit–II

Life Insurance: Principles, Products term insurance, Endowment insurance, Pensions, Annuities, Claim management, Premium payment lapse and revival, Premium calculations, Concept of mortality tables, Assignment, Nomination, Loans, Surrenders, Foreclosure, Reinsurance, Bank assurance, Underwriting actuarial profession.

Unit–III

General Insurance: Principles, Products fire, Marine, Motor vehicles, Public liability, Commercial, Medi-claim and health policies, Group Insurance, Crop insurance etc.

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Life Insurance Policies: Applications in different situations, Important life insurance policies, Life insurance annuities, Important legal provisions and judicial pronouncements in India.

Unit–IV

Insurance Regulatory and Development Authority (IRDA): Functions & importance of IRDA, Legislation on advisors, Brokers, Corporate agents, TPA, Recent developments.

Suggested Readings:

- Risk Assessment and Vulnerability Analysis in Disaster Management by Jayaprakash Mahendra, Academic Aspirations.
- Risk and Vulnerability to Natural Hazards by Stefan Schneiderbauer, KS OmniScriptum Publishing.
- Risk Assessment and Vulnerability Analysis, Gyaniversity Publications.
- Insurance Principles and Practice by M. N. Mishra, S. Chand & Co., New Delhi.
- Management of Indian Financial Institutions by R. M. Shrivastava, Himalaya Publications, New Delhi.
- Principles of Banking by Arondekar, IIBF, Macmillan India Ltd.
- Risk Management by Ajay Kumar, IIBF, Macmillan India Ltd.
- Bank Management by Timothy Koch and S. MacDonald, Dryden Press, New York.
- Life Insurance Corporation of India – Vol. I, II & III by M. N. Mishra, Raj Book & Subscription, Jaipur.

Corresponding Online Resources:

- https://www.udemy.com/course/risk-analysis-and-insurance-planning-cfp-certification/
- https://www.udemy.com/course/life-insurance-annuity-ultimate-buyers-guide/?src=sac&kw=life+insurance&couponCode=CM251216G1
- https://www.udemy.com/course/insurance-principles-and-types-business-services-class-xi/?utm
- https://onlinecourses.nptel.ac.in/noc24_mg20/preview?utm

Course Code	**MFTDM403A**				
Course Title	**Risk Based Engineering**				
Scheme and Credits	L	T	P	**Credits**	**Semester- VII**
	3	0	0	**3**	
Course Objectives	The objectives of this course are • To introduce principles of probabilistic risk assessment and risk-based engineering. • To develop understanding of probability, reliability theory and life prediction methods. • To provide knowledge of system reliability modelling and probabilistic risk assessment techniques. • To understand uncertainty, sensitivity and human reliability analysis in complex systems. • To expose students to advanced PRA applications in design, operation, and regulation.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Explain principles of probabilistic risk assessment, reliability theory, life prediction methods and human reliability concepts.	Level 2: Understand
CO2	Apply probability distributions, reliability models, estimation techniques and system modelling tools such as RBD, FTA, ETA, and Markov analysis.	Level 3: Apply
CO3	Analyze system reliability, accident sequences, uncertainty, sensitivity and human reliability using probabilistic risk assessment methods.	Level 4: Analyze
CO4	Evaluate plant or system risk using PRA techniques, risk metrics and risk-informed decision-making approaches.	Level 5: Evaluate

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction & Risk characterization: Historical perspective on probabilistic risk assessment and risk-based applications, Integrated risk-based engineering approach, Factor of safety and uncertainty, Basic framework for integrated risk-based engineering, Risk characterization policy and principles, Background and definition of risk, Major elements of risk characterization, Failure Mode Effect and Criticality Analysis (FMECA), Hazard and operability (HAZOP) analysis, Risk metrics.

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Unit-II

Probabilistic approach to risk and reliability: Bathtub Curve, Probability theory-main concepts, Reliability (time-based, stress/strength, cycle based), Derivation of reliability function from the first principle, Reliability characteristics, Mean time to failure (MTTF), Reliability & availability, Probability distribution functions, Point estimate, Method of moment, Maximum likelihood estimate, Bayesian estimator, Confidence interval estimation, Goodness-of-fit tests.

Unit-III

Life Prediction: Introduction to life prediction, Scope and objective, Life prediction and assessment approaches, Accelerated screening and life testing, Probabilistic fracture mechanics.

Systems Reliability Modelling and Analysis: Reliability block diagram, Fault tree, Event tree analysis, Series, Parallel, Standby and complex configuration modelling, Markov Modelling, Dynamic fault tree and dynamic event tree, Bayesian updating, Confidence interval analysis, Importance and sensitivity analysis, Availability and maintainability analysis, Data modelling and analysis.

Unit-IV

Probabilistic Risk Assessment: Definition, Level 1, 2 and 3 PRA, Preliminary hazard analysis, Initiating event selection, Accident sequence modelling, System modelling, Data collection, Analysis and management requirements, Quantification, Uncertainty and sensitivity analysis, Evaluation of risk statement for the plant / system.

Special Features of PRA: Common cause failure, Human reliability, Risk ranking of system, Structure of components, Introduction to low-power and shutdown PRA, Flood and fire PRA, External event PRA – an introduction to PRA applications in design, Operation and regulation as part of risk-informed strategy. Human Reliability Analysis-HR techniques and methods with their limitation and advantages, Role of

Suggested Readings:

- Risk-based Engineering -An integrated approach to Complex Systems – Special reference to nuclear plants by Varde P.V. and Pecht M, Springer 2018.
- What Every Engineer Should Know About Risk and Reliability Analysis by M. Moderras, CRC Press, 1993.
- Risk-Based Bridge Engineering by Khalead M, CRC Press.
- Reliability and Risk Assessment in Engineering by Prof. Vijay Kumar Gupta, Prof. Prabhakar V. Varde, Dr. P. K. Kankar, Narendra Joshi , Springer Singapore 2018.
- Reliability Engineering and Risk Analysis – A Practical Guide by Modarres M., Kaminskiy M., Krivtsov V., CRC Press 2010.
- Reliability Evaluation of Power Systems by R. N. Allan, Billinton , Springer Verlag 2013.
- Risk and Safety Analysis of Nuclear Systems by John C. Lee, Norman J. McCormick, Wiley 2012.
- Intelligent Fault Diagnosis and Prognosis for Engineering Systems by George Vachtsevanos, Frank L. Lewis, Michael Roemer, Andrew Hess, Biqing Wu, Wiley 2006.
- Probabilistic Risk Assessment by Mark G. Stewart & Robert E. Melchers, Chapman & Hall 1997.
- Risk-based Management – Reliability Centred Maintenance by Jones Richard B, Routledge 1995
- Human Reliability and Safety Analysis Data Handbook by Gertman, David I, Wiley-Interscience 1993.
- Risk-conscious operations management by Prabhakar V. Varde, Springer Verlag, Singapore 2023.

Corresponding Online Resources: Risk-Based Engineering by Prof. Prabhakar V Varde

https://onlinecourses.nptel.ac.in/noc24_ge48/preview

Course Code	**MFTDM404A**				
Course Title	**Climate Hazards and Disaster Mitigation**				
Scheme and Credits	L	T	P	**Credits**	**Semester- VIII**
	3	0	0	**3**	
Course Objectives	The objectives of this course are • To introduce the basic concepts of climate hazards, disasters, risk and vulnerability. • To explain climate change, climate variability and climate vulnerability of India. • To provide knowledge of hydro-climatic data, geospatial tools and modelling methods for hazard assessment. • To familiarize students with disaster mitigation approaches, management frameworks and future challenges.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	**Skills Demonstrated**	**RBT Level**
CO1	Describe the concepts and characteristics of climate hazards, disasters and vulnerability.	Level 1: Remember
CO2	Understand climate variability, hazard drivers, hydro-climatic data and disaster risk reduction frameworks.	Level 2: Understand
CO3	Apply hydro-climatic data, geospatial tools and modelling methods for hazard and risk assessment.	Level 3: Apply
CO4	Analyze trends, vulnerability, mitigation measures and disaster management policies.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction to Climate Hazards & Vulnerability: Introduction to climate hazards and disasters, Climate change and climate variability, Climate vulnerability profile of India, Hazard versus disaster, Risk versus vulnerability, Hydro climatic measurements and data rainfall, Temperature, Streamflow, Wind, Storm surge, Geospatial data, Satellite-based data, Reanalysis data, Radar measurements, Altimetric data, Downloading and processing gridded rainfall and temperature data.

Unit-II

Modelling Flood Hazards: Floods types and characteristics, Causes and drivers of floods, Deriving flood time series, Trend analysis, Flood frequency analysis, Plotting position, Trends in flood characteristics, Flood frequency analysis, Distribution fitting and return period estimation, Compound and concurrent floods, Bivariate flood frequency analysis using Copula, Univariate and bivariate flood risk assessment, Flood

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mitigation measures structural and non-structural, Flood hazard and risk mapping, Flood management using geospatial data, Impact of cyclones and tropical storms.

Unit-III

Drought Estimation & Mitigation: Droughts types & characteristics, Drought history of India, Estimation of drought indices SPI, SPEI, RAI, etc., Computation of drought indices, Drought estimation, Drought severity and vulnerability, Drought mitigation through nature-based solutions and related case studies, Vulnerability mapping of drought prone areas.

Heat waves, Cold waves and their compound effects: Heat waves, Definition, Criteria, Causes and drivers, Compound extreme events: Compound hot-dry, Hot-wet, Cold-dry and Cold-wet events, Heat wave and cold wave mitigation approaches through case studies.

Unit-IV

Disaster Mitigation Framework and Approaches: Science meets policy, Disaster mitigation, Disaster risk reduction under SDGs, Economics of disasters, Study of various disaster management frameworks, Hyogo framework for action, The Sendai framework and others, Emergency and humanitarian response, Role of National Disaster Management Authority (NDMA) and other regional authorities, The Disaster Management Act 2005 (India) and the way forward.

Emerging Areas and Future Direction: Role of big data in climate and disaster modelling, Early warning systems, Role of climate change in modulating future occurrences of climate hazards, Integrated disaster management framework, Discussion on policy measures for disaster risk reduction.

Suggested Readings:

- Climate Events and Disaster Mitigation from Policy to Practice by Alejandro Linayo Rivero (Editor), Daya Pub. House.
- Mitigation of Natural Hazards and Disasters by C. Emdad Haque, Springer Dordrecht.
- Routledge Studies in Hazards, Disaster Risk and Climate Change, Taylor and Francis.
- Natural Hazards and Disaster Management by R.B. Singh, Rawat Books.
- Disaster Risk and Management Under Climate Change by Anil Kumar Gupta, Akhilesh Gupta and Pritha Acharya, Springer Nature, Singapore.
- Mapping climatic and biological disasters in India: National Institute of Disaster Management, NIDM, New Delhi: 2021.

Corresponding Online Resources:

- NPTEL, Climate Hazards and Disaster Mitigation Course by Dr. Priyank J. Sharma, IIT Indore
- https://onlinecourses.swayam2.ac.in/cec25_hs135/preview?utm_source
- https://onlinecourses.swayam2.ac.in/ini25_hs32/preview?utm_source

Course Code	MLFTDM303A				
Course Title	PROJECT-I				
Scheme and Credits	L	T	P	Credits	Semester-VI
	0	0	6	3	
Course Objectives	The objectives of this course are • To expose students to real-world fire safety, industrial safety and risk management challenges in industries, buildings and infrastructure systems. • To enable students to apply fire protection engineering principles, hazard identification techniques, safety management systems and risk assessment tools effectively. • To develop understanding of safety planning, fire prevention strategies, emergency response systems, disaster management, occupational health and sustainable industrial safety practices.				
Assessment	50 Marks				
End Semester Examination	50 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define and identify fire hazards, industrial safety issues, risk factors and safety regulations in different industrial and commercial environments.	Level 1: Remember
CO2	Explain a systematic process for hazard identification, fire risk assessment, safety audits, emergency planning and safety documentation.	Level 2: Understand
CO3	Apply appropriate fire protection systems, safety management tools and risk mitigation strategies to address industrial safety problems.	Level 3: Apply
CO4	Analyze safety risks, regulatory compliance, environmental impacts, occupational health factors and disaster management strategies in project development.	Level 4: Analyze
CO5	Evaluate and justify safety design decisions based on risk reduction, reliability, cost-effectiveness, regulatory standards and sustainability.	Level 5: Evaluate
CO6	Design and develop an optimized fire safety or industrial safety system/plan to address a defined safety or risk management problem.	Level 6: Design

1. Successful completion of the project work is compulsory for the award of the B.Tech Degree in Fire Technology and Safety / Industrial safety.
2. Securing the minimum prescribed passing marks in this course is mandatory.
3. The course shall be evaluated for 50 marks each for the assessment and end semester examination.
4. Projects may be undertaken individually or in groups of 2–3 students. For large or complex projects, group size may be extended with prior approval of the Guide/HOD.
5. The project must address a clearly defined real-world problem related to fire protection engineering, industrial safety management, occupational health, disaster risk reduction or environmental safety.
6. The scope of the project may include:

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a. Fire safety system design
b. Industrial safety audits
c. Hazard identification and risk assessment
d. Fire protection system analysis
e. Emergency evacuation planning
f. Safety management system development
g. Disaster preparedness studies
h. Accident analysis and prevention strategies

7. The project shall follow a systematic methodology including:
   a. Problem identification
   b. Literature review
   c. Hazard and risk assessment
   d. System design or safety strategy development
   e. Implementation or simulation
   f. Testing, analysis, and validation

8. The project shall be undertaken under departmental supervision, either independently or jointly with an approved co-supervisor from industry, fire departments, safety consultancy firms, or R &D organizations, with prior permission of the Guide/HOD.

9. Students are encouraged to prepare and present a research paper or technical report for conference presentation, technical symposium, or journal publication wherever feasible.

10. A comprehensive project dissertation shall be submitted in the prescribed departmental format including:
    a. Introduction
    b. Problem statement
    c. Literature review
    d. Methodology
    e. Risk analysis
    f. Safety design/solution
    g. Results and discussion
    h. Conclusion and recommendations

11. Evaluation shall be conducted through:
    a. Periodic project reviews
    b. Seminar presentations
    c. Safety case study analysis
    d. Project demonstrations (if applicable)
    e. Technical report submission
    f. Final viva-voce examination

Course Code	MLFTDM405A				
Course Title	Emergency and Rescue Operations Lab				
Scheme and Credits	L	T	P	Credits	Semester-VII
	0	0	4	2	
Course Objectives	The objectives of this course are • To introduce students to basic concepts of disaster management and emergency response. • To develop practical skills in rescue, evacuation and first-aid operations. • To familiarize students with emergency equipment and standard operating procedures. • To enhance teamwork, leadership and communication during disaster situations. • To improve preparedness and safety awareness for natural and man-made disasters.				
Assessment	50 Marks				
End Semester Practical Examination	50 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Explain the types, functions and safe handling procedures of emergency rescue equipment and PPE.	Level 2: Understand
CO2	Perform BLS and CPR procedures and execute disaster evacuation mock drills effectively.	Level 3: Apply
CO3	Analyze emergency scenarios to select appropriate rescue equipment, communication methods and response strategies.	Level 4: Analyze
CO4	Evaluate past disaster management practices and recommend improvements for future emergency response.	Level 5: Evaluate

List of Experiments

1. Identification and handling of emergency rescue equipment.
2. Selection, donning and doffing of personal protective equipments (PPE).
3. Emergency communication and incident command system simulation.
4. Search techniques for victim location in disaster-affected areas.
5. Victim lifting, carrying and extrication techniques.
6. Smoke navigation and visibility reduction drill.
7. Basic life support (BLS) and cardiopulmonary resuscitation (CPR).
8. Disaster evacuation planning and mock drill execution.
9. Use of GIS, drones and sensors in disaster response.
10. Case Study - Analysis of major disasters (India & Global).

At least 8 experiments to be studied/performed from the above list and other experiments can be studied/performed depending upon the scope of course as decided by the department.

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DEPARTMENT OF MECHANICAL ENGINEERING

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Minutes of 3rd meeting of Board of Studies of Mechanical Engineering Department

The 3rd meeting of Board of Studies of Mechanical Engineering Department was held on 27.12.2025 at 11:00 A.M in the office of Mechanical Engineering.

The following members were present for the BOS meeting:

SN	Name of the Member	Affiliation/Organization	Designation within Board of Studies
1	Mr. Vivek	HOD, GITAM, Kablana	Chairperson
2	Dr. Vasdev Malhotra	Professor, J.C Bose UST, YMCA Faridabad	Member
3	Dr. V. N. Mathur	Professor, MAIT Rohini	Member
4	Dr. Deepak Chhabra	Associate Professor, UIET, MDU Rohtak	Member
5	Dr. Aman Aggarwal	Professor, GITAM Kablana	Member
6	Dr. Jitender Kumar	Professor, GITAM Kablana	Member
7	Dr. Hari Parshad	Professor, GITAM Kablana	Member
8	Dr. Sunil Kadiyan	Professor, GITAM Kablana	Member
9	Dr. Vishant Kumar	Professor, GITAM Kablana	Member
10	Dr. Devender Singh Punia	Assistant Professor, GITAM Kablana	Member
11	Mr. Parvesh	Assistant Professor, GITAM Kablana	Member
12	Mr. Bhoop Singh	Assistant Professor, GITAM Kablana	Member
13	Dr. Balraj Hooda	Assistant Professor, GITAM Kablana	Member
14	Mr. Manmohan	Assistant Professor, GITAM Kablana	Member
15	Mr. Chirag Verma	Assistant Professor, GITAM Kablana	Member
16	Mr. Mohit Taneja	Assistant Professor, GITAM Kablana	Member
17	Mr. Vikas Goel	Assistant Professor, GITAM Kablana	Member
18	Mr. Nikhil Sikka	Assistant Professor, GITAM Kablana	Member
19	Mr. Vishnu	Assistant Professor, GITAM Kablana	Member
20	Mr. Manoj Kumar	Assistant Professor, GITAM Kablana	Member
21	Mr. Atul	Alumnus	Member

At the outset the Chairperson welcomed all the members present in the meeting. The agenda items, as circulated prior to the meeting, were taken up for discussion.

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Agenda wise Discussion and Resolutions

Item No. 3.1
Confirmation of the minutes of 2nd Meeting of the Board of Studies (BOS) of Mechanical Engineering Department held on 24.05.2025.

The minutes of 2nd meeting of the Board of Studies of Mechanical Engineering Department held on 24.05.2025 (Annexure-3.1 Page No. 1-4 already circulated) be confirmed.

Item No. 3.2
Follow up action report of the decisions taken in the 2nd Meeting of Board of Studies held on 24.05.2025.

Follow up action of the decisions taken in the 2nd Meeting of Board of Studies held on 24.05.2025 be noted (Annexure 3.2 Page No. 5-6 already circulated).

Item No. 3.3
Scheme of Examinations and Syllabus of Certificate Course on "CNC Machines and Part Programming" from Academic Session 2025-26.

Resolved that Scheme of Examinations and Syllabus of Certificate Course on "CNC Machines and Part Programming" from Academic Session 2025-26 (Annexure 3.3 Page No. 7-9) be approved and further resolved that the Scheme of Examinations and Syllabus of the above is recommended to the Academic Council for approval.

Item No. 3.4
Scheme of Examinations and Syllabus of Minor Degree/Honors (Hons.)/Specialization in "Robotics" from Academic Session 2025-26.

Resolved that Scheme of Examinations and Syllabus of Minor Degree/Honors (Hons.)/Specialization in "Robotics" from Academic Session 2025-26 (Annexure 3.4 Page No. 10-27) be approved and further resolved that the Scheme of Examinations and Syllabus of the above is recommended to the Academic Council for approval.

Item No. 3.5
Minor correction in the Course Title of B. Tech Mechanical Engineering 2nd Year from Academic Session 2025-26.

Resolved that the minor correction in the Course Title of B. Tech Mechanical Engineering 2nd Year are approved and further resolved that the correction in the Course Title is recommended to the Academic Council for approval as given below.

Course Code	Existing Course Title	Corrected Course Title
PEC-ME-216A	CNC Machining	CNC Technology

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Item No. 3.6

Review of the Panel of Examiners for Theory and Practical's of B. Tech and M. Tech programs for academic year 2025-26.

The panel of examiners for Theory and Practical's of B. Tech and M. Tech programs for academic year 2025-26 be reviewed and approved. The same can be sent to the Controller of Examinations of the Institute for the Information (Annexure 3.5 Page No. 28-30).

The meeting concluded with the thanks to the Chair.

Chairperson
Board of Studies
Mechanical Engineering Deptt

Annexure 4.4 b

~~Annexure 3.3~~

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT

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CERTIFICATE COURSE ON "CNC MACHINES AND PART PROGRAMMING"

SESSION: 2025-26

Eligibility Criteria: At least senior secondary examination (10+2) with atleast 50% marks (47.5% in case of SC/ST/Blind/Visually/Differently abled etc. candidates of Haryana only) from board of school education Haryana, Bhiwani or any other examination recognized by Maharshi Dayanand University, Rohtak as equivalent thereto.

Duration: 6 Months (Offering twice in an academic year)

Course Credits: 3

No. of Seats: 30

The reservation of seats is as given below

Sr. No.	Name of Program	Break of seats as per State Govt. Reservation Policy							DA/PwD/ PH/ESM/ DFF##	EWS**	No. of Sanctioned Seats
		AIC	EWS*	HOGC	SC#		BC (A)	BC (B)			
					OSC	DSC					
1	Certificate Course On "CNC Machines and Part Programming"	4	-	11	3	3	4	3	1	1	30

Note: In the event of vacant seats remaining after the final date of allotment based on reservations, these may be allocated to general category candidates.

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SCHEME AND SYLLABUS CERTIFICATE COURSE

Course Code	**CC-CNC-01**				
Category	Certificate Course				
Course Title	CNC Machines and Part Programming				
Scheme and Credits	L	T	P	**Credits**	
	3	0	0	**3**	
Course Objectives	The objectives of this course are • To introduce the fundamentals of CNC systems, machine components, G-codes, M-codes, and coordinate systems used in CNC machining. • To provide knowledge of CNC operations and train to write part programs. • To familiarize learners with advanced CNC programming concepts.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Note: The Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each, and the remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, the first being compulsory and selecting one from each unit.

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define the basics and fundamentals of CNC machining & programming.	Level 1: Remember
CO2	Explain the fundamentals of CNC systems, machine components, coordinate systems, and the role of G-codes and M-codes in CNC machining.	Level 2: Understand
CO3	Apply advanced CNC programming techniques for improved machining efficiency.	Level 3: Apply
CO4	Develop and execute CNC turning and milling part programs for operations using appropriate G-codes, M-codes.	Level 6: Create

Unit No.	Contents
Unit-I	**Introduction to CNC system and Machines**: Overview of CNC System, Machine Codes, G-codes and M-codes, CNC Machine Components, Types of CNC Machines, Concept- Linear, circular path operations in lathe and milling machine. Coordinate systems: Absolute & Incremental, Advantages and Applications of CNC Systems.
Unit-II	**CNC Turning Operations and Programming:** Basic turning operations on CNC lathe, Part Programming for Step Turning Operation, Part Programming for Taper Turning, Part Programming for Radius and Groove Turning, Part Programming for Threading on CNC Turning, Programming for Single Start Threads, G-codes and M-codes for Threading, Threading Cycles and Parameters in CNC Turning.
Unit-III	**CNC Milling Operations and Programming:** Basic milling operations: facing, slotting, pocketing, contouring. Toolpath concepts: linear & circular interpolation. Tooling for milling: End mills, drills, face mills. Part programming for Face milling, Slot milling, Pocket milling, Peck drilling, tapping, boring cycles.
Unit-IV	**Advanced CNC Programming Techniques**: Canned Cycles, Sub programming, Macro Programming, Custom G-codes and M-codes, Tool Offsets and Compensation, Multi-axis CNC Programming. Program optimization and troubleshooting.

Suggested Readings:

1. P. M. Agrawal, "CNC Fundamentals and Programming", Charotar Publishing House Pvt. Ltd.
2. Pabla B. S. & M. Adithan "CNC Machines", New Age International Private Limited.
3. P. Radhakrishnan, S. Subramanyan, V. Raju, CAD/CAM/CIM, 3rd Edition, New Age International Publishers.
4. Mikell P. Groover, "Automation, Production Systems and Computer-Integrated Manufacturing", Pearson Education.
5. Peter Smid, "CNC Programming Handbook", Industrial Press Inc.
6. Y. Koren, Computer Control of Manufacturing Systems, McGraw Hill.

Useful Video links

Unit No.	Topic	Link
UNIT-I	G Codes & M Codes	https://youtu.be/_5r2XR1h1aQ?si=Yje_f7E8fENH8lHi
	Absolute and Incremental Mode	https://youtu.be/B7MM5M7DzpM?si=yc-D-sAe8giEbGEY
UNIT-II	CNC Programming	https://www.youtube.com/watch?v=_5r2XR1h1aQ

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA (JHAJJAR)

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'A' GRADE ACCREDITED BY NAAC

Evaluation Scheme & Syllabus

For

Minor Degree/Honors (Hons.)/Specialization

in

Robotics

Department of Mechanical Engineering

(Effective from the Session: 2025-26)

APPROVED BY AICTE, NEW DELHI AND AFFILIATED TO MDU, ROHTAK

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD ME

Minor Degree/Honors (Hons.)/Specialization
in
Robotics
Offered by Mechanical Engineering Department

Robotics is an interdisciplinary field that integrates engineering, science, and technology. It is a fascinating and rapidly growing area of study, as robots are being employed more and more in various sectors, including industry, research laboratories, and even households. The government is emphasizing and supporting the study and adoption of these emerging technologies. Institutions and Universities must incorporate them into education, training and research.

Keeping the above in view, the Department of Mechanical Engineering has started a Minor Degree/Honors (Hons.)/Specialization in **"Robotics"** from the academic session 2025–26, with the aim of enhancing students' employability skills and imparting in-depth knowledge in emerging areas that are usually not covered in the undergraduate degree framework. These emerging areas will help students tap into the wide range of employment opportunities available in these domains.

This Minor Degree/Honors (Hons.)/Specialization will require earning 18 credits. It will be an addition to the regular undergraduate program, implying that passing or failing it will not affect the results of the regular undergraduate program being pursued by the student. Upon successful completion of the course, a Minor Degree/Honors (Hons.)/Specialization shall be awarded to the candidate. Students of Mechanical Engineering and other engineering programs shall be eligible for the Minor Degree/Honors (Hons.)/Specialization as outlined below:

Name of the Minor Degree/Honors (Hons.)/Specialization	**B. Tech Program whose students are eligible to opt for Minor Degree**	**B.Tech Program whose students are eligible to opt for Honors (Hons.)/Specialization**
Robotics	All Branches except Mechanical, Electrical, Electronics and Communication Engg.	Mechanical, Electrical, Electronics and Communication Engg.

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GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA, JHAJJAR (HR.)

Scheme of Studies and Examination

Minor Degree/Honors (Hons.)/Specialization in Robotics

(Effective from the Session: 2025-26)

Sr. No.	Semester	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Scheme (Marks)				Exam Duration in
				Lecture (L)	Tutorial (T)	Practical (P)			Assessment	End Semester Examination		Total	
										Theory	Practical		
1	IV	MMER202A	Introduction to Robotics	3	0	0	3	3	40	60		100	3
2	V	MMER301A	Mechanism and Robot Kinematics	2	0	0	2	2	40	60		100	3
3	VI	MMER302A	Advanced Robotics	3	0	0	3	3	40	60		100	3
4	VII	MMER401A	Microprocessors and Microcontrollers	3	0	0	3	3	40	60		100	3
5	VIII	MMER402A	Modelling and Simulation of Dynamic Systems	2	0	0	2	2	40	60		100	3
6	V	MLMER303A	Robotics Lab	0	0	4	4	2	25		25	50	
7	VI	MPMER304A	Project-I	0	0	4	4	2	50		50	100	
8	VII	MLMER403A	Microprocessors and Microcontrollers Lab	0	0	2	2	1	25		25	50	
							Total Credits	**18**				**700**	

Note: To earn the required credits for the award of B. Tech Minor Degree/Honors (Hons.)/Specialization, students may choose either:

(i) To enroll in courses offered through NPTEL/MOOCs that must be equivalent to the prescribed courses in the approved scheme, subject to availability in any semester.
OR

(ii) To complete the prescribed courses in the same semester as offered by the department under the approved scheme and curriculum structure.

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Course Code	MMER202A				
Course Title	Introduction to Robotics				
Scheme and Credits	L	T	P	Credits	Semester-IV
	3	0	0	3	
Course Objectives	The objectives of this course are • To introduce fundamental concepts and classifications of robotic systems. • To understand the construction and working of robotic end effectors and sensors. • To learn robot drives, actuators, and control strategies. • To familiarize students with robot programming techniques and emerging trends in robotics.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define fundamental concepts and terminology of robotics.	Level 1: Remember
CO2	Explain the working principles, parts, drives and control systems.	Level 2: Understand
CO3	Apply concepts and techniques to use suitable robotic systems.	Level 3: Apply
CO4	Analyze the robotic and automation system for specific applications.	Level 4: Analyze

Note: The Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each, and the remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, the first being compulsory and selecting one from each unit.

Unit No.	Contents
Unit-I	**Introduction to robotics:** Introduction, definition, need and scope of robotics; brief history and evolution of industrial robots; types of robots; laws of robotics; elements of robotic system i.e. robot anatomy and degrees of freedom (DOF); classification of robotic system on the based work volume, type of drive, and applications; performance parameters i.e. resolution, accuracy, repeatability, dexterity etc.; introduction to automation; industrial applications of robots.
Unit-II	**End Effectors:** Functions and types of end effectors; mechanical, pneumatic, hydraulic, magnetic and vacuum grippers; internal and external grippers; two fingered and three fingered grippers; remote center compliance (RCC) grippers; selection criteria and design considerations for grippers. **Sensors for robotics** - Need and role of sensors in robot operation; types and classification of sensors such as - position, proximity, force, tactile, vision sensors; characteristics and performance parameters of sensing devices; selection criteria for sensors; Introduction to machine vision systems.

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Unit-III	**Robot Drives Systems:** Pneumatic drives, hydraulic drives, mechanical drives, electrical drives; D.C. servo motors, stepper motors and A.C. servo motors - salient features, applications and comparison; power transmission systems - gears, belts, lead screws, ball screws, and harmonic drives. **Control System**: Definition and classification; open and closed loop control systems with relative merits and demerits; introduction to linear and non-linear control systems in robotics.
Unit-IV	**Programming and Languages for Robotics:** Introduction to robot programming; basic motion commands and control structures; overview of common industrial robot programming languages. **Related Topics in Robotics**: Socio Economic aspect of robotisation; economic considerations in robot selection and design; robot safety standards and industrial safety guidelines; introduction to artificial intelligence (AI) in robotics; applications of AI techniques in robotics; emerging trends in robotics - collaborative robots (COBOTS), Industry 4.0, IoT integration, autonomous systems.

Suggested Readings

1. S. K. Saha, Introduction to Robotics, TATA McGraw Hills Education.
2. Dilip Kumar Pratihar, Fundamentals of Robotics, Narosa Publishing House.
3. R. K. Mittal, I. J. Nagrath, Robotics and Control, TATA McGraw Hill Publishing Co Ltd, New Delhi.
4. A. B. Bhattacharya, Debasish Roy, Foundations of Robotics & Automation (Theory & Practice), Khanna Book Publishing.

Useful Video links

Unit No.	Topic	Link
UNIT-I	Evolution of Robotics	https://nptel.ac.in/courses/107106090
	Elements of Robotic System	https://nptel.ac.in/courses/112104298
UNIT-II	Types of Grippers	https://nptel.ac.in/courses/107106090
	Sensors And Vision System	https://nptel.ac.in/courses/112105249
UNIT-III	Robot Drives Systems	https://nptel.ac.in/courses/112105236
	Types of Controllers	https://nptel.ac.in/courses/112107289
UNIT-IV	Introduction to Artificial Intelligence	https://nptel.ac.in/courses/106102220

Course Code	MMER301A				
Course Title	Mechanism and Robot Kinematics				
Scheme and Credits	L	T	P	Credits	Semester-V
	2	0	0	2	
Course Objectives	The objectives of this course are • To introduce fundamental concepts and terminology of mechanisms and robotic systems. • To study kinematic structure and motion behavior of constrained mechanisms and robotic manipulators. • To learn Jacobian concepts and virtual work principles for motion and force analysis. • To analyze displacement, velocity, acceleration of constrained mechanisms and robotic manipulators.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define fundamental terminologies of mechanisms and robot kinematics.	Level 1: Remember
CO2	Explain the working principles and kinematic structure of mechanisms and robotic manipulators.	Level 2: Understand
CO3	Apply kinematic relations to calculate motion parameters of mechanisms and machines.	Level 3: Apply
CO4	Analyze displacement, velocity, acceleration, force transmission and Jacobian characteristics of mechanisms and robotic manipulators.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit No.	Contents
Unit-I	**Introduction to Mechanisms and Robotics**: Overview of mechanisms and robotics; terminology: link, joint, pair, chain, mechanism vs robot; kinematic diagrams; degree of freedom (DOF); DOF of planar and spatial kinematic chains; constrained mechanism and robotic mechanisms; failure of DOF calculation. **Mobility Analysis**: Grashof Criteria for simple planar mechanisms-4R chain, inversion and assembly modes; metamorphosis of 4R to 3R1P chain; Grashof Criteria for-3R1P, RRPP, RPRP chains; geometry concept; representation of vectors; vector projections.
Unit-II	**Displacement Analysis of Constrained mechanisms**: Four-bar (4R) chain; 3R1P chain Type-I and Type-II; application problems. **Displacement Analysis of Robot Manipulators:** Open chain planar manipulators 2 DOF (2R and RP) and 3-DOF (RPR); closed chain planar robots 2 DOF (2R,RPR) and 3 DOF (RPR).

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Unit-III	**Geometric Velocity Analysis**: Motion of planar rigid body; instantaneous center of rotation; relative instantaneous center of rotation; Aronhold-Kennedy theorem and its application; geometric velocity analysis of 4R chain, 3R1P chain. **Analytical Velocity Analysis:** Analytical approach for 4R chain, 3R1P chain; velocity analysis of open chain planar robot manipulators (2R, RP); introduction to Jacobian matrix, velocity mapping and singularity concept in planar manipulators; velocity analysis of closed chain manipulators; path generation problems.
Unit-IV	**Acceleration Analysis:** Relative and absolute acceleration; Input-output acceleration relations; analytical acceleration analysis of 4R, 3R1P mechanisms, acceleration analysis of open chain planar robots (2R). **Force Analysis:** Concept of force and torque transmission; static force analysis of planar mechanisms; principle of virtual work; force analysis of constrained mechanisms (4R, 3R1P chain) and open chain planar robots (2R).

Suggested Readings

1. S. S. Rattan "Theory of Machines" Tata McGraw-Hill Education Pvt. Ltd., New Delhi.
2. Saeed B. Niku, "Introduction to Robotics: Analysis, Systems, Applications", Pearson Education India.
3. John J. Craig, "Introduction to Robotics: Mechanics and Control" Pearson Education India.
4. Mikell P. Groover, " Industrial Robotics", Tata McGraw-Hill Education India.

Useful Video links:

https://nptel.ac.in/courses/112105236

https://nptel.ac.in/courses/112105268

Course Code	MMER302A				
Course Title	**Advanced Robotics**				
Scheme and Credits	L	T	P	**Credits**	**Semester-VI**
	3	0	0	**3**	
Course Objectives	The objectives of this course are • To make mathematical and kinematic models of robotic manipulators. • To formulate velocity, static, and dynamic behavior of robotic systems. • To formulate trajectory planning and feedback control strategies for manipulators. • To introduce principles of robotic grasping and legged locomotion.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define fundamental concepts and terminologies of robotics.	Level 1: Remember
CO2	Explain mathematical models, kinematic and dynamic relationships, control strategies, and manipulation principles in robotic systems.	Level 2: Understand
CO3	Use mathematics, mechanics, control, and manipulation principles to solve robotic problems.	Level 3: Apply
CO4	Analyze the robotic mechanics, modelling and control techniques for robot systems.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit No.	Contents
Unit-I	**Mathematical Preliminaries of Robotics**: Overview of robotic system; coordinate frames; 2D & 3D Transformations - translation, rotation, reflection, scaling, shearing; compound transformations; inverse transformations; homogeneous coordinates; homogeneous transformations matrices. **Robot Kinematics**: Denavit-Hartenberg Approach; Standard DH convention; D-H parameters; deriving transformation matrices; forward kinematics; inverse kinematics - geometric and analytical approach.
Unit-II	**Velocities Analysis & Jacobians**: Linear and angular velocity; joint velocity relationships; time differentiation of transformation matrices; basic Jacobian; Jacobian matrix derivation; kinematic singularity & redundancy; force balance equation; velocity - force Duality; virtual work; force ellipsoid.

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	Robot Dynamics: Introduction to robot dynamics; rigid body acceleration; Newton-Euler's formulation; Lagrangian formulation, derivation of manipulator dynamic equations; mass matrix; Coriolis and centrifugal terms; nonlinear robot dynamics; actuator modeling.
Unit-III	**Trajectory Planning and Control**: Joint space trajectory planning; Cartesian space trajectory planning; polynomial trajectory planning; open-loop and closed-loop control; Proportional (P), Proportional-Derivative (PD), Proportional-Integral-Derivative (PID) control of manipulator. **Sensors and Robotic Perception**: Types of Sensors - position sensors, velocity sensors, force/torque sensors, vision sensors, tactile sensors; sensor integration - feedback mechanisms, state estimation, error correction; actuation Systems - electric, hydraulic, and pneumatic actuators, actuator selection criteria.
Unit-IV	**Robotic Grasping and Manipulation:** Fundamentals of grasping; types of robotic grippers; grasp analysis - form closure, force closure, grasp matrix; stability analysis; kinematics of multi-finger systems; force distribution and dexterous manipulation. **Legged Robotics and Locomotion:** Fundamentals of locomotion - active vs passive walking; static vs dynamic walking, Zero moment Point (ZMP) – Definition and mathematical formulation, Balance control- modeling of biped systems; gait generation; walking cycle phases; Design & Optimization of Legged Robots

Suggested Readings

1. R. K. Mittal, I. J. Nagrath, Robotics and Control, Tata McGraw Hill.
2. M. Spong, S. Hutchinson, M. Vidyasagar, Robot Modeling and Control, Wiley & Sons.
3. John J. Craig, Introduction to Robotics: Mechanics and Control, 3rd Edition, Pearson Education.

Useful Video links:

https://nptel.ac.in/courses/112104316

Course Code	MMER401A				
Course Title	Microprocessors and Microcontrollers				
Scheme and Credits	L	T	P	Credits	Semester-VII
	3	0	0	3	
Course Objectives	The objectives of this course are • To introduce the fundamental concepts of microprocessors and microcontrollers, focusing on the architecture, functional blocks, and signal descriptions of 8086 and 8051. • To provide knowledge of instruction sets, addressing modes, assembler directives, and assembly language programming. • To learn interfacing techniques of microprocessors and microcontrollers with memory, peripheral ICs, and devices such as ADC/DAC, keyboard, LCD, and LEDs. • To explore microcontroller programming, embedded applications, and recent advancements in processor technologies.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define the architecture, functional blocks, registers, and signals of 8086 microprocessor and 8051 microcontrollers.	Level 1: Remember
CO2	Explain the instruction sets, addressing modes, assembler directives, and programming concepts of 8086 and 8051.	Level 2: Understand
CO3	Apply assembly language programming and interfacing techniques to design circuits with memory, peripheral ICs and devices such as ADC/DAC, keyboard, LCD, and LEDs.	Level 3: Apply
CO4	Analyze microcontroller-based embedded applications by integrating programming, interfacing, and system design concepts for real-world problem solving.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit No.	Contents
Unit-I	**Fundamentals & 8085 Overview:** Evolution of microprocessors,8085 microprocessors, instruction set, Architecture, Basic Computer Organization Concepts **8086 Microprocessor:** Functional Diagram, Register Organization, Memory Segmentation, Signal Descriptions-Common Function Signals, Minimum and Maximum Mode Signals, Timing Diagrams, Interrupts of 8086.

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Unit-II	**Assembly Language Programming of 8086:** Instruction set and addressing modes, Assembler directives, Assembly programming logical, branch, and call instructions, evaluating arithmetic expressions, string manipulations.
Unit-III	**Memory & Peripheral Interfacing:** Interfacing with RAMs and ROMs, Peripheral ICs: 8255(programmable peripheral interface), 8259 (programmable interrupt controller), 8254 (programmable timer), LEDs, LCDs, Sensor/Transducer & Actuator Interfacing **Advanced Interfacing & System Concepts:** ADCs and DACs interfacing. Bus structure and timing, Interrupt handling and DMA concepts. Standard Interfaces (RS-232, USB).
Unit-IV	**8051 Architecture & Core Features:** Overview of 8051 microcontrollers, architecture, memory organization, Inbuilt modules: timers, serial communication, port operation, special function registers, timing and control, interrupts. **Programming, Interfacing & ARM:** Instruction set and programming: operand types, addressing modes, data transfer, arithmetic, logic, and control transfer instructions,8051 interfacing: memory and I/O interfacing - Introduction to ARM Cortex-M series. Application Examples of Microprocessors/Microcontrollers

Suggested Readings

- Douglas V. Hall, Microprocessors and Interfacing Programming and Hardware, Gregg Division, McGraw-Hill 2nd Edition.
- Kenneth J. Ayala, The 8051 Microcontroller, Cengage Learning, Thomson Delmar 3rd Edition
- A Nagoor Kani, Microprocessors and Microcontrollers, CBS Publishers.
- Ramesh S. Gaonkar, Microprocessor Architecture Programming and Applications with 8085, Penram International Publishing/ Prentice Hall 6th Edition.
- Eldhose P. Sim, A Comprehensive Guide for Microprocessor and Microcontroller, Notion Press 1st Edition.
- Santanu Chattopadhyay, Microprocessors & Microcontrollers, McGraw Hill 1st Edition.

Useful Video links

https://nptel.ac.in/courses/108105102

Course Code	MMER402A				
Course Title	Modelling and Simulation of Dynamic Systems				
Scheme and Credits	L	T	P	Credits	Semester-VIII
	2	0	0	2	
Course Objectives	The objectives of this course are • To introduce the fundamental principles of modelling and simulation of dynamic systems. • To build mathematical model for representing dynamic systems. • To equip students to simulate and optimize dynamic systems. • To interpret system responses for performance predication.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define fundamental principles of modelling and simulation of dynamic systems.	Level 1: Remember
CO2	Explain the dynamic systems interactions using appropriate modeling approaches.	Level 2: Understand
CO3	Apply modelling and simulation techniques to and optimize dynamic systems.	Level 3: Apply
CO4	Analyze the system responses to predict performance and dynamic characteristics.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit No.	Contents
Unit-I	**Introduction to Modelling and Simulation**: Introduction to modelling and simulation; types and classification of models; mathematical modelling of dynamic systems, introduction to simulation techniques: MATLAB as a Simulation tool. **Bond Graphs Modelling**: Elements of bond graph; causality assignment, generation of system equations, procedure for constructing bond graph models.
Unit-II	**Basic System Models**: Mathematical modelling of mechanical systems, electrical systems, hydraulic systems, pneumatic systems, thermal systems. **Combined Systems**: Linearity and non-linearity in systems, modelling of combined rotary and translatory systems, electro-mechanical systems, hydro-mechanical systems and basic modelling of robotic systems.
Unit-III	**Dynamic Response and Transfer Function:** Dynamic response of the first order system, second order system; performance measure of second order system; transfer function representation of dynamic systems.

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	System Representation Techniques: Block diagram algebra; signal flow graphs; state space formulation; frequency response analysis; bode plot and interpretation.
Unit-IV	**Simulation Applications**: Simulation using SIMULINK, simulation of simple and compound pendulum, simulation of planar mechanism, model validation and verification techniques. **Parameter Estimation and Optimization:** Parameter estimation methods; system identifications techniques; introduction to optimization; optimization of engineering systems using modelling and simulation tools.

Suggested Readings

1. Dean C. Karnopp, Donald L. Margolis, Ronald C. Rosenberg, "System Dynamics: Modelling, Simulation, and Control of Mechatronic Systems" Wiley India Pvt. Ltd.
2. Katsuhiko Ogata, "System Dynamics: Modelling and Simulation of Mechatronic Systems", Pearson Education India.
3. Robert L. Woods, Kent L. Lawrence, "Modeling and Simulation of Dynamic Systems", PHI Learning Pvt. Ltd., New Delhi.
4. Averill M. Law, W. David Kelton, "Simulation Modeling and Analysis", Tata McGraw-Hill Education India.
5. Wolfgang Borutzky, "Bond Graph Modelling of Engineering Systems" Springer India.
6. S. N. Shivanandam, S. P. Shivanandam, "Introduction to MATLAB & SIMULINK for Engineers" Wiley India

Useful Video links:

https://nptel.ac.in/courses/112107214

Course code	**MLMER303A**				
Course title	**Robotics Lab**				
Scheme and Credits	L	T	P	**Credits**	**Semester-V**
	0	0	4	**2**	
Course Objectives	The objectives of this course are • To study robot configurations, applications, and laboratory safety rules. • To teach a robotic arm points using a teach pendant. • To explore complex trajectories using a robotic arm. • To familiarise with various operations using a robotic arm.				
Assessment	25 Marks				
End Semester Practical Examination	25 Marks				
Total Marks	50				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

CO	Skill Demonstrated	RBT Level
CO1	Describe the basic facts, concepts, and safety rules.	Level 2 : Understand
CO2	Explain the basic operational procedure of robotic arm.	Level 2 : Understand
CO3	Apply the procedure to demonstrate the various types of robot operations.	Level 3: Apply
CO4	Analyze engineering requirements and select a suitable end effector for a given robotic application	Level 4: Analyze

List of Experiments

Sr. No.	Content	COs
1	To study different robotic configurations and their applications.	CO1
2	To study various safety rules and precautions followed in robotics lab.	CO1
3	To study and perform the homing operation of a robotic arm.	CO2
4	To teach robotic arm a point in space by using teach pendant.	CO2
5	To draw a triangle in particular frame by using robotic arm.	CO3
6	To draw a circle in particular frame by using robotic arm.	CO3
7	To make a complicated shape involving arcs and circle by using teach pendent.	CO3
8	To select suitable operating parameters and perform pick-and-place operation using a vacuum gripper using a robotic arm.	CO4

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9	To select appropriate operating parameters and perform material sensing operation by using robotic arm.	**CO4**
10	To select suitable operating parameters and perform two finger pick-and-place operation using a robotic arm.	**CO4**
11	To select appropriate operating parameters and perform magnetic pick and place operation by using robotic arm.	**CO4**
12	To select appropriate operating parameters and perform color sensing operation by using robotic arm.	**CO4**

Note: At least ten experiments are to be performed. Eight experiments should be from the above list and remaining two experiments may either be performed from the above list or as per the scope of the syllabus.

<table>
<tr><td>Course code</td><td colspan="5">MPMER304A</td></tr>
<tr><td>Course title</td><td colspan="5">Project-I</td></tr>
<tr><td rowspan="2">Scheme and Credits</td><td>L</td><td>T</td><td>P</td><td>Credits</td><td rowspan="2">Semester-VI</td></tr>
<tr><td>0</td><td>0</td><td>4</td><td>2</td></tr>
<tr><td>Course Objectives</td><td colspan="5">The objectives of this course are
• To identify an engineering problem through literature review and clearly define project objectives.
• To learn fundamental engineering principles to propose a feasible solution methodology.
• To inculcate skills in project planning, preliminary design, and use of appropriate engineering tools.
• To enhance teamwork, technical documentation, and presentation skills.</td></tr>
<tr><td>Assessment</td><td colspan="5">50 Marks</td></tr>
<tr><td>End Semester Practical Examination</td><td colspan="5">50 Marks</td></tr>
<tr><td>Total Marks</td><td colspan="5">100</td></tr>
<tr><td>Duration of Exam</td><td colspan="5">03 Hours</td></tr>
</table>

The students expected to take up a project under the guidance of teacher from the college. The Project must be based on **Robotics/Mechanical Engineering** problems, which can be extended up to the full semester. The students may be asked to work individually or in a group normally not more than three students in a group (if any large/ big projects occur then strength of students' can be increased as per guide supervision). Viva-voce must be based on the preliminary reports submitted by the students related to the project.

Course code	**MLMER403A**				
Course title	**Microprocessors and Microcontrollers Lab**				
Scheme and Credits	L	T	P	**Credits**	**Semester-VII**
	0	0	2	**1**	
Course Objectives	The objectives of this course are • Understand architecture and working of Microprocessor and Microcontroller. • Learn assembly programming for arithmetic and data operations. • Provide hands-on experience in interfacing various peripherals with processor based systems.				
Assessment	25 Marks				
End Semester Practical Examination	25 Marks				
Total Marks	50				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

CO	Skill Demonstrated	RBT Level
CO1	Explain the architecture and functioning of microprocessors and microcontroller used in robotics applications.	Level 2: Understand
CO2	Implement programs for arithmetic, data processing, and mathematical computations.	Level 3: Apply
CO3	Apply interfacing techniques to connect peripherals with computing devices for practical applications.	Level 3: Apply
CO4	Analyze embedded control algorithms for hardware interfacing and timing operations in robotics systems.	Level 4: Analyze

List of Experiments

Sr. No.	Content	COs
1	To study the architecture, pin configuration, and functional blocks of the 8085 microprocessor using an 8085 trainer kit.	CO1
2	Write and execute 8085 assembly language programs to perform arithmetic operations such as addition, subtraction, multiplication, and division	CO2
3	To study and analyze the architecture, pin configuration, and functional blocks of the 8086 microprocessor using the trainer kit.	CO1
4	To write and execute an 8086 assembly language program to add the contents of two memory locations and store the result in a third memory location.	CO2
5	To write and execute an 8086 assembly language program to perform addition and subtraction of 16-bit numbers using the 8086 instruction set.	CO2
6	To write and execute an 8086 assembly language program to perform multiplication and division of 16-bit numbers using the 8086 instruction set.	CO2

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7	Write an assembly language program to calculate the factorial of a given number using the 8086 instruction set.	CO2
8	Write an 8086 assembly language program to find the average of two given numbers using the 8086 instruction set.	CO2
9	To write and execute an 8086 assembly language program to interface a stepper motor using 8255 PPI and control its rotation.	CO3
10	To study the architecture and pin configuration of the 8051 microcontroller and understand the functions of its ports, control signals, and special purpose pins.	CO1
11	To write and execute a program to generate a square wave using the 8051 microcontroller.	CO4
12	To write and execute a program to interface an LED with the 8051 microcontroller and generate a blinking effect using software delay.	CO4

Note: At least ten experiments are to be performed. Eight experiments should be from the above list and remaining two experiments may either be performed from the above list or as per the scope of the syllabus.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, JHAJJAR

An Autonomous Institute | NAAC 'A' Grade Institute | Affiliated to MDU, Rohtak

Minutes of 3rd meeting of Board of Studies of Electronics and Communication Engineering (ECE) Department

The 3rd meeting of Board of Studies of Electronics and Communication Engineering (ECE) Department was held on 27.12.2025 at 10:30 A.M in the conference hall of the Institute.

The following members were present for the BOS meeting:

S.No.	Name of the Member	Affiliation/Organization	Designation within Board of Studies
1	Prof. Rakesh Kumar Joon	Head of the Department, ECE, GITAM Kablana	Chairperson
2	Prof. Manoj Taleja	Professor, NIT, New Delhi	Member
3	Prof. Sunil Mathur	Professor, MAIT, New Delhi	Member
4	Prof. Pardeep Sangwan	Professor, MSIT, New Delhi	Member
5	Dr. Vivek Kumar	Professor, GITAM, Kablana	Member
6	Dr. Rishu Bhatia	Professor, GITAM, Kablana	Member
7	Dr. Hitanshu	Professor, GITAM, Kablana	Member
8	Dr. Nitin Kumar	Professor, GITAM, Kablana	Member
9	Mr. Amit Dalal	Asst. Professor, GITAM, Kablana	Member
10	Mr. Satish	Asst. Professor, GITAM, Kablana	Member
11	Ms. Lalina	Asst. Professor, GITAM, Kablana	Member
12	Ms. Gagan Preet	Asst. Professor, GITAM, Kablana	Member
13	Ms. Ritu Juneja	Asst. Professor, GITAM, Kablana	Member
14	Mr. Vishal	Asst. Professor, GITAM, Kablana	Member
15	Ms. Sonia Arora	Asst. Professor, GITAM, Kablana	Member
16	Mr. Dhruv Malik	Asst. Professor, GITAM, Kablana	Member
17	Ms. Neetu Sharma	Asst. Professor, GITAM, Kablana	Member
18	Ms. Ritu Devi	Asst. Professor, GITAM, Kablana	Member
19	Ms. Ritu Rana	Asst. Professor, GITAM, Kablana	Member

20	Mr. Parveen Kumar	Asst. Professor, GITAM, Kablana	Member
21	Mr. Devender Nath Maurya	Mr. Devender Nath Maurya, Manager (R&D), Embedded Deptt. Company Name: Virtual Employee Pvt. Ltd. , J-38, Sector-63, Noida, GB Nagar, UP-201301	Member
22	Mr. Nishant Dev Rathi	Decimal Technologies, Urban Business Park sector-67 Gurugram	Member

At the outset the Chairperson welcomed all the members present in the meeting. The agenda items, as circulated prior to the meeting, were taken up for discussion.

Agenda wise Discussion and Resolutions

Item No. 3.1

Confirmation of the minutes of 2nd meeting of the Board of Studies (BOS) of Electronics and Communication Engineering (ECE) Department held on 25.05.2025.

The minutes of 2nd meeting of the Board of Studies of Electronics and Communication Engineering Department held on 25.05.2025 (Annexure 3.1, Pages 1-4 already circulated) be confirmed.

Item No. 3.2

Follow up action report of the decisions taken in the 2nd Meeting of Board of Studies held on 25.05.2025.

The follow up action report of the decisions taken in the 2nd Meeting of Board of Studies held on 25.05.2025 (Annexure 3.2, Page 5 already circulated) be noted.

Item No. 3.3

Scheme of Examinations and Syllabus of Minor/ Honors (Hons.)/ Specialization in VLSI Design and Technology from Academic Session 2025-26.

VLSI Design and Technology is a highly demanded and emerging specialization in the field of Electronics and Communication Engineering, as it focuses on the design and fabrication of integrated circuits that power almost every modern electronic device. From smart phones and laptops to medical equipment, satellites and AI processors, VLSI technology lies at the heart of technological innovation. With the rapid expansion of the global semiconductor industry, there is a growing demand for skilled VLSI engineers in design, verification and physical implementation roles. This specialization develops strong expertise in digital systems, semiconductor physics, CMOS technology and hardware description languages such as Verilog and VHDL. Pursuing VLSI as a minor or specialization enhances analytical abilities, industry readiness, and long-term career growth in core electronics and research domains.

Keeping in view of the above, the Department of Electronics and Communication Engineering has proposed to start a Minor/ Honors (Hons.)/Specialization Degree in **"VLSI**

Design and Technology" from the academic session 2025–26, with the aim of enhancing students' employability skills and imparting in-depth knowledge in emerging areas that are usually not comprehensively covered in the undergraduate degree framework. These emerging areas will help students tap into the wide range of employment opportunities available in these domains.

Resolved that the Scheme of Examinations and Syllabus of Minor/ Honors (Hons.)/ Specialization in VLSI Design and Technology from Academic Session 2025-26 be approved and further resolved that the Scheme of Examinations and Syllabus of the above is recommended to the Academic Council for approval (Annexure 3.3, Pages 6 - 23).

Item No. 3.4

Scheme of Examinations and Syllabus of Certificate Course on "IOT Fundamentals and its Applications" from Academic Session 2025-26.

Resolved that the Scheme of Examinations and Syllabus of Certificate Course on "IOT Fundamentals and its Applications" from Academic Session 2025-26 be approved and further resolved that the Scheme of Examinations and Syllabus of the above is recommended to the Academic Council for approval (Annexure 3.4, Pages 24-27).

Item No. 3.5

Review of the Panel of Examiners for Theory and Practical's of B. Tech and M. Tech programs for academic year 2025-26.

The panel of examiners for Theory and Practical Examinations of B.Tech and M.Tech Electronics and Communication Engineering programs for Academic Year 2025-26 has been reviewed and approved. The same is to be sent to the Controller of Examinations of the Institute for the Information (Annexure 3.5, Pages 28-30).

Item No. 3.6

Any other item with the permission of the chair.

The meeting concluded with the thanks to the Chair.

Chairperson
Board of Studies
Department of ECE

~~Annexure - 3.3~~

Annexure 4.5 b

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA (JHAJJAR)

An Autonomous Institute
'A' GRADE ACCREDITED BY NAAC

Evaluation Scheme & Syllabus

For

Minor/ Honors (Hons.)/ Specialization

in

VLSI Design and Technology

Department of Electronics & Communication Engineering

(Effective from the Session: 2025-26)

APPROVED BY AICTE, NEW DELHI AND AFFILIATED TO MDU, ROHTAK

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA, JHAJJAR (HR.)

Scheme of Studies and Examination

Minor/ Honors (Hons.) / Specialization in VLSI Design and Technology

w.e.f. 2025-26

Sr. No.	Semester	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Scheme (Marks)				Exam Duration in Hrs
				Lecture (L)	Tutorial (T)	Practical (P)			Assessment	End Semester Examination		Total	
										Theory	Practical		
1	IV	MECEVLSI-201A	Digital Design with Verilog	3	0	0	3	3	40	60		100	3
2	V	MECEVLSI-301A	VLSI Technology	3	0	0	3	3	40	60		100	3
3	VI	MECEVLSI-302A	Analog VLSI Design	3	0	0	3	3	40	60		100	3
4	VII	MECEVLSI-401A	Low Power VLSI Circuits & Systems	3	0	0	3	3	40	60		100	3
5	VIII	MECEVLSI-402A	VLSI Physical Design	3	0	0	3	3	40	60		100	3
6	IV	MLECEVLSI-202A	Digital Design with Verilog Lab	0	0	2	2	1	25		25	50	3
7	VI	MLECEVLSI-303A	Analog VLSI Design Lab	0	0	2	2	1	25		25	50	3
8	VIII	MLECEVLSI-403A	Project Work	0	0	6	6	3	50		50	100	3
							Total Credits	**20**				**700**	

Note: To earn the required credits for the award of B.Tech Minor/Honors (Hons.)/Specialization Degree, students may choose either:

(i) To enroll in courses offered through NPTEL/MOOCs that must be equivalent to the prescribed courses in the approved scheme, subject to availability in any semester.

OR

(ii) To complete the prescribed courses in the same semester as offered by the department under the approved scheme and curriculum structure.

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD-ECE

Course Code	MECEVLSI-201A				
Course Title	Digital Design with Verilog				
Scheme and Credits	L	T	P	Credits	Semester-IV
	3	0	0	3	
Course Objectives	The objectives of this course are • To introduce the fundamentals of Boolean algebra, logic gates, and HDL programming. • To explain the design and implementation of combinational and sequential circuits using HDL and CMOS concepts. • To understand finite state machines (FSMs), test benches, and simulation for digital systems. • To develop the ability to prototype digital designs on FPGA platforms and analyze performance.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define Boolean algebra concepts, truth tables, logic gates, and canonical representations of digital logic.	Level 1: Remember
CO2	Explain CMOS logic principles and structural behavior of digital circuits.	Level 2: Understand
CO3	Simplify Boolean expressions and design combinational, sequential, and finite state machine circuits.	Level 3 : Apply
CO4	Analyze FPGA architecture, timing constraints and resource utilization for digital circuit implementation.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Logic Fundamentals & Boolean Algebra: Boolean laws, truth tables, canonical forms (SOP, POS), Number Systems, Logic gates, Base conversions and signed number representation (1's & 2's only),Binary codes, Code converters, Prime Implicants, Minimization techniques: K-map, Quine-McCluskey(Tabulation method).

Unit-II

Combinational Circuit Design: CMOS Combinational Circuit: Design Half Adder, Full Adder, Multiplexer and Demultiplexer using CMOS. CMOS Sequential logic circuits: Design SR latch, SR flip flop, JK flip flop, D flip flop using CMOS. Comparator design, parity checker, decoders, multipliers. Ripple carry adder, Carry look-ahead adder.BCD adders, code converters.

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Unit-III

Sequential Circuit Design: Flip-flops (SR, JK, D, T) – CMOS latch and flip-flop design Registers (SISO, SIPO, PISO, PIPO) – CMOS register structures, Counters (asynchronous, synchronous, modulo N) – CMOS counter design, FSMs (Mealy & Moore) withVerilog.FSM minimization techniques, Implementation of flip-flops, counters, and registers in Verilog, ASM charts.RTL sequential multiplier.

Unit-IV

HDL Modeling & FPGA Prototyping: VHDL/Verilog syntax, modeling styles (behavioral, dataflow, structural) Test benches and simulation (Model Sim, Viv ado) FPGA synthesis, mapping, implementation, FSM testing, ASM methodology, Timing constraints and clock distribution in FPGA and optimization strategies.

Suggested Readings

- Digital Logic Circuits: With VHDL and Verilog Programs – A. Nagoor Kani
- Fundamentals of Digital Logic with VHDL Design – Stephen D. Brown & Zvonko Vranesic
- Digital Design: With an Introduction to Verilog HDL – M. Morris Mano & Michael Ciletti
- Digital Design Using Verilog- Charles H. Roth Jr., Lizy Kurian John
- Digital Systems Design Using Verilog-Charles H. Roth Jr., Lizy Kurian John
- Verilog Digital System Design-Zainalabedin Navabi

Useful Video Links

Unit No.	Topic	Link	Source
Unit-I	Boolean laws	https://www.youtube.com/watch?v=yqDDwJalxUk	NPTEL (IIT Delhi)
	Minimization using k- map	https://www.youtube.com/watch?v=BPBiyzc0OBw	NPTEL (IIT Kharagpur)
Unit-II	Design Half Adder	https://www.youtube.com/watch?v=85XxQZqBNlg	NPTEL (IIT Delhi)
	CMOS Sequential logic circuit: Design SR latch	https://www.youtube.com/watch?v=jm0PGDSSBkI	Unacademy
Unit-III	Logic Gate design using pass transistor:	https://www.youtube.com/watch?v=eqnMAaYU4OY	NPTEL (Madras)
	Basic principle, non-ideal effects, domino CMOS logic, high performance dynamic CMOS circuits, clocking issues, clock distribution	https://www.youtube.com/watch?v=q8adOpQx7tc	NPTEL (IIT Delhi)
Unit-IV	VLSI design methodology, design Hierarchy	https://www.youtube.com/watch?v=9QgdNsl9qwk&list=PLyqSpQzTE6M8iOrfy70ELk9W72JG5a98V	NPTEL (IIT Delhi)
	lambda-based design rules.	https://www.youtube.com/watch?v=OAxIm8up7QY	NPTEL (IIT Delhi)

NPTEL Link

nptel.ac.in/courses/106103358

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD-ECE

Course Code	MECEVLSI-301A				
Course Title	VLSI Technology				
Scheme and Credits	L	T	P	Credits	Semester-V
	3	0	0	3	
Course Objectives	The objectives of this course are • To introduce the basics of MOS fundamentals, fabrication technology and CMOS process steps. • To explain layout design rules, stick diagrams, and lambda-based design methodology. • To understand the complete VLSI design flow from RTL to GDSII using CAD tools. • To develop the ability to apply CAD tools for chip-level design and verification through case studies.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define VLSI evolution, Moore's Law and complete IC fabrication process flow stages.	Level 1: Remember
CO2	Explain MOS capacitor and MOSFET operation, scaling concepts and short-channel effects in modern devices.	Level 2: Understand
CO3	Apply CMOS fabrication processes, lithography, etching, metallization and integration techniques.	Level 3 : Apply
CO4	Analyze advanced VLSI technologies, reliability issues and TCAD-based process and device simulations.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction to VLSI Technology: Evolution of IC technology: SSI, MSI, LSI, VLSI, ULSI and Moore's Law and scaling challenges. Overview of fabrication process flow (wafer preparation, oxidation, lithography, etching, doping), Comparison of VLSI Design vs VLSI Technology focus, metallization, planarization (CMP), detailed process integration

Unit-II

MOSFET Fundamentals & Scaling: - MOS capacitor and MOSFET structure, Threshold voltage, channel formation, short-channel effects, Scaling theories, constant field scaling, constant voltage

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scaling, High-k dielectrics, metal gates, Fin FETs. MOSFET I–V characteristics, velocity saturation, sub threshold conduction, DIBL, mobility degradation.

Unit-III

Fabrication Technology: -Wafer fabrication steps: oxidation, diffusion, ion implantation, Photolithography and mask design, Etching techniques (wet, dry, plasma), Metallization and interconnect technology, Process integration for CMOS,CMP, isolation techniques, advanced lithography.

Unit-IV

Advanced VLSI Technology: -Low-power and high-speed technology trends, SOI (Silicon-on-Insulator), Emerging technologies, Reliability issues: hot carrier effects, NBTI, electro migration, TCAD basics, process and RTL device/Process/device simulation basics. Reliability testing methodologies, Packaging and yield issues

Suggested Readings

- VLSI Technology by Simon M. Sze (McGraw Hill)
- CMOS VLSI Design: A Circuits and Systems Perspective by Neil H.E. Weste & David Harris
- Introduction to VLSI Design Flow by Sneh Saurabh
- VLSI Fabrication Principles: Silicon and Gallium Arsenide by Sorab K. Ghandhi
- Modern VLSI Design: System-on-Chip Design by Wayne Wolf

Useful Video Links

Unit No.	Topic	Link	Source
Unit-I	Evolution of IC technology	https://www.youtube.com/watch?v=g6CCJAbdkK8&list=PLHO2NKv71TvsSqYwVvUCZwNkY-jUyUHdS	NPTEL-NOC IITM
	Overview of fabrication process flow	https://www.youtube.com/watch?v=Uj0QJliffcI	NPTEL IIT Guwahati
Unit-II	MOS capacitor and MOSFET structure	https://www.youtube.com/watch?v=faiEVOOCe-s	NPTEL IIT Roorkee
	short-channel effects, High-k dielectrics	https://www.youtube.com/watch?v=ftdNBEwNDm0	NPTEL - Indian IOS, Bengaluru
Unit-III	Wafer fabrication steps Photolithography Etching techniques.	https://www.youtube.com/watch?v=Tacv0fA9n_s	NPTEL IISc Bangalore
	Metallization and interconnect technology.	https://www.youtube.com/watch?v=HSn3G3r69QE&list=PLLy_2iUCG87AMeXL_nGl5_6-L-hD8IK6i	NPTEL IIT Roorkee
Unit-IV	Low-power and high-speed technology trends.	https://www.youtube.com/watch?v=KvN3JXICzdM	AI Uncovered
	Emerging technologies: CNTFETs, TFETs, Quantum devices.	https://www.youtube.com/watch?v=U9I9yFTxa6c&list=PLwdnzlV3ogoVGGv52O5biztwOcUewLEf5	NPTEL IIT Guwahati

NPTEL Link

nptel.ac.in/courses/117106093

Course Code	MECEVLSI-302A				
Course Title	Analog VLSI Design				
Scheme and Credits	L	T	P	Credits	Semester-VI
	3	0	0	3	
Course Objectives	The objectives of this course are • To introduce CMOS analog building blocks such as current mirrors, differential amplifiers, and small-signal models. • To explain the design principles of CMOS operational amplifiers, gain stages, and stability analysis. • To understand mixed-signal circuits including ADCs, DACs, and PLLs, and their role in communication systems. • To develop the ability to evaluate analog/mixed-signal designs for efficiency, noise, and real-world applications.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define MOS device types, amplifier types, and key terminology used in analog VLSI circuit design.	Level 1: Remember
CO2	Explain MOS device operation, small-signal models, second-order effects, and differential amplifier principles for analog circuits.	Level 2: Understand
CO3	Apply MOS amplifier configurations, current mirrors, feedback topologies, and small-signal models to design functional analog circuits.	Level 3: Apply
CO4	Analyze amplifier performance, frequency response, feedback effects, op-amp limitations, and VCO/PLL/DLL operation in analog VLSI. .	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

MOS Operation and Models: Basic MOS Device Physics: Device Structure and Operation, General Considerations, MOS I/V Characteristics, Finite Output Resistance in Saturation, Transconductance, Second Order effects: body effect, Channel length modulation, Subthreshold conduction, MOS small signal models, SPICE, Short Channel Effects: DIBL, velocity saturation, hot carrier, impact ionization.

Unit-II

MOS Amplifiers: Basic concepts, Single Stage Amplifiers: Basic Concepts, Common Source Stage: resistive load, diode connected load, current source load, triode load, source degeneration. Source Follower, Common Gate Stage, Cascode Stage. Folded cascode.

Differential Amplifiers: Single Ended and Differential Operation, Basic Differential Pair, Common Mode Response, Differential Pair with MOS loads, Gilbert Cell.

Unit-III

Frequency Response of Amplifiers: Passive and Active Current Mirrors: Basic Current Mirrors, Cascode Current Mirrors, Active Current Mirrors.
Frequency Response of Amplifiers: Amplifier transfer function, General Considerations, Miller Effect, Common Source Stage, Source Followers, Common Gate Stage, Cascode Stage, Differential Pair.

Unit-IV

Feedback Amplifiers: Feedback Amplifiers: General Considerations, Feedback Topologies, Effect of Loading. Operational Amplifiers: General Considerations, One Stage Op Amps, Two Stage Op Amps, Gain Boosting, Common Mode Feedback, Input Range limitations, Slew Rate, Power Supply Rejection.

Suggested Readings

- B.Razavi, "Design of Analog CMOS Integrated Circuits", 2nd Edition, McGraw Hill Edition 2016.
- Paul. R.Gray and Robert G. Meyer, "Analysis and Design of Analog Integrated Circuits", Wiley, 5th Edition, 2009.
- VLSI Design Techniques for Analog and Digital Circuits – Randall Geiger, Phillip Allen, Noel Strader
- Analog VLSI – Shih-Chii Liu (MIT Press)
- VLSI Design – K. Lal Kishore & V.S.V. Prabhakar

Useful Video Links

Unit No.	Topic	Link	Source
Unit-I	Basic MOS Device Physics	https://www.youtube.com/watch?v=MuBiC9yz2fc	NPTEL IIT Madras
	Short Channel Effects	https://www.youtube.com/watch?v=6Yxz4gJYDWw	IIScBangalore.
Unit-II	Single Stage Amplifiers	https://www.youtube.com/watch?v=ghnE-zAt7LQ&list=PLvk3cI7PEisx4x9oeqV84O90gpAPwTz1f	Clearcon
	Differential Amplifiers	https://www.youtube.com/watch?v=xJCwoEuyuAY	NPTEL IIT Delhi
Unit-III	Current Mirrors	https://www.youtube.com/watch?v=vueo1EeSPYo	NPTELIIT Kharagpur
	Amplifier transfer function	https://www.youtube.com/watch?v=jL0G_bvcmnY	FOKAL ACADEMY
Unit-IV	Feedback Amplifiers	https://www.youtube.com/watch?v=m4sjTt7rhow	NPTEL IIT Delhi
	VCO Circuit design	https://www.youtube.com/watch?v=YJLQk4jowFw	NPTEL IIT Guwahati

NPTEL Link :

nptel.ac.in/courses/108104193

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Course Code	MECEVLSI-401A				
Course Title	Low Power VLSI Circuits & Systems				
Scheme and Credits	L	T	P	Credits	Semester-VII
	3	0	0	3	
Course Objectives	The objectives of this course are • To introduce the fundamentals of power dissipation in VLSI circuits, including dynamic, static, and leakage power. • To explain low-power techniques such as clock gating, multi-Vt design, power gating, and voltage scaling. • To understand circuit-level and architectural approaches for reducing power in processors and memory systems. • To develop the ability to analyze industry case studies of low-power processors and IoT chips.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define low-power VLSI concepts, chip types, and identify basic sources of power dissipation in digital circuits.	Level 1: Remember
CO2	Explain CMOS leakage, short-circuit currents, transistor/gate sizing, technology scaling, and probabilistic power analysis concepts.	Level 2: Understand
CO3	Apply SPICE simulation, gate-level power estimation, and low-power circuits/clock techniques to design and optimize digital VLSI circuits.	Level 3 : Apply
CO4	Analyze low-power architectures, logic and clock optimization, switching activity reduction, and trade-offs for system-level performance.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction: Need for Low power VLSI Chips, Sources of power dissipation, Dynamic dissipation in CMOS, Short Circuit current in CMOS, CMOS leakage current, Basic principle of Low power design, Impact of technology Scaling, Technology & Device innovation.
Simulation Power analysis: SPICE circuit simulators, gate-level logic simulation, capacitive power estimation, static state power, gate level capacitance estimation, architecture level analysis.

Unit-II

Probabilistic power analysis: Random logic signals, probability & frequency, probabilistic power analysis techniques, signal entropy.
Low Power Circuits: Transistor and gate sizing, Equivalent Pin Ordering, network restructuring, and Reorganization. Special Flip Flops & Latches design, high capacitance nodes, low power digital cells library.

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Unit-III

Logic level: Gate reorganization, signal gating, logic encoding, state machine encoding, pre-computation logic. Low power Architecture & Systems: Power & performance management, switching activity reduction, parallel architecture with voltage reduction, flow graph transformation, low power arithmetic components

Unit-IV

Low power Clock Distribution: Power dissipation in clock distribution, , Special Techniques: Power Reduction in Clock networks, Clock Gating, Low Power Bus, Delay balancing, and Low Power Techniques for SRAM.

Suggested Readings

- Low-Power VLSI Circuits and Systems Ajit Pal Oxford University Press, 2009
- Practical Low Power Digital VLSI DesignGary K. YeapSpringer, 1998
- Low-Power CMOS VLSI Circuit DesignKaushik Roy, Sharat PrasadWiley-Interscience, 2000
- Low-Power Digital VLSI Design: Circuits and Systems-Anantha Chandrakasan, Robert W. Brodersen
- Low-Power VLSI CMOS Design-Christian Piguet

Useful Video Links

Unit No.	Topic	Link	Source
Unit-I	Low power design	https://www.youtube.com/watch?v=TFOO1JAll2Y	NPTEL IIT Kharagpur
	SPICE circuit simulators	https://www.youtube.com/watch?v=Z6Cfbs0ODpg	NPTEL IIT Roorkee
Unit-II	probabilistic power analysis techniques	https://www.youtube.com/watch?v=TFOO1JAll2Y&list=PLBU5KursMXEMWAkoUPB5aqUPb3lKYqN6q	NPTEL IIT Delhi
	Special Flip Flops & Latches design	https://www.youtube.com/watch?v=YeAf3DlylyA	NPTEL-NOC IITM
Unit-III	Logic level Gate reorganization, signal gating	https://www.youtube.com/watch?v=_A7fUR2Itsc	VLSI Physical Design
	switching activity reduction	https://www.youtube.com/watch?v=ORtlxpW_LMU	NPTEL –IIT Kharagpur
Unit-IV	Power dissipation in clock distribution	https://www.youtube.com/watch?v=ae6nCRA7lyg	VLSI Academy
	Low Power Techniques	https://www.youtube.com/watch?v=TldMKf7jR70	NPTEL-IITBombay

NPTEL Link

nptel.ac.in/courses/106105034

Course Code	MECEVLSI-402A				
Course Title	VLSI Physical Design				
Scheme and Credits	L	T	P	Credits	Semester-VIII
	3	0	0	3	
Course Objectives	The objectives of this course are • To introduce partitioning algorithms such as Kernighan–Lin, spectral methods, and hierarchical partitioning. • To explain placement algorithms including simulated annealing, force-directed, and analytical methods. • To understand routing algorithms such as maze routing, line-probe, and Steiner tree approaches. • To develop the ability to perform timing analysis and optimization using CAD tool integration.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define basic terms and concepts related to VLSI physical design and computer-aided design flows.	Level 1: Remember
CO2	Explain algorithmic approaches and hierarchical methods used in physical design optimization.	Level 2: Understand
CO3	Apply optimization techniques within CAD tools to generate valid physical layouts under practical design constraints.	Level 3 : Apply
CO4	Analyze timing behavior and delay effects to evaluate trade-offs and achieve timing closure in VLSI designs.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Partitioning Algorithms: Kernighan–Lin Algorithm, Graph-based partitioning of circuits, Cost function minimization (cut size, balance constraints),Iterative improvement strategy, Applications in hierarchical design. Hierarchical Partitioning, Top-down and bottom-up approaches, Recursive bisection methods, multi-level partitioning for large-scale designs, Fiduccia–Mattheyses (FM) algorithm.

Unit-II

Placement Algorithms: Simulated Annealing, Probabilistic optimization for placement, Cost functions: wire length, congestion, timing, Cooling schedules and convergence criteria Analogy to physical systems (springs and forces),Iterative refinement for minimizing wirelength, Handling constraints (fixed blocks, density control), Quadratic placement formulation, Linear and nonlinear optimization techniques, Force-directed placement methods (spring analogy).

Unit-III

Routing Algorithms :Maze Routing Lee's algorithm for shortest path routing, Grid-based routing and congestion handling, Limitations and optimizations, Line-Probe Algorithms, Faster alternatives to maze routing, Trade-offs between accuracy and speed, Steiner tree Minimum Steiner tree problem for interconnect optimization, Approximation algorithms for multi-terminal nets, Global routing: coarse path planning across chip regions, Detailed routing: exact wire assignment with design rules, DRC (Design Rule Check) considerations, Channel routing and switchbox routing.

Unit-IV

Timing &Optimization: Static Timing Analysis (STA), Timing paths: setup and hold constraints, Clock skew, jitter, and timing closure, Slack calculation and critical path identification, Elmore delay model,RC delay estimation for interconnects, Impact of scaling on delay, Heuristic optimization for placement and routing, Performance-driven placement/routing optimization.

Suggested Readings

- Algorithms for VLSI Physical Design Automation – Naveed A. Sherwani
- Optimization Methods in VLSI Design – Apoorva S. Shastri
- SoC Physical Design: Complete Guide for PD Engineers – Veena Chakravarthi &Sivananda R. Koteswar
- VLSI Physical Design: From Graph Partitioning to Timing Closure-Andrew B. Kahng, Jens Lienig, Igor L. Markov, Jin Hu
- Modern VLSI Design: System-on-Chip Design-Wayne Wolf
- Principles of CMOS VLSI Design-Neil H. E. Weste, Kamran Eshraghian

Useful Video Links

Unit No.	Topic	Link	Source
Unit-I	Kernighan–Lin Algorithm	https://www.youtube.com/watch?v=95OB005rdtA	IIT Roorkee
	Laplacian matrix representation of circuit graphs	https://www.youtube.com/watch?v=FRZvgNvALJ4	Stanford University
Unit-II	Simulated Annealing	https://www.youtube.com/watch?v=TC9WNwM2noM	NPTEL IIT Kharagpur
	Quadratic placement formulation	https://www.youtube.com/watch?v=u_IZPrel3as	IIT Roorkee
Unit-III	Maze Routing Lee's algorithm for shortest path routing	https://www.youtube.com/watch?v=wVu5qN0E4ww	NPTEL IIT Madras
	Steiner tree algorithm	https://www.youtube.com/watch?v=_W-L7dNPvjY	NPTEL-NOC IITM
Unit-IV	Static Timing Analysis (STA)	https://www.youtube.com/watch?v=qC5ZPVaOgTI	NPTEL-NOC IITM
	Elmore delay model	https://www.youtube.com/watch?v=BIXuGEzHJsM	NPTEL-NOC IITM

NPTEL Link :

nptel.ac.in/courses/106105161

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD-ECE

Course Code	MLECEVLSI-202A				
Course Title	Digital Design with Verilog Lab				
Scheme and Credits	L	T	P	Credits	Semester-IV
	0	0	2	1	
Course Objectives	The objectives of this course are • To introduce HDL programming for combinational and sequential circuits. • To explain FSM modeling and simulation using CAD tools • To understand FPGA synthesis and mapping of digital designs. • To develop the ability to analyze timing and functionality of FPGA prototypes.				
Assessment	25 Marks				
End Semester Examination	25 Marks				
Total	50 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Design combinational digital circuits using HDL and demonstrate their functional behavior through simulation results.	Level 3: Apply
CO2	Design sequential digital circuits using HDL and their functional operation through simulation.	Level 3: Apply
CO3	Realize finite state machine–based digital systems using HDL and implement them on FPGA platforms.	Level 3: Apply
CO4	Evaluate HDL-based digital designs by judging logical correctness and timing performance using simulation waveforms.	Level 5: Evaluate

List of Experiments

Sr. No.	Contents	Cos
1	Design of half-adder and full adder using Verilog/VHDL.	CO1
2	Design and verify multiplexer and de-multiplexer circuits using HDL.	CO1
3	Implement and simulate encoder and decoder circuits using HDL.	CO1
4	Develop HDL models for basic logic gates and verify their logical operation.	CO4
5	Design and simulate SR, JK, D, and T flip-flops using HDL.	CO2
6	Implement up, down, and modulo-N counters using HDL.	CO2
7	Design and simulate SISO, SIPO, PISO, and PIPO registers using HDL.	CO2
8	Implement CMOS-based latches and flip-flops and study their sequential behavior.	CO2

9	Design and simulate a traffic light controller using finite state machine modeling in HDL.	CO3
10	Model and verify Mealy and Moore finite state machines using HDL.	CO4

Useful Video Links

Sr. No.	Topic	Link	Source
1	Design of half-adder and full adder using Verilog/VHDL.	https://youtu.be/lDbQq_t3N8I	Explore Electronics (You Tube)
2	Multiplexer and Demultiplexer design with HDL.	https://www.youtube.com/watch?v=BbhJnd0A9dI	Abhishek Sharma (You Tube)
3	Encoder and decoder implementation	https://www.youtube.com/watch?v=uiQuoUxPJZY	Learn Thought (You Tube)
4	HDL coding for basic gates (AND, OR, NOT, NAND, NOR, XOR).	https://www.youtube.com/playlist?list=PLgwJf8NK-2e5JBJcNCZ7tqc2XjbezGjS8	Engineering Funda
5	Traffic light controller using FSM in Verilog.	https://www.youtube.com/watch?v=hJhBhEcCc-c	Rahul Kumar (You Tube)
6	HDL modeling of Mealy and Moore FSMs	https://www.youtube.com/watch?v=EzMWYmRkHFQ&list=PLBInK6fEyqRhduNC2PI4FPJqAhwoNTe1d	Neso Academy

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD-ECE

Course Code	MLECEVLSI-303A				
Course Title	Analog VLSI Design Lab				
Scheme and Credits	L	T	P	Credits	Semester-VI
	0	0	2	1	
Course Objectives	The objectives of this course are • To introduce the fundamentals of CMOS analog building blocks such as current mirrors and differential amplifiers • To explain the design principles of CMOS operational amplifiers, gain stages, and stability analysis. • To understand mixed-signal circuits including ADCs, DACs, and PLLs, and their role in communication systems • To develop the ability to analyze and evaluate analog/mixed-signal designs for efficiency, noise, and real-world applications such as IoT and biomedical systems				
Assessment	25 Marks				
End Semester Examination	25 Marks				
Total	50 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

Cos	Skills Demonstrated	RBT Level
CO1	Explain MOSFET I–V characteristics and describe second order and short-channel effects, including the extraction of small-signal parameters.	Level 2 :Understand
CO2	Apply simulation techniques to implement a single-stage MOS amplifier, cascade, folded-cascade amplifiers and current mirror circuits.	Level 3 : Apply
CO3	Apply simulation methodologies to design and develop a differential amplifier for CMRR measurement and a two-stage CMOS op-amp using Miller compensation.	Level 3 : Apply
CO4	Analyze op-amp frequency response and stability, investigate VCO/PLL behavior, and examine feedback topologies under loading.	Level 4: Analyze

List of Experiments

Sr. No.	Contents	Cos
1	To study MOSFET I–V characteristics and extract small-signal parameters.	CO2
2	To study second-order and short-channel effects in MOSFETs.	CO2
3	To design and simulate a single-stage MOS amplifier.	CO3
4	To design cascade and folded-cascade amplifiers.	CO3
5	To design and simulate current mirrors.	CO3
6	To design a differential amplifier and measure its CMRR.	CO3

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7	To design a two-stage CMOS op-amp using Miller compensation.	CO3
8	To analyze frequency response and stability of op-amp circuits.	CO4
9	To design and simulate a Voltage-Controlled Oscillator (VCO) and Phase-Locked Loop (PLL).	CO4
10	To study feedback amplifier topologies and analyze the effect of loading.	CO4

Useful Video Links

Sr. No.	Topic	Link	Source
1	MOSFET I–V characteristics and small-signal parameter extraction.	https://www.youtube.com/watch?v=0UuC2mecFkA	Amit Solanki(You Tube)
2	Study of second order and short-channel effects.	https://www.youtube.com/watch?v=uiJhV6-OauEt	NPTEL IIT Roorkee
3	Design and simulation of single-stage MOS amplifiers)	https://www.youtube.com/watch?v=-PQ4oE_RHk0	NPTEL IIT Kharagpur
4	Cascade and folded cascade amplifier design.	https://www.youtube.com/watch?v=HxSHOPVIebA	NPTEL IIT Kanpur
5	Design and simulation of current mirrors	https://www.youtube.com/watch?v=vueo1EeSPYo	NPTEL IIT Kharagpur
6	Differential amplifier design and CMRR measurement.	https://www.youtube.com/watch?v=y3lqdbv8Cac	NPTEL, IIT Kanpur
7	Design of two-stage CMOS op-amp with Miller compensation.	https://www.youtube.com/watch?v=muJc6MaB_5M	Nithin Muralidharan (You Tube)
8	Frequency response and stability analysis of op-amp.	https://www.youtube.com/watch?v=CyJ0IxXWxrc	NPTEL IIT Madras
10	Feedback amplifier topologies and effect of loading	https://www.youtube.com/watch?v=7Xa3_UVI-w4&t=14s	Learning With Dr. Shaw (You tube)

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD-ECE

Course Code	MLECEVLSI-403A				
Category	Professional Core Courses				
Course Title	Project work				
Scheme and Credits	L	T	P	Credits	Semester- VIII
	0	0	6	3	
Course Objectives	The objectives of this course are • To expose students to real-world VLSI design and semiconductor engineering challenges. • To enable application of VLSI concepts, tools and hardware description languages effectively. • To develop understanding of planning, designing, testing, power, performance, area constraints and sustainable semiconductor design practices.				
Assessment	50 Marks				
End Semester Examination	50 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to:

COs	Skills Demonstrated	RBT Level
CO1	Define and identify domain-specific problems, design challenges and fundamental concepts in VLSI and semiconductor engineering.	Level 1: Remember
CO2	Explain a systematic simulation process, synthesis, physical design, documentation and technical presentation.	Level 2: Understand
CO3	Apply appropriate VLSI design methods and tools to develop optimized hardware solutions meeting given design specifications.	Level 3 : Apply
CO4	Analyze design constraints, ethical considerations, economic factors, manufacturability, sustainability and emerging trends in semiconductor project development.	Level 4: Analyze
CO5	Evaluate and justify VLSI design decisions based on power, performance, area, timing, reliability and scalability metrics.	Level 5 : Evaluate
CO6	Design and develop an optimized, cost-effective, and energy-efficient VLSI-based prototype addressing a defined engineering problem.	Level 6: Design

Note: Project Guidelines – Minor/Honours/Specialization in VLSI Design

1. Successful completion of the project work is compulsory for the award of the Minor/Honours/Specialization Degree.
2. Securing the minimum prescribed passing marks in this course is mandatory.
3. The course shall be evaluated for 50 marks each for internal and external assessment.
4. Projects may be undertaken individually or in groups of 2–3 students. For large or complex projects, group size may be extended with prior approval of the Guide/HOD.

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5. The project must address a clearly defined real-world or engineering problem in VLSI Design, semiconductor technology, or closely related domains of Electronics and Communication Engineering.
6. The scope of the project may include hardware implementation, software development, simulation, modeling, or a hybrid approach, as applicable.
7. The project shall follow a systematic methodology including problem identification, literature review, design, implementation, testing, and validation.
8. The project shall be undertaken under departmental supervision, either independently or jointly with an approved co-supervisor from an R&D organization or relevant industry, with prior permission of the Guide/HOD.
9. Students are encouraged and supported to prepare and present a research paper for conference presentation or journal publication, wherever feasible.
10. A comprehensive dissertation shall be submitted in the prescribed departmental format for evaluation.
11. Evaluation shall be conducted through periodic reviews, seminar presentations, project demonstrations, structured technical report submission, and viva-voce examination.

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ELECTRONICS AND COMMUNICATION ENGINEERING
CERTIFICATE COURSE ON "IOT FUNDAMENTALS AND ITS APPLICATIONS"

SESSION: 2025-26

Eligibility Criteria: At least senior secondary examination (10+2)/ITI with at least 50% marks (47.5% in case of SC/ST/Blind/Visually/Differently abled etc. candidates of Haryana only) from board of school education Haryana, Bhiwani or any other examination recognized by Maharshi Dayanand University, Rohtak as equivalent thereto.

Duration: 6 Months (Offering twice in an academic year)

Course Credits: 3

No. of Seats: 60

The reservation of seats is as given below

Sr. No.	Name of Program	Break of seats as per State Govt. Reservation Policy							DA/PwD /PH/ESM/DFF##	EWS**	No. of Sanctioned Seats
		AIC	EWS *	HOGV	SC#		BC (A)	BC (B)			
					OSC	DSC					
1	Certificate Course On IOT Fundamentals And Its Applications	8	3	23	5	5	8	6	1	1	60

Note: In the event of vacant seats remaining after the final date of allotment based on reservations; these may be allocated to general category candidates.

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ELECTRONICS AND COMMUNICATION ENGINEERING
SCHEME AND SYLLABUS CERTIFICATE COURSE

Course Code	CC-IOT-01				
Category	Certificate Course				
Course Title	IOT FUNDAMENTALS AND ITS APPLICATIONS				
Scheme and Credits	L	T	P	Credits	
	2	0	2	3	
Course Objectives	The objectives of this course are • To understand the fundamentals, evolution and architectures of the Internet of Things. • To introduce IOT access technologies and communication protocols for constrained networks. • To familiarize students with IOT design methodology and embedded hardware platforms. • To Expose IOT platforms and applications in various industrial domains.				
Theory Marks	50 Marks				
	End Semester Examination: 35 Marks			Internal Assessment: 15 Marks	
Practical Marks	25 Marks				
	External Assessment :15 Marks			Internal Assessment :10 Marks	
Total Marks	75 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Describe IOT concepts, evolution, enabling technologies, functional blocks, and basic components of IOT and IIOT systems.	Level 1: Remembering
CO2	Explain IOT architectures, access technologies, communication protocols, network structures, and security requirements.	Level 2: Understand
CO3	Use microcontroller programming and simulation tools to interface sensors, actuators, and basic input–output devices.	Level 3: Apply
CO4	Analyze IOT platforms and solutions for home, industrial, healthcare, and smart city applications.	Level 4: Analyze
CO5	Evaluate the performance and communication reliability of sensors used in an IOT system.	Level 5 – Evaluate
CO6	Design and implement a basic IOT application using Arduino, ESP8266/ESP32, or Raspberry Pi with sensors and actuators.	Level 6 – Create

Note: The Examiner will set nine questions in total. Question one will be compulsory. Question one will have 7 parts (preferably covering all units) of 1 marks each, and the remaining eight questions of 7 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, the first being compulsory and selecting one from each unit.

Unit No.	Contents
Unit-I	**Fundamentals of IOT:** Introduction to Internet of Things (IOT), Evolution of Internet of Things, Basic Electronics Components of IOT, Enabling Technologies, M2M Communication. **Simplified IOT Architecture**: Core IOT Functional Stack and IOT World Forum (IOTWF) standardized architecture. **Functional Blocks of an IOT Ecosystem:** Sensors, Actuators, Smart Objects and Connecting Smart Objects.
Unit-II	**IOT Access Technologies:** Physical and MAC layers, Topology and Security of IEEE 802.15.4, 802.11ah and Lora WAN. **Network Layer Protocol:** IP versions, Constrained Nodes and Constrained Networks, 6LoWPAN. **Transport and Application Layer Protocols:** Application transport mechanisms, Application Layer Protocols including CoAP and MQTT.
Unit-III	**IOT System Design and Simulation:** Basic Programming on Microcontroller using Tinkercad and its Simulation with LEDs & Serial Monitor. **IOT Hardware Platforms:** Arduino Board , ESP 32 , ESP 8266 and Raspberry pi
Unit-IV	**IOT Applications:** Health Care Equipments, Security, Industries, Home Appliances, Smart Cities, Overview of Industry 4.0 concepts and their relationship with IOT technology.

List of Experiments

Sr. No.	Contents	Relevant COs
1	To study various components used for designing circuits	CO1
2	To design & simulate circuit using Tinkercad and Arduino IDE software	CO6
3	Write a program to display data on Serial Monitor	CO2
4	Write a program to control LED blinking using microcontroller	CO3
5	Write a program to design Traffic light control using three LEDs	CO3
6	Write a program to interface Push-button with LED	CO3
7	Write a program to control LED using push-button	CO4
8	Write a program to interface Buzzer for audio indication	CO3
9	Write a program to interface buzzer, LED, and push-button	CO3
10	Write a program to verify Potentiometer operation as analog input	CO5
11	Write a program to control LED brightness using potentiometer (PWM)	CO4
12	Write a program to design circuit for distance measurement using ultrasonic sensor	CO3
13	Write a program to interface LDR with LED for light control system	CO3
14	Write a program to interface PIR sensor with LED for motion detection	CO3

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Note:

- Hardware used: Arduino or ESP
- At least 10 experiments are to be performed by the students. Faculty members can add 2-3 extraexperiment under topic beyond syllabus.

Suggested Readings:

Text Books:

- **IOT Fundamentals:** Networking Technologies, Protocols and Use Cases for Internet of Things by David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, Cisco Press 2017
- **Internet of Things** – A hands-on approach by Arshdeep Bahga, Vijay Madisetti Universities Press, 2015
- **Internet of Things**: Architecture, Design Principles and Applications by Rajkamal, McGraw Hill Higher Education

Reference Books:

- **The Internet of Things** – Key applic`ations and Protocols by Olivier Hersent, David Boswarthick, Omar Elloumi, Wiley, 2012
- **Architecting the Internet of Things** by Dieter Uckelmann, Mark Harrison, Michahelles and Florian (Eds), Springer, 2011.
- **Recipes to Begin, Expand, and Enhance Your Projects**, by Margolis,Arduino Cookbook and O"Reilly Media, 2nd Edition,Michael.

Useful Video Links:

Unit No.	Topics	Links
Unit-I	LDR interfacing with LED for light-based control	https://youtu.be/93jahzf2lK0
Unit-II	Distance measurement using ultrasonic sensor	https://youtu.be/pjKdQJuzRF4
Unit-III	PIR sensor interfacing with LED for motion detection	https://youtu.be/hjTTUl0yP94
Unit-IV	Smart gas detection using MQ2 Sensor	https://youtu.be/rgKu8QhqjZ0

Annexure 4.6 a

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, JHAJJAR
An Autonomous Institute | NAAC 'A' Grade Institute | Affiliated to MDU, Rohtak

Minutes of 3rd meeting of the Board of Studies of Computer Science and Engineering Department

The 3rd meeting of Board of Studies of Computer Science and Engineering Department was held on 27.12.2025 at 12:00 P.M in the office of Computer Science and Engineering Department.

The following members were present for BOS meeting:

SN	Name of the Member	Affiliation/Organization	Designation within Board of Studies
1	Dr. Nitin Kumar	HOD, CSE, GITAM Kablana	Chairperson
2	Prof. Yudhvir Singh	Director, UIET, MDU, Rohtak, University Nominee	Member
3	Prof. Yogesh Chaba	Subject Expert (Professor, CSE, GJU Science & Technology, Hisar), Outside Parent University	Member
4	Prof. Namita Gupta	Subject Expert (Professor, CSE, MAIT, New Delhi), Outside Parent University	Member
5	Dr. Pramod Kumar	Associate Professor, GITAM Kablana	Member
6	Dr. Poonam	Assistant Professor, GITAM Kablana	Member
7	Dr. Priyanka Rani	Assistant Professor, GITAM Kablana	Member
8	Ms. Upasna	Assistant Professor, GITAM Kablana	Member
9	Mr. Rahul	Assistant Professor, GITAM Kablana	Member
10	Mr. Jitender Kumar	Assistant Professor, GITAM Kablana	Member
11	Ms. Nisha Rani	Assistant Professor, GITAM Kablana	Member
12	Ms. Ritu Kadyan	Assistant Professor, GITAM Kablana	Member
13	Ms. Manjali	Assistant Professor, GITAM Kablana	Member
14	Ms. Aakansha	Assistant Professor, GITAM Kablana	Member
15	Ms. Smriti	Assistant Professor, GITAM Kablana	Member
16	Mr. Tarun Kumar	Assistant Professor, GITAM Kablana	Member
17	Ms. Naveen	Assistant Professor, GITAM Kablana	Member
18	Ms. Ritu Lohchab	Assistant Professor, GITAM Kablana	Member
19	Mr. Vikas	Assistant Professor, GITAM Kablana	Member
20	Ms. Preeti Sharma	Assistant Professor, GITAM Kablana	Member
21	Mr. Arihant Jain	Alumni	Member

At the outset the Chairperson welcomed all the members present in the meeting. The agenda items, as circulated prior to the meeting, were taken up for discussion.

Item No. 3.1

Confirmation of the minutes of 2nd meeting of the Board of Studies (BOS) of Computer Science and Engineering Department held on 28.05.2025.

Resolved that the minutes of 2nd meeting of the Board of Studies of Computer Science and Engineering Department held on 28.05.2025 (Annexure 3.1, Pages 1-4 already circulated) be confirmed.

Item No. 3.2

Follow-up action report of the decisions taken in the 2nd meeting of Board of Studies held on 28.05.2025.

Resolved that the Follow-up action of the decisions taken in the 2nd Meeting of Board of Studies held on 28.05.2025 be noted (Annexure 3.2, Pages 5-6 already circulated).

Item No. 3.3

Scheme of Examinations and Syllabus of Certificate Course on "Generative Artificial Intelligence" from Academic Session 2025-26.

Resolved that the Scheme of Examinations and Syllabus of Certificate Course on "Generative Artificial Intelligence" from Academic Session 2025-26 (Annexure 3.3 Pages 7-13) be approved and further resolved that the Scheme of Examinations and Syllabus of the above is recommended to the Academic Council for approval.

Item No. 3.4

Scheme of Examinations and Syllabus of

(a) Minor/Honors (Hons.)/Specialization in "Cyber Security"
(b) Minor Degree in "Data Science" and
(c) Minor Degree in "Artificial Intelligence and Machine Learning" from Academic Session 2025-26.

Resolved that the Scheme of Examinations and Syllabus be approved for

(a) Minor/Honors (Hons.)/Specialization in "Cyber Security" (Annexure 3.4(a) Pages 14-31)
(b) Minor Degree in "Data Science" (Annexure 3.4(b) Pages 32-49), and
(c) Minor Degree in "Artificial Intelligence and Machine Learning (Annexure 3.4(c) Pages 50-67)".

Further resolved that the above mentioned at (a)-(c) are recommended to the Academic Council for approval.

Item No. 3.5

Amendment in the Course Objectives and Course Outcomes for Course Code PCC-CSE-210A 2nd Year from Academic Session 2025-26.

Resolved that the Amendment in the Course Objectives and Course Outcomes for the course Code PCC-CSE-210A 2nd Year be approved with effect from the academic session 2025–26 and recommended to the Academic Council for approval.

Course Code PCC-CSE-210A	
Existing Course Objectives	**Revised Course Objectives**
The objectives of this course are • To introduce Python programming basics, including syntax, data types, and control structures. • To develop skills in Python data structures, functions, and recursion. • To explore Python's graphical programming, image processing, and GUI development. • To explain object-oriented programming, exception handling, and multithreading concepts.	The objectives of this course are • To introduce the fundamental concepts, history, and problem-solving nature of artificial intelligence. • To provide an understanding of core AI techniques for search, knowledge representation, reasoning, planning, and learning. • To develop the ability to apply appropriate AI methods to solve representative computational problems. • To familiarize students with modern AI systems, expert systems, neural networks, and emerging trends in artificial intelligence.
Existing Course Outcomes	**Revised Course Outcomes**
CO1: Recall fundamental Python programming concepts including syntax, data types, control structures, functions, object-oriented principles, and multithreading. **CO2:** Explain the use of Python data structures, file operations, graphical libraries, and GUI components for developing structured programs. **CO3:** Solve real life problem by developing Python programs using logic, functions, graphics, OOP, and multithreading. **CO4:** Analyze programming constructs and design techniques for efficient Python applications.	**CO1:** Define fundamental concepts of artificial intelligence, problem characteristics, knowledge representation, learning paradigms, and current AI trends. **CO2:** Explain search strategies, knowledge representation schemes, reasoning under uncertainty, planning approaches, and learning methods used in artificial intelligence. **CO3:** Apply appropriate AI techniques such as search algorithms, logical reasoning, probabilistic methods, and learning models to solve representative AI problems. **CO4:** Analyze AI problems to select suitable problem-solving, reasoning, planning, or learning approaches and evaluate their effectiveness.

Item No. 3.6

Panel of Examiners for Theory and Practical's of B. Tech and M. Tech programs for academic year 2025-26.

The panel of examiners for Theory and Practical's of B.Tech and M.Tech programs for academic Year 2025-26 be approved. The same is to be sent to the Controller of Examinations of the Institute for the Information (Annexure 3.5, Pages 68-70).

The meeting concluded with the thanks to the Chair.

Chairperson
Board of Studies
Computer Science and Engineering Deptt

~~ANNEXURE 3.3~~

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT

AN AUTONOMOUS INSTITUTE | NAAC 'A' GRADE | AFFILIATED TO MDU ROHTAK

CERTIFICATE COURSE ON "GENERATIVE ARTIFICIAL INTELLIGENCE"

SESSION: 2025-26

Eligibility Criteria: At least senior secondary examination (10+2) with at least 50% marks (47.5% in case of SC/ST/Blind/Visually/Differently abled etc. candidates of Haryana only) from board of school education Haryana, Bhiwani or any other examination recognized by Maharshi Dayanand University, Rohtak as equivalent thereto.

Duration: 6 Months (Twice in an Academic Year)

Course Credits: 3+1 = 4

No. of Seats: 30

The reservation of seats is as given below

Sr. No.	Name of Program	Break of seats as per State Govt. Reservation Policy							DA/PwD/PH/ESM/DFF##	EWS**	No. of Sanctioned Seats
		AIC	EWS*	HOGC	SC#		BC (A)	BC (B)			
					OSC	DSC					
1	Certificate Course On "**Generative Artificial Intelligence**"	**4**	**-**	**11**	**3**	**3**	**4**	**3**	**1**	**1**	**30**

Note: In the event of vacant seats remaining after the final date of allotment based on reservations, these may be allocated to general category candidates.

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SCHEME AND SYLLABUS CERTIFICATE COURSE

Course Code	**CC-GAI-01**				
Category	Certificate Course				
Course Title	Generative Artificial Intelligence				
Scheme and Credits	**L**	**T**	**P**	**Credits**	
	3	0	0	3	
Course Objectives	The objectives of this course are • To introduce basic concepts of Artificial Intelligence and Generative AI. • To develop practical understanding of generative AI tools for text, image, and video creation. • To enable learners to apply prompt-based techniques for effective content generation. • To create awareness of ethical, legal, and societal implications of generative AI technologies.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Explain the basic concepts of Artificial Intelligence and Generative AI, along with their applications and limitations.	Level 1: Remembering
CO2	Apply generative AI tools and structured prompting methods to produce relevant and accurate digital content.	Level 2: Understand
CO3	Apply generative AI technologies to create integrated multimodal outputs supporting learning, creativity, and communication needs.	Level 3: Apply
CO4	Analyze the broader impact of Generative AI adoption with respect to effectiveness, risks, trustworthiness, and responsible use.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction to Generative AI: Introduction to Artificial Intelligence and Generative AI, their scope and significance, distinction between traditional AI, machine learning, and generative models, types of Generative AI including text, image, audio, video generation models, applications of Generative AI in

various fields, limitations such as bias, data dependency, ethical issues, privacy risks, misinformation, copyright issues, deepfakes, and responsible use of AI-generated content.

Unit-II

Generative AI for text: Basic concepts of text generation, text preprocessing techniques such as tokenization, stemming, and lemmatization, generative AI tools such as ChatGPT, Google Bard/Gemini, Claude, Hugging Face text demos, and DeepAI for text generation, creating short essays, stories, summaries, translations, and question–answer content using prompts, basic prompt writing and comparison of outputs from different tools, awareness of limitations, bias, and responsible use of AI-generated text, applications of text-generative AI in education, entertainment, advertising, and social media.

Unit-III

Generative AI for images: Introduction to text-to-image generation concepts, use of free online Generative AI tools such as DALL·E, Stable Diffusion web demos, Craiyon, and Canva AI for creating images from text prompts, understanding simple prompt elements like objects, style, and colors, comparison of images generated by different tools, applications in design, art, education, and media, along with awareness of limitations.

Unit-IV

Generative AI for video generation: Introduction to text-to-video and image-to-video generation concepts, use of free or demo-based online tools such as Runway ML (free tier), Pika Labs (free credits), CapCut AI, Canva AI Video, and Stable Video Diffusion demos for creating short videos and animations, applications of generative AI videos in education, entertainment, advertising, and social media.

Suggested Readings:

1. Artificial Intelligence: A Guide for Thinking Humans by Melanie Mitchell, Farrar, Straus and Giroux, 2019.
2. Generative Deep Learning: Teaching Machines to Paint, Write, Compose, and Play by David Foster, O'Reilly Media, 2019.
3. Hands-On ChatGPT for Beginners by Michael Miller, Que Publishing, 2023.
4. Prompt Engineering for Generative AI by James Phoenix and Mike Taylor, O'Reilly Media, 2024.
5. Stable Diffusion for Beginners by Chris McCormick, Self-Published / Online Guide, 2023.
6. The Art of AI Image Generation by Umberto Nicoletti, Packt Publishing, 2023.

Official Online Documentation (Free Learning Resources):

1. ChatGPT Documentation, OpenAI, 2023.
2. Hugging Face Course, Hugging Face, 2022.
3. Runway ML Learning Hub, Runway AI, 2023.
4. Canva AI Help & Tutorials, Canva, 2023.
5. Google Responsible AI Practices, Google AI, 2022

Reference Books:

1. AI Ethics, Mark Coeckelbergh, MIT Press, 2020.
2. The Hundred-Page Machine Learning Book, Andriy Burkov, Andriy Burkov Publications, 2019.
3. Deep Learning, Ian Goodfellow, Yoshua Bengio, Aaron Courville, MIT Press, 2016.
4. GANs in Action: Deep Learning with Generative Adversarial Networks, Jakub Langr and Vladimir Bok, Manning Publications.

Tools Used:

Unit	Tools
I	ChatGPT, Google Gemini, Claude.
II	ChatGPT, Google Bard / Gemini, Claude, Hugging Face (text demos), and DeepAI.
III	DALL·E, Stable Diffusion (web demos), Craiyon, and Canva AI.
IV	Runway ML (free tier), Pika Labs (free credits), CapCut AI, Canva AI Video, and Stable Video Diffusion (demos).

Useful Video Links:

Unit No.	Topics	Links
Unit-I	Introduction to Artificial Intelligence	https://nptel.ac.in/courses/106102220?utm_source=chatgpt.com
Unit-II	Master ChatGPT and LLM Responses	https://youtu.be/_ZvnD73m40o?si=aBKJxxiLa08r-oPE
	Hugging Face Tutorial for Beginners	https://youtu.be/3xLTD5wSBEs?si=EfsV58QK4KUu4AGt
	How to Use Claude AI	https://youtu.be/yrphNwXox8c?si=YVzXFL99g6dZYLns
Unit-III	Using DALL-E to Generate Images & A.I. Art	https://youtu.be/bEq7NfNH58Q?si=sawiWnkiwKMvXqTL
	Text To Image Generator Project, Stable Diffusion	https://youtu.be/pFXVYrdok-Y?si=-ulz20filjCzYuuK
	Canva AI	https://youtu.be/Ryv4Q1qmxHs?si=HeFqiUC9x4u-1Ec6
Unit-IV	Runway AI Cinematic Video Generation	https://youtu.be/-og75MUlnFk?si=KEUVfz3-YIc32Ys2
	Pika Labs	https://youtu.be/F4vZTKOCeds?si=fpRE3LYN2DC1n6Xa
	CapCut AI	https://youtu.be/WPm6OxxkMzM?si=OXPmJo30jgt6nJYy

Course Code	**LC-CC-GAI-01**				
Category	**Certificate Course**				
Course Title	**Generative Artificial Intelligence Lab**				
Scheme and Credits	L	T	P	**Credits**	
	0	0	2	**1**	
Course Objectives	The objectives of this course are • To provide hands-on exposure to generative AI tools for text, image, and video creation. • To enable learners to apply prompt-engineering techniques for effective content generation. • To develop skills in evaluating AI-generated outputs for quality, bias, and ethical concerns. • To create awareness of responsible and ethical use of generative AI tools.				
Assessment	25 Marks				
End Semester Practical Examination	25 Marks				
Total Marks	50				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skill Demonstrated	RBT Level
CO1	Explain the working of Generative AI models and their distinction from traditional AI/ML systems.	Level 2: Understand
CO2	Apply prompt-engineering and text-processing techniques using generative AI tools to create and refine text-based content.	Level 3: Apply
CO3	Apply generative AI tools to create and refine multimodal outputs for real-world applications.	Level 3: Apply
CO4	Analyze performance, limitations, and ethical implications of generative AI systems.	Level 4: Analyze

List of Experiments

S. No.	Contents	COs
1.	To study AI, ML, and Generative AI concepts, applications, historical evolution, and ethical concerns.	CO1
2.	Use ChatGPT and Claude to generate formal and informal emails for real-life scenarios such as leave applications, internship requests, and complaint letters. Compare tone, clarity, and correctness.	CO2
3.	Generate concise summaries of long news articles using Google Gemini and Hugging Face text demos. Evaluate summaries based on coverage, coherence, and word limit.	CO2
4.	Translate real-world content such as government notices, travel instructions, or product descriptions between English and Indian regional languages using ChatGPT and DeepAI. Compare accuracy and fluency.	CO2
5.	Design a Q&A prompt to generate answers for common student queries (exam preparation, career guidance) using ChatGPT. Test factual correctness and explanation depth.	CO2

6.	Use ChatGPT and Claude to create resumes and cover letters for freshers applying for internships or entry-level jobs. Compare personalization and professionalism.	CO2
7.	Generate engaging product descriptions for items like mobile phones, books, or clothing using DeepAI and Hugging Face demos. Evaluate marketing effectiveness.	CO2
8.	Experiment with different prompt styles (instruction-based, role-based, constraint-based) in ChatGPT to generate the same content. Study how prompt variation affects output quality.	CO2
9.	Generate opinions on social or workplace scenarios using Google Gemini and Claude. Identify bias, assumptions, and ethical concerns in the responses.	CO4
10.	Create a short report using ChatGPT on where AI-generated text should and should not be used (academics, journalism, legal writing). Highlight limitations, plagiarism risks, and responsible practices.	CO4
11.	Use Canva AI to generate images for a college fest or seminar poster using text prompts. Experiment with different styles (modern, minimal, colorful) and analyze visual appeal.	CO3
12.	Generate Instagram/Facebook post images from short promotional text using DALL·E and Craiyon. Compare clarity, creativity, and suitability for social media.	CO3
13.	Create simple educational illustrations (e.g., water cycle, solar system, human heart) using Stable Diffusion web demos. Evaluate accuracy and usefulness in teaching.	CO3
14.	Generate multiple logo concepts for a fictional startup using DALL·E. Analyze how prompt keywords like color, shape, and industry affect the output.	CO3
15.	Create illustrations for a short children's story using Craiyon. Study how descriptive prompts improve character and background consistency.	CO3
16.	Use the same prompt in DALL·E, Stable Diffusion, and Craiyon. Compare realism, artistic quality, and prompt adherence.	CO4
17.	Generate product advertisement images (mobile phone, shoes, book cover) using Canva AI. Evaluate commercial usability and audience appeal.	CO3
18.	Modify prompt elements such as objects, style, lighting, and color in Stable Diffusion. Observe changes in image quality and detail.	CO3
19.	Generate images representing professions, genders, or cultures using DALL·E. Identify bias, stereotypes, or unrealistic portrayals.	CO4
20.	Create a case study using images generated from Craiyon to demonstrate ethical vs unethical use, including copyright concerns and deepfake risks.	CO4
21.	Create a short educational video (e.g., "Working of Solar Energy" or "AI in Daily Life") using Canva AI Video. Evaluate clarity, visuals, and suitability for classroom learning.	CO3
22.	Generate a 10–15 second story video from a text prompt using Runway ML (free tier). Analyze scene continuity and motion realism.	CO3
23.	Convert a static image into a short animated clip using Pika Labs. Observe how motion, camera movement, and effects enhance storytelling.	CO3
24.	Create a short promotional reel for a college event using CapCut AI features. Evaluate engagement potential for Instagram or YouTube Shorts.	CO3
25.	Generate a short product advertisement (mobile phone, book, or app) using Runway ML. Study how prompt wording impacts branding and appeal.	CO3
26.	Use the same prompt in Runway ML, Pika Labs, and Canva AI Video. Compare video quality, motion smoothness, and creativity.	CO4
27.	Create an awareness video (road safety, cyber safety, environment protection) using Canva or CapCut AI. Assess message effectiveness.	CO4
28.	Modify prompts by changing style, camera movement, duration, and mood using Pika Labs. Observe improvements or distortions in output.	CO3

29.	Generate a hypothetical scenario video using Stable Video Diffusion demo. Identify risks related to deepfakes, consent, and misuse.	**CO4**
30.	Prepare a short report using videos generated from Runway ML or Canva discussing ethical use, copyright concerns, privacy risks, and best practices.	**CO4**

Note: At least 20 experiments are to be performed by the students. Faculty members can add 2-3 extra experiment under topic beyond syllabus.

Virtual Lab Links

Experiment Name	Virtual Lab Link	Sources
To demonstrate stemming and lemmatization techniques in Natural Language Processing.	https://youtu.be/8rXD5-xhemo?si=8lAp_s0zPkvi6MAP	YouTube (Stanford Online)
To demonstrate attention mechanism and transformer architecture basics.	https://jalammar.github.io/illustrated-transformer/	Github
To implement a basic Generative Adversarial Network (GAN).	https://poloclub.github.io/ganlab/	Github
To demonstrate GAN variants such as DCGAN or Conditional GAN.	https://colab.research.google.com/github/tensorflow/docs/blob/master/site/en/tutorials/generative/dcgan.ipynb	Colab

Annexure 4.6 c

~~ANNEXURE 3.4(a)~~

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA (JHAJJAR)

An Autonomous Institute
'A' GRADE ACCREDITED BY NAAC

Evaluation Scheme & Syllabus

For

Minor Degree/Honors (Hons.)/Specialization

in

Cyber Security

Department of Computer Science and Engineering

(Effective from the Session: 2025-26)

APPROVED BY AICTE, NEW DELHI AND AFFILIATED TO MDU, ROHTAK

Minor Degree/Honors (Hons.)/Specialization
in
Cyber Security
Offered by the Department of Computer Science and Engineering

Cyber Security is an interdisciplinary field that combines computer science, information technology, and network engineering to protect digital systems, networks, and data from cyber threats. With the rapid expansion of digital infrastructure across industries, government services, and daily life, ensuring information security has become a critical priority. Recognizing its growing importance, the government is actively promoting education, research, and innovation in cyber security. Therefore, universities and institutions are encouraged to integrate cyber security into their academic programs.

In view of this, the **Department of Computer Science Engineering** has introduced a **Minor Degree/Honors (Hons.)/Specialization in "Cyber Security"** from the academic session **2025–26**. This program aims to enhance students' employability by providing specialized knowledge and practical skills in areas such as network security, ethical hacking, data protection, and cyber risk management—fields that are often not extensively covered in the regular undergraduate curriculum. The program will enable students to develop expertise in cyber security and prepare them for diverse career opportunities in this rapidly evolving domain.

This Minor Degree/Honors (Hons.)/Specialization will require earning 20 credits. It will be an addition to the regular undergraduate program, implying that passing or failing it will not affect the results of the regular undergraduate program being pursued by the student. Upon successful completion of the course, a Minor Degree/Honors (Hons.)/Specialization shall be awarded to the candidate. Students enrolled in B.Tech programs shall be eligible to pursue a Minor Degree/Honors (Hons.)/Specialization as outlined below:

Name of the Minor/Honors (Hons.)/Specialization Degree	**B.Tech Program whose students are eligible to opt for Minor Degree**	**B.Tech Program whose students are eligible to opt for Honors (Hons.)/Specialization**
Cyber Security	All Branches except Computer Science and Engineering, CSE-Artificial Intelligence and Machine Learning and CSE-Data Science	Computer Science and Engineering, CSE-Artificial Intelligence and Machine Learning and CSE-Data Science

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA, JHAJJAR (HR.)

Scheme of Studies and Examination

Minor Degree/Honors (Hons.)/Specialization in Cyber Security

(Effective from the Session: 2025-26)

Sr. No	Semester	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Scheme (Marks)				Exam Duration in H
				Lecture (L)	Tutorial (T)	Practical (P)			Assessment	End Semester Examination		Total	
										Theory	Practical		
1	IV	MCS202A	Information Security Fundamentals	3	0	0	3	3	40	60		100	3
2	V	MCS301A	Cryptography and Secure Communication	3	1	0	4	4	40	60		100	3
3	VI	MCS302A	Ethical Hacking and Penetration Testing	3	0	0	3	3	40	60		100	3
4	VII	MCS401A	Network Security	3	0	0	3	3	40	60		100	3
5	VIII	MCS402A	Cyber Laws and Ethics	3	0	0	3	3	40	60		100	3
6	VI	MLCS304A	Ethical Hacking and Penetration Testing Lab	0	0	2	2	1	25		25	50	
7	VII	MLCS403A	Network Security Lab	0	0	2	2	1	25		25	50	
8	VIII	MPCS404A	Project	0	0	4	4	2	50		50	100	
Total Credits								20				700	

Note: To earn the required credits for the award of B. Tech Minor Degree/Honors (Hons.)/Specialization, students may choose either:

(i) To enroll in courses offered through NPTEL/MOOCs that must be equivalent to the prescribed courses in the approved scheme, subject to availability in any semester.

OR

(ii) To complete the prescribed courses in the same semester as offered by the department under the approved scheme and curriculum structure.

Course code	MCS202A				
Course title	**Information Security Fundamentals**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	0	0	**3**	
Course Objectives	The objectives of this course are • To introduce fundamental concepts of information theory that underpin secure communication and cyber security systems. • To develop conceptual understanding of secrecy, authentication, privacy, and cryptographic security principles used in cyber environments. • To enable learners to reason about security mechanisms, attacks, and defences using information-theoretic and cryptographic models. • To provide analytical perspective on emerging cyber security challenges, including threats, forensic considerations, and security guarantees.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define key concepts of information theory and secure communication relevant to cyber security.	Level 1: Remember
CO2	Explain theoretical principles underlying secrecy, authentication, privacy, and cryptographic security.	Level 2: Understand
CO3	Apply information-theoretic and cryptographic models to reason about security mechanisms and attacks.	Level 3 : Apply
CO4	Analyze cyber security scenarios by evaluating threats, security guarantees, and investigative approaches.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Shannon's foundation of Information theory, Random variables, Probability distribution factors, Uncertainty/entropy information measures, Leakage, Quantifying Leakage and Partitions, Lower bounds on key size for secrecy, authentication, and secret sharing, provable security, computational security, motivation for symmetric cipher systems, role of entropy in key generation and randomness.

Unit-II

Secrecy, Authentication, Secret sharing, Optimistic results on perfect secrecy, Secret key agreement, Unconditional Security, Quantum Cryptography, Randomized Ciphers, Types of codes- block codes,

Hamming and Lee metrics, description of linear block codes, parity check Codes, cyclic code, Masking techniques.

Unit-III

Information-theoretic security and cryptography, basic introduction to Diffie-Hellman, AES, and side channel attacks. Secrecy metrics- strong, weak, semantic security, partial secrecy, Secure source coding, rate-distortion theory for secrecy systems, side information at receivers, Distributed channel synthesis.

Unit-IV

Cyber warfare: definition, evolution and objectives, cyberspace as a domain of warfare, cyber warfare vs cyber crime vs cyber terrorism, types of cyber warfare attacks including cyber espionage, sabotage, information warfare and DDoS attacks, nation-state cyber-attacks and cyber weapons.
Digital Forensics: introduction to digital and network forensics, digital forensic investigation process, types of digital evidence and sources, chain of custody and legal admissibility of digital evidence, role of digital forensics in incident response, connection of information theory concepts to modern cryptographic and forensic systems.

Suggested Readings:

1. Information Theory and Coding by Muralidhar Kulkarni and K. S. Shivaprakasha, John Wiley & Sons, 1st Edition.
2. Communication Systems: Analog and Digital by Singh and Sapre, Tata McGraw-Hill.
3. Fundamentals in Information Theory and Coding by Monica Borda, Springer, 1st Edition, 2011.
4. Information Theory, Coding and Cryptography by R. Bose, McGraw-Hill Education, 3rd Edition, 2008.
5. Information Security & Cyber Laws by Gupta & Gupta, Khanna Publishing House, 1st Edition, 2019.
6. "Multimedia System Design" by Prabhat K. Andleigh and Kiran Thakrar, Prentice Hall, 1st Edition, 1995.

Useful Video Links:

Unit No.	Topics	Links	Sources
Unit-I	Random Variable	https://youtu.be/snt3FVAVqHg?si=VPerGmbHCnbddfHv	NPTEL (IIT Delhi)
	Uncertainty/entropy information measures, Leakage	https://youtu.be/TT5Wm9jDR2A	NPTEL (IIT Bombay)
Unit-II	Secret Key Exchange (Diffie-Hellman)	https://youtu.be/2kfAga111ls?si=BCCh4CwcgUOdmV34	NPTEL (IIT Kharagpur)
	Quantum Cryptography	https://www.youtube.com/watch?v=BQhZpcg0sc4&list=PLyqSpQzTE6M8Pp2Z8kOAVyoSbw1UOPWQY	NPTEL (IIT Madras)
	Cyclic Codes	https://youtu.be/a_-vfzdvCFg?si=qeoPjw5h-GjT6ZpC	NPTEL (IIT Delhi)
Unit-III	AES	https://youtu.be/fMJl01wbmWE?si=Usn2dUJE9e_ZSwYd	NPTEL (IIT Kharagpur)
	Differential privacy	https://youtu.be/_wMBrZSBBow?si=2AsoeS0sl2RfQU1s	NPTEL (IIT Madras)
Unit-IV	Cyber Warfare	https://onlinecourses.nptel.ac.in/noc26_lw01/preview	Swayam (NALSAR University of Law)
	Digital Forensics	https://youtu.be/jEJYXu59ecQ?si=S2GjKBCqkwulGanI	YouTube (Mossé Cyber Security Institute)

Course code	**MCS301A**				
Course title	**Cryptography and Secure Communication**				
Scheme and Credits	L	T	P	**Credits**	**Semester-V**
	3	1	0	**4**	
Course Objectives	The objectives of this course are • To introduce the mathematical and algorithmic foundations of modern cryptography. • To explain formal security goals, definitions, and threat models used in cryptographic systems. • To familiarize students with symmetric-key primitives, block ciphers, and their provably secure constructions. • To develop an understanding of semantic, computational, and provable security concepts. • To enable students to analyze and reason rigorously about cryptographic security guarantees in secure communication systems.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	**Skills Demonstrated**	**RBT Level**
CO1	Define fundamental cryptographic primitives, security goals, and formal security models used in secure communication.	Level 1: Remember
CO2	Explain semantic and computational security, pseudorandom generators, and block cipher modes of operation.	Level 2: Understand
CO3	Apply provably secure constructions of cryptographic primitives such as PRGs, PRFs, and CPA-secure encryption schemes.	Level 3 : Apply
CO4	Analyze cryptographic definitions, reductions, and security proofs to evaluate the strength of secure communication mechanisms.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction and Symmetric Key Foundations: Overview of cryptography and secure communication, historical ciphers and motivation for modern cryptography. Security goals: confidentiality, integrity, and authenticity. Symmetric-key encryption: syntax and threat models. Perfect secrecy and Shannon's theorem, limitations of perfect secrecy. Computational security and adversarial models. Formal definition of semantic security. Introduction to pseudorandom generators (PRGs) and their basic properties.

Unit-II

Pseudorandom Functions and Stream Ciphers: Provable security definitions for pseudorandom generators. Practical constructions and instantiations of secure PRGs. Stream ciphers: design principles, security requirements, and real-world examples. Pseudorandom functions (PRFs): definitions,

constructions, and examples. Relationship between PRGs and PRFs and their role in secure communication protocols.

Unit-III

Block Ciphers and Modes of Operation: Block cipher fundamentals: definitions and security intuition. Construction of CPA-secure encryption schemes using PRFs. Standard block cipher modes of operation: ECB, CBC, and CTR modes. Security analysis and limitations of various modes. Principles of secure mode design. Provable security constructions based on block ciphers.

Unit-IV

Provable Security and Advanced Constructions: Introduction to provable security methodology. Game-based definitions and reduction-based proof techniques. Security of composition of cryptographic primitives. Advanced encryption notions: CCA security and authenticated encryption. Practical considerations in secure communication systems. Overview of real-world cryptographic standards and best practices.

Suggested Readings:

1. Foundations of Cryptography by Oded Goldreich, Volumes 1 & 2, Cambridge University Press.
2. Introduction to Modern Cryptography by Jonathan Katz & Yehuda Lindell, CRC Press.
3. Foundations of Cryptography Lecture Notes by Mihir Bellare & Phillip Rogaway.
4. A Graduate Course in Applied Cryptography by Dan Boneh & Victor Shoup, (freely available online).

Useful Video Links:

Course Name	Tutor	NPTEL Link
Foundations of Cryptography	Prof. Ashish Choudhury, IIT Madras	https://nptel.ac.in/courses/106106221

Course code	MCS302A				
Course title	Ethical Hacking and Penetration Testing				
Scheme and Credits	L	T	P	Credits	Semester-VI
	3	0	0	3	
Course Objectives	The objectives of this course are • To introduce ethical hacking principles, penetration testing methodologies, and legal–ethical frameworks. • To explain reconnaissance, system exploitation, malware, and network-based attacks from an attacker's perspective. • To enable understanding of web, wireless, and cryptographic attack surfaces and basic defensive measures. • To familiarize students with digital forensics fundamentals, incident response, and emerging hacking trends.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define ethical hacking concepts, penetration testing processes, and legal–ethical considerations.	Level 1: Remember
CO2	Explain reconnaissance, system hacking techniques, malware behavior, and network attack mechanisms.	Level 2: Understand
CO3	Apply ethical hacking concepts to analyze web, wireless, and cryptographic security weaknesses.	Level 3 : Apply
CO4	Analyze forensic evidence, incident response processes, and emerging security challenges.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Foundations of Ethical Hacking and Reconnaissance: Ethical hacking: definition, scope, objectives, ethical vs unethical hacking, roles of ethical hackers, legal and regulatory framework in India. Penetration testing concepts, penetration testing vs vulnerability assessment, penetration testing life cycle, threat modeling, red teaming and blue teaming.

Reconnaissance and footprinting: passive and active reconnaissance, WHOIS and DNS interrogation, search engine hacking, OSINT, basic network scanning and enumeration.

Unit-II

System Hacking and Malware: System hacking techniques: authentication weaknesses, password attacks, privilege escalation, maintaining access, backdoors. Malware fundamentals: viruses, worms, Trojans, ransomware, botnets – characteristics and propagation. Malware analysis overview: static vs dynamic analysis, indicators of compromise. **Sniffing and spoofing attacks:** packet sniffing concepts, ARP

poisoning, DNS spoofing, session hijacking. Basic countermeasures: system hardening, endpoint security, intrusion detection overview.

Unit-III

Network, Web, and Wireless Attacks: Network attacks: DoS and DDoS concepts, man-in-the-middle attacks, routing and protocol abuse, Web application attacks: web attack surface, OWASP Top 10 vulnerabilities, SQL injection, XSS, CSRF, authentication and session flaws, Wireless attacks: wireless security standards (WEP, WPA, WPA2, WPA3), rogue access points, evil twin attacks, Bluetooth threats, Overview of defensive mechanisms: firewalls, web application firewalls, intrusion prevention systems.

Unit-IV

Cryptographic Attacks, Forensics, and Emerging Trends: Cryptography from an attacker's view: weak encryption usage, password storage flaws, brute force and rainbow table attacks, PKI overview: digital certificates, trust models, common PKI and SSL/TLS misconfigurations. Digital forensics fundamentals: investigation process, evidence acquisition, chain of custody, log and memory analysis. Incident response basics and cyber law overview in India, Emerging trends: cloud misconfigurations, IoT hacking basics, mobile security threats, social engineering.

Suggested Readings:

1. CEH Certified Ethical Hacker Study Guide by Ric Messier, 4th Edition, Wiley, 2019.
2. The Web Application Hacker's Handbook by Dafydd Stuttard and Marcus Pinto, 2nd Edition, Wiley, 2011.
3. Hacking: The Art of Exploitation by Jon Erickson, 2nd Edition, No Starch Press, 2008.
4. Computer Security: Principles and Practice by William Stallings and Lawrie Brown, 4th Edition, Pearson, 2018.

Useful Video Links:

Course Name	Tutor	NPTEL Link
Ethical Hacking	Prof. Indranil Sengupta, IIT Kharagpur	https://onlinecourses.nptel.ac.in/noc23_cs44/preview

Course code	MCS401A				
Course title	Network Security				
Scheme and Credits	L	T	P	Credits	Semester-VII
	3	0	0	3	
Course Objectives	The objectives of this course are • To introduce secure network architectures, communication models, and fundamental principles of network security. • To explain transport, IP, wireless, email, and web security protocols with emphasis on secure design and vulnerability mitigation. • To familiarize students with network defense mechanisms, traffic monitoring, and incident response processes. • To enable analysis of emerging network security challenges in cloud, IoT, mobile, and zero-trust environments.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define network security concepts, secure architectures, threat models, and communication principles.	Level 1: Remember
CO2	Explain secure communication protocols, certificate infrastructures, and protocol-level vulnerabilities.	Level 2: Understand
CO3	Apply network defense mechanisms, monitoring tools, and mitigation strategies to protect communication systems.	Level 3 : Apply
CO4	Analyze advanced network security challenges, incident response scenarios, and emerging secure network architectures.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Network security fundamentals: CIA triad in network communication, Authentication–Authorization–Accounting (AAA), threat models and attack surfaces, secure network design principles: defense-in-depth, segmentation, DMZ, trusted vs. untrusted zones, conceptual analysis of DNS hijacking, man-in-the-middle attacks, and distributed denial-of-service (DDoS) attacks (case-study based).

Unit-II

Secure communication protocols: SSL/TLS architecture, handshake and record protocols, digital certificates and PKI, certificate pinning and HSTS, analysis of TLS vulnerabilities (BEAST, POODLE, Heartbleed) and mitigation strategies, IPSec architecture, AH and ESP headers, transport and tunnel modes, Internet Key Exchange (IKE), Virtual Private Networks (VPNs): site-to-site and remote-access VPNs.

Unit-III

Network defense and monitoring mechanisms: firewalls (packet filtering, stateful inspection, proxy and next-generation firewalls), Network Address Translation (NAT), Intrusion Detection Systems (IDS) and Intrusion Prevention Systems (IPS), signature-based and anomaly-based detection, Security Information and Event Management (SIEM) fundamentals, log collection and correlation, network traffic monitoring, anomaly detection, network-level incident response and forensic readiness.

Unit-IV

Advanced network security and emerging trends: wireless, email, and web security (secure configuration and protection), wireless security standards (WEP, WPA, WPA2, WPA3) and KRACK vulnerability analysis, email security (PGP, S/MIME), web security mechanisms (HTTPS, secure cookies, DNSSEC), cloud network security (VPCs, cloud firewalls, Web Application Firewalls, zero-trust models), IoT network security fundamentals, Zero Trust Network Architecture (ZTNA), Secure Access Service Edge (SASE), AI/ML-based network anomaly detection, post-quantum cryptography impact on network protocols.

Suggested Readings:

1. Network Security Essentials: Applications and Standards by William Stallings, 6th Edition, Pearson.
2. Cryptography and Network Security: Principles and Practice by William Stallings, 8th Edition, Pearson.
3. Computer Security: Principles and Practice by William Stallings & Lawrie Brown, Pearson.
4. Network Security Bible by Eric Cole, Wiley.
5. Applied Cryptography by Bruce Schneier, Wiley.
6. Network Security: Private Communication in a Public World by Kaufman, Perlman & Speciner, Prentice Hall.
7. Encyclopedia of Cryptography and Security by Henk C.A. van Tilborg (Ed.), Springer.

Useful Video Links:

Course Name	Tutor	NPTEL Link
Network Security	Prof. Gaurav S. Kasbekar, IIT Bombay	https://nptel.ac.in/courses/108101585?

Course code	MCS402A				
Course title	Cyber Laws and Ethics				
Scheme and Credits	L	T	P	Credits	Semester-VIII
	3	0	0	3	
Course Objectives	The objectives of this course are • To introduce the foundations of cyber law, cyberspace, and cyber jurisprudence. • To familiarize learners with the Information Technology Act, cyber-crimes, and electronic governance. • To outline cyber law in relation to intellectual property, allied laws, and dispute resolution. • To highlight cyber ethics, cyber regulations, and ethical issues in artificial intelligence.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define fundamental terms and concepts related to cyber law, cyberspace governance, cyber-crimes and cyber ethics.	Level 1: Remember
CO2	Explain the legal, regulatory and ethical frameworks governing activities and interactions in cyberspace, including emerging digital technologies.	Level 2: Understand
CO3	Apply cyber law principles and statutory provisions to address practical issues and case scenarios arising in digital environments.	Level 3: Apply
CO4	Analyze the broader implications of cyberspace technologies by evaluating legal compliance, ethical challenges and responsible use in contemporary society.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction to Cyber Law: Evolution of computer technology, emergence of cyber space, cyber jurisprudence, jurisprudence and law, doctrinal approach, consensual approach, real approach, cyber ethics, cyber jurisdiction, hierarchy of courts, civil and criminal jurisdictions, cyberspace web-space, web hosting and web development agreement, legal and technological significance of domain names, Internet as a tool for global access.

Unit-II

Information Technology Act: Overview of IT Act 2000, amendments and limitations of IT Act, digital signatures, cryptography, electronic governance, legal recognition of electronic records, legal recognition

of digital signature, certifying authorities, cyber crime and offences, Network Service Providers Liability, Cyber Regulations Appellate Tribunal, Penalties and Adjudication.

Unit-III

Cyber Law and Related Legislation: Patent Law, Trademark Law, Copyright, Software Copyright or Patented, Domain Names and Copyright disputes, Electronic Data Base and its Protection, IT Act and Civil Procedure Code, IT Act and Criminal Procedural Code, Relevant Sections of Indian Evidence Act, Relevant Sections of Bankers Book Evidence Act, Relevant Sections of Indian Penal Code, Relevant Sections of Reserve Bank of India Act, Law Relating To Employees And Internet, Alternative Dispute Resolution, Online Dispute Resolution (ODR).

Unit-IV

Cyber Ethics: Introduction to Cyber ethics, Significance of cyber Ethics, Need for Cyber regulations and Ethics. Ethics in Information society, Introduction to Artificial Intelligence Ethics: Ethical Issues in AI and core Principles.

Suggested Readings:

1. Textbook on Cyber Law by Pavan Duggal, Deccan Law House, 2007.
2. Cyber Law Simplified by Vivek Sood, Tata McGraw-Hill Publishing Company, 2001.
3. Cyber Laws, Information Technology and Artificial Intelligence by Jyoti Rattan, Eastern Book Company (EBC), 2023.
4. Introduction to Computer Security by Matt Bishop, Pearson Education, 2003.
5. Cyber Law and Cyber Crimes by Dr. Santosh Kumar and Dr. Gagandeep Kaur, Eastern Book Company (EBC), 2020.

Useful Video Links:

Unit No.	Topics	Links	Sources
Unit-I	Introduction to Cyber Laws	https://onlinecourses.swayam2.ac.in/cec24_cs14/preview	NPTEL (Punjabi University, Patiala)
	Cyber Security and Privacy	https://onlinecourses.nptel.ac.in/noc23_cs127/preview	NPTEL (IIT Madras)
Unit-II	Cryptography	https://youtu.be/B-Xe7_mf2CY?si=KuOwiHqLmyZXTzxH	NPTEL (IIT Kharagpur)
	Sections 11, 12, and 13 of Information Technology Act, 2000	https://www.youtube.com/watch?v=0BbBRRVX_I4	YouTube (Asian School of Cyber Laws)
Unit-III	Patent Law, Trademark Law, Copyright	https://youtu.be/xeAtjYoMa1A?si=53PJ532fA0NW2c2t	YouTube (Dhaval Chandarana)
	Indian patent act, 1970	https://youtu.be/8VGW5Y81SxU?si=-tjk0r-Nl02jIXVl	YouTube (Lawlecture by TarunaSharma)
Unit-IV	Introduction of Cyber Ethics	https://youtu.be/xeDZalBaLkQ?si=L0cCFKcxLJmOWXKF	YouTube (Dhaval Chandarana)
	Ethics in information society	https://onlinecourses.nptel.ac.in/noc23_hs47/preview	YouTube (IIT Bangalore)

Course Code	MLCS304A				
Course Title	Ethical Hacking and Penetration Testing Lab				
Scheme and Credits	L	T	P	Credits	Semester-VI
	0	0	2	1	
Course Objectives	The objectives of this course are • To provide hands-on exposure to ethical hacking tools, techniques, and methodologies. • To practice reconnaissance, scanning, exploitation, and basic post-exploitation activities in controlled environments. • To analyze common system, network, web, and wireless vulnerabilities through laboratory experiments. • To understand attacker techniques alongside basic defensive and forensic countermeasures. • To develop ethical awareness, legal compliance, and responsible hacking practices.				
Assessment	25 Marks				
End Semester Practical Examination	25 Marks				
Total Marks	50				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Understand ethical hacking concepts, penetration testing methodology, and legal frameworks through practical demonstrations.	Level 2: Understand
CO2	Apply reconnaissance, scanning, and enumeration techniques using standard ethical hacking tools.	Level 3: Apply
CO3	Perform controlled exploitation of system, network, web, and wireless vulnerabilities.	Level 3: Apply
CO4	Analyze attacks, malware behavior, logs, and incident evidence to propose countermeasures.	Level 4: Analyze

List of Experiments:

Sr. No.	Content	COs
1.	Install and configure an ethical hacking lab environment (Kali Linux/Parrot OS, Metasploitable, DVWA) and study ethical hacking laws and guidelines in India.	CO1
2.	Perform passive and active reconnaissance using WHOIS, DNS lookup, Google dorking, and OSINT tools.	CO2
3.	Network scanning and enumeration using Nmap: port scanning, service detection, OS fingerprinting.	CO2
4.	Perform vulnerability scanning using tools such as OpenVAS/Nessus; analyze scan reports.	CO2
5.	Demonstrate password attacks: dictionary and brute-force attacks on test systems using ethical tools.	CO3
6.	Perform privilege escalation and maintain access in a controlled lab environment.	CO3

7.	Study malware behavior using static and dynamic analysis tools; identify indicators of compromise.	CO2
8.	Demonstrate sniffing and spoofing attacks: packet capture, ARP poisoning, DNS spoofing in a sandbox.	CO3
9.	Exploit web application vulnerabilities (SQL Injection, XSS, CSRF) using OWASP DVWA / Juice Shop.	CO3
10.	Perform wireless security assessment: WEP/WPA attacks, evil twin simulation, Bluetooth scanning.	CO3
11.	Analyze cryptographic weaknesses: password hashing flaws, brute force and rainbow table attacks.	CO4
12.	Perform basic digital forensics: log analysis, memory dump inspection, evidence handling and chain of custody.	CO4

Note: At least 10 experiments are to be performed by the students. Faculty members can add 2-3 extra experiments under topic beyond syllabus.

Virtual Lab Links:

Experiment Name	Virtual Lab Link	Source
Network scanning using Nmaps	https://labex.io/labs/nmap-how-to-scan-multiple-ip-addresses-simultaneously-using-nmap-in-cybersecurity-414798	Labex
Cryptographic attacks	https://overthewire.org/wargames/bandit/	overthewire.org
SQL injection	https://portswigger.net/web-security/sql-injection	portswigger.net

Course Code	MLCS403A				
Course Title	Network Security Lab				
Scheme and Credits	L	T	P	Credits	Semester-VII
	0	0	2	1	
Course Objectives	The objectives of this course are • To understand network security fundamentals, threats, and cryptographic mechanisms through hands-on experiments. • To apply transport, IP-layer, wireless, email, and web security protocols in practical network environments. • To configure and analyze network defense mechanisms including firewalls, IDS/IPS, and monitoring tools. • To investigate network attacks, perform forensics, and study emerging trends such as cloud, IoT, and zero-trust security.				
Assessment	25 Marks				
End Semester Practical Examination	25 Marks				
Total Marks	50				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Understand network security principles, threats, cryptographic foundations, and secure network architectures.	Level 2: Understand
CO2	Apply security protocols and mechanisms at transport, IP, wireless, email, and web layers.	Level 3: Apply
CO3	Implement and configure firewalls, IDS/IPS, traffic monitoring, and secure network services.	Level 3: Apply
CO4	Analyze network attacks, security incidents, forensics evidence, and effectiveness of modern defense strategies.	Level 4: Analyze

List of Experiments:

Sr. No.	Content	COs
1	Install and configure Linux networking tools; study CIA triad, AAA, and basic cryptographic primitives.	CO1
2	Perform packet sniffing and traffic analysis using Wireshark; study plaintext credential leakage.	CO2
3	Implement and analyze spoofing attacks (ARP poisoning, MAC spoofing) in a controlled lab setup.	CO2
4	Perform scanning and reconnaissance using Nmap; analyze attack surface exposure.	CO2
5	Configure SSL/TLS; analyze handshake, certificates, PKI, HSTS, and certificate pinning.	CO2
6	Study TLS vulnerabilities Heartbleed, POODLE, BEAST) using simulations and test environments.	CO3, CO4

7	Configure IPSec in transport and tunnel modes; implement site-to-site and remote-access VPNs.	CO3
8	Implement wireless security: WEP/WPA/WPA2/WPA3 configuration; analyze 4-way handshake and KRACK.	CO3
9	Configure firewall rules (packet filtering, stateful, NAT, DMZ); analyze traffic behavior.	CO3
10	Deploy IDS/IPS (Snort/Suricata); analyze alerts and intrusion patterns.	CO4
11	Simulate DDoS attacks (SYN flood, UDP flood); study mitigation strategies and logging.	CO4

Note: At least 10 experiments are to be performed by the students. Faculty members can add 2-3 extra experiments under topic beyond syllabus.

Virtual Lab Links

Experiment Name	Virtual Lab Link	Source
TCP SYN Flood attack	https://ns-amrt.vlabs.ac.in/exp/tcp-syn-flood/	Virtual Labs
To simulate the S Socket Layer (SSL) transmission between er and a server	https://ns-amrt.vlabs.ac.in/exp/ssl-simulation/	Virtual Labs
Intrusion Detection Systems (IDS)	https://ns-amrt.vlabs.ac.in/exp/intrusion-detection/	Virtual Labs
Intrusion prevention system using firewalls	https://ns-amrt.vlabs.ac.in/exp/firewall/	Virtual Labs

Course code	**MPCS404A**				
Course title	**Project**				
Scheme and Credits	L	T	P	**Credits**	**Semester-VIII**
	0	0	4	2	
Course Objectives	The objectives of this course are • To identify an engineering problem through literature review and clearly define project objectives. • To learn fundamental engineering principles to propose a feasible solution methodology. • To inculcate skills in project planning, preliminary design, and use of appropriate engineering tools. • To enhance teamwork, technical documentation, and presentation skills.				
Assessment	50 Marks				
End Semester Practical Examination	50 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

The students expected to take up a project under the guidance of teacher from the college. The Project must be based on **Cyber Security** problems, which can be extended up to the full semester. The students may be asked to work individually or in a group normally not more than three students in a group (if any large/ big projects occur then strength of students' can be increased as per guide supervision). Viva-voce must be based on the preliminary reports submitted by the students related to the project.

Annexure 4.6 d

~~ANNEXURE 3.4(b)~~

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA (JHAJJAR)

An Autonomous Institute
'A' GRADE ACCREDITED BY NAAC

Evaluation Scheme & Syllabus

For

Minor Degree

in

Data Science

Department of Computer Science and Engineering

(Effective from the Session: 2025-26)

APPROVED BY AICTE, NEW DELHI AND AFFILIATED TO MDU, ROHTAK

Minor Degree
in
Data Science
Offered by the Department of Computer Science and Engineering

Data Science is an interdisciplinary field that integrates computer science, statistics, and mathematics to extract meaningful insights from large and complex datasets. With the rapid growth of digital technologies and data-driven decision-making across industries, government services, and research domains, the demand for skilled data science professionals has increased significantly. Recognizing its importance, the government is actively promoting education, research, and innovation in data science and related technologies. Therefore, universities and institutions are encouraged to incorporate data science into their academic programs.

In view of this, the **Department of Computer Science and Engineering** has introduced a **Minor Degree in "Data Science"** from the academic session **2025–26**. This program aims to enhance students' employability by providing specialized knowledge and practical skills in areas such as data analytics, machine learning, data visualization, and big data technologies fields that are often not extensively covered in the regular undergraduate curriculum. The program will enable students to develop expertise in data science and prepare them for diverse career opportunities in this rapidly evolving domain.

This Minor Degree will require earning 20 credits. It will be an addition to the regular undergraduate program, implying that passing or failing it will not affect the results of the regular undergraduate program being pursued by the student. Upon successful completion of the course, a Minor Degree shall be awarded to the candidate. Students enrolled in B.Tech programs shall be eligible to pursue a Minor Degree, as outlined below:

Name of the Minor	B.Tech Program whose students are eligible to opt for Minor Degree
Data Science	All Branches except Computer Science and Engineering, CSE-Artificial Intelligence and Machine Learning and CSE-Data Science

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA, JHAJJAR (HR.)

Scheme of Studies and Examination

Minor Degree in Data Science

(Effective from the Session: 2025-26)

Sr. No.	Semester	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Scheme (Marks)				Exam Duration in H
				Lecture (L)	Tutorial (T)	Practical (P)			Assessment	End Semester Examination		Total	
										Theory	Practical		
1	IV	MDS202A	Mathematics for DS	3	1	0	4	4	40	60		100	3
2	V	MDS301A	Fundamentals of DS	3	0	0	3	3	40	60		100	3
3	VI	MDS302A	Data Preparation and Preprocessing	3	0	0	3	3	40	60		100	3
4	VII	MDS401A	Data Handling and Visualization	3	0	0	3	3	40	60		100	3
5	VIII	MDS402A	Big Data Analytics	3	0	0	3	3	40	60		100	3
6	VI	MLDS304A	Data Preparation and Preprocessing Lab	0	0	2	2	1	25		25	50	
7	VII	MLDS403A	Data Handling and Visualization Lab	0	0	2	2	1	25		25	50	
8	VIII	MPDS404A	Project	0	0	4	4	2	50		50	100	
							Total Credits	**20**				**700**	

Note: To earn the required credits for the award of B. Tech Minor Degree, students may choose either:

(i) To enroll in courses offered through NPTEL/MOOCs that must be equivalent to the prescribed courses in the approved scheme, subject to availability in any semester.

OR

(ii) To complete the prescribed courses in the same semester as offered by the department under the approved scheme and curriculum structure.

Course code	MDS202A				
Course title	**Mathematics for DS**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	4	
Course Objectives	The objectives of this course are • To introduce the fundamentals of probability theory and random variables for modeling uncertainty in data science. • To develop understanding of discrete and continuous probability distributions and statistical measures for data analysis. • To enable application of estimation methods and descriptive statistics for parameter inference. • To cultivate skills in hypothesis testing and statistical decision-making for data-driven conclusions.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define fundamental concepts of probability, random variables, probability distributions, and statistical inference.	Level 1: Remember
CO2	Explain properties of discrete and continuous distributions, estimation methods, and hypothesis testing principles.	Level 2: Understand
CO3	Apply probability models, estimation techniques, and statistical tests to solve data-driven problems.	Level 3 : Apply
CO4	Analyze statistical data using distribution theory, correlation measures, and hypothesis testing frameworks to draw meaningful conclusions.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Foundations of Probability Theory: Random experiments and events, Definitions of probability and basic properties of probability functions. Conditional probability, independence of events. Problems on probability. Definition of random variables, probability distribution of a random variable, discrete and continuous distributions. Special discrete distributions: Bernoulli, Binomial, Geometric, Poisson. Introduction to discrete processes: Poisson process.

Unit-II

Continuous Distributions: Special continuous distributions – Exponential, Gamma, Beta, Uniform and related families; Normal distribution and applications. Joint distributions (discrete and continuous), independence, product moments, correlation, bivariate normal distribution, additive properties of distributions. Distribution of order statistics.

Unit-III

Descriptive Statistics: Measures of central tendency, dispersion, quantiles, moments, measures of skewness and kurtosis.
Estimation Theory: Concepts of unbiasedness, consistency, method of moments estimation (MME), maximum likelihood estimation (MLE).

Unit-IV

Hypothesis Testing: Basic definitions of hypothesis testing, types of errors. Tests for normal mean and variance, large-sample tests for variance, two-sample problems, paired t-test, testing equality of proportions. Sampling distributions – Chi-square, t-distribution and F-distribution.

Suggested Readings:

1. An Introduction to Probability and Statistics by V. K. Rohatgi and A. K. Md. E. Saleh, 3rd Edition, Wiley Series in Probability and Statistics, 2015.
2. Probability and Statistical Inference by R. V. Hogg, E. A. Tanis, and J. M. Rao, 7th Edition, Pearson Education, New Delhi, 2009.
3. John E. Freund's Mathematical Statistics with Applications" by Irwin Miller and Marylees Miller, 7th Edition, Pearson Education, Asia, 2006.
4. Fundamentals of Statistics, Vol. I by A. M. Goon, M. K. Gupta, and B. Dasgupta, 8th Edition, The World Press, Kolkata, 2002.
5. An Introduction to the Theory of Statistics by G. U. Yule and M. G. Kendall, 14th Edition, Universal Book Stall, Delhi, 1994.

Useful Video Links:

Unit No.	Topics	Links	Source
Unit-I	Random experiments, sample space, events	https://youtu.be/r1sLCDA-kNY?si=YjBpSNfFcBNXuixd	NPTEL (IIT Kharagpur)
	Conditional probability & independence	https://youtu.be/o1qL2Eb87Ew?si=ZT6TZex4bKfUGklD	NPTEL (IIT Guwahati)
	Special discrete distributions: Bernoulli, Binomial, Geometric, Poisson	https://youtu.be/dByGT1N8JAw?si=HKeIgCFrGXyg4yTl	NPTEL (IISC Bengaluru)
Unit-II	Normal distribution	https://youtu.be/GMcfFrsfBQU	NPTEL (IIT Kharagpur)
	Joint distribution	https://youtu.be/S_Zx-g8FU0w?si=ECEKIcSgAt4ICPq3	NPTEL (IIT Kharagpur)
	Order Statistics	https://youtu.be/E_sJQML1PMg?si=UFtbHnBcDhgT6ZrA	NPTEL (IIT Guwahati)
Unit-III	Moments	https://youtu.be/rlFR9Co8UgY?si=mrx7EcVoUtbxzAF	NPTEL (IIT Delhi)
	Maximum Likelihood Estimation	https://youtu.be/iXyMDeYqwaQ?si=og7R9e-rw_wvvBtF	NPTEL (IIT Guwahati)
Unit-IV	Hypothesis testing	https://youtu.be/6zslEdMGGiQ?si=v7L3lsCWuLR5W6TE	NPTEL (IIT Kharagpur)
	The Chi-Square Test	https://youtu.be/qUQ-alqJQag?si=lP3JMaggYy9lqv7q	NPTEL(IISER Kolkata)
	t and F Distribution	https://youtu.be/ZJHXVVjI1ns?si=XxJRVa06VOvjx4GY	NPTEL (IIT Kanpur)

Course code	MDS301A				
Course title	**Fundamentals of DS**				
Scheme and Credits	L	T	P	Credits	Semester-V
	3	0	0	3	
Course Objectives	The objectives of this course are • To understand the fundamentals and evolution of Data Science, including Big Data, Little Data, Machine Learning, Artificial Intelligence, and Data Analytics. • To learn the types of data, challenges in data science, and the role of a data scientist in handling and processing data effectively. • To acquire skills in statistical modeling, Python programming, and data handling techniques to analyze datasets and solve practical problems. • To develop the ability to analyze real-world datasets and design simple recommendation systems using statistical reasoning, Python tools, and utility matrices.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Recall and define the basic terminology, concepts, and scope of Data Science.	Level 1: Remember
CO2	Explain the data science process, types of data, and statistical foundations used in data analysis and decision-making..	Level 2: Understand
CO3	Apply statistical techniques and Python programming constructs to perform basic data analysis, file handling, and exception handling tasks.	Level 3 : Apply
CO4	Analyze real-world data problems and recommendation systems using statistical reasoning, Python-based approaches, and utility matrix concepts.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction: Evolution and scope of Data Science, Big Data vs Little Data, Data Science vs. Data Analytics vs. ML vs. AI, Types of data (structured, semi-structured, unstructured), Data Science life cycle / process, Challenges in data science, Data science process & role of a data scientist, Applications of Data Science in real-world domains (business, healthcare, social media).

Unit-II

Statistical Modeling for Data Science: Descriptive statistics (mean, median, mode, variance, standard deviation), Probability distributions (normal, binomial, Poisson), Sampling methods (Simple random sampling, Stratified sampling, Systematic sampling), Hypothesis testing, null and alternative hypotheses, Type-I and Type-II errors, Basics of confidence intervals.

Unit-III

Python for Data Science: Introduction to Python and its role in Data Science, Python basics, control structures, Data structures (lists, dictionaries), Files and exception handling, Python Libraries for Data Science (Introductory): NumPy (arrays and numerical operations), Pandas (Series, Data Frames, basic data manipulation), Matplotlib and Seaborn (basic data visualization).

Unit-IV

Recommendation systems: Introduction to recommendation systems, Types of recommendation systems (overview): Content-based, Collaborative filtering, Utility matrix and long tail concept, Applications and populating the utility matrix, Applications of recommendation systems.

Suggested Readings:

1. Python for Data Analysis, Second Edition – Wes McKinney, 2017, O'Reilly Media.
2. Elaine Rich, Kevin Knight, & Shivashankar B Nair, Artificial Intelligence, McGraw Hill, 3rd ed., 2009.
3. Introduction to Artificial Intelligence & Expert Systems, Dan W Patterson, PHI, 2010.
4. Artificial intelligence, Patrick Henry Winston, 1992, Addition Wesley.

Useful Video Links:

Unit No.	Topics	Links	Source
Unit-I	Evolution & scope, Big vs Little Data	https://www.youtube.com/watch?v=tA42nHmmEKw	NPTEL (IIT Madras)
	AI vs ML vs Data Science	https://www.youtube.com/watch?v=tA42nHmmEKw	NPTEL (IIT Madras)
	Types of data, challenges	https://www.youtube.com/watch?v=tA42nHmmEKw	NPTEL (IIT Madras)
Unit-II	Descriptive statistics	https://www.youtube.com/playlist?list=PLyqSpQzTE6M_JcleDbrVyPnE0PixKs2JE	NPTEL (IIT Madras)
	Mean/median/mode	https://www.youtube.com/playlist?list=PLyqSpQzTE6M_JcleDbrVyPnE0PixKs2JE	NPTEL (IIT Madras)
	Sampling	https://www.youtube.com/playlist?list=PLyqSpQzTE6M_JcleDbrVyPnE0PixKs2JE	NPTEL (IIT Madras)
Unit-III	Python basics	https://www.youtube.com/playlist?list=PLyqSpQzTE6M_fFg1zZmeGIkenMDgXKGYi	NPTEL (IIT Madras)
	File & exception handling	https://www.youtube.com/playlist?list=PLyqSpQzTE6M_fFg1zZmeGIkenMDgXKGYi	NPTEL (IIT Madras)
Unit-IV	Utility matrix	https://www.youtube.com/playlist?list=PLOAciEalMV3Hqaau-IJo_cR9k2k76ErJI	NPTEL (IIT Madras)
	Long-tail concept	https://www.youtube.com/playlist?list=PLOAciEalMV3Hqaau-IJo_cR9k2k76ErJI	NPTEL (IIT Madras)

Course code	MDS302A				
Course title	Data Preparation and Preprocessing				
Scheme and Credits	L	T	P	Credits	Semester-VI
	3	0	0	3	
Course Objectives	The objectives of this course are • To introduce the role of data preparation in the data science lifecycle. • To develop practical skills for cleaning, transforming, and preprocessing data using Python libraries. • To enable students to handle real-world data quality issues programmatically. • To enable students to design reproducible data preprocessing workflows using standard tools.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define the concepts, techniques, and workflows of data preparation, cleaning, transformation, feature engineering, and integration in data science.	Level 1: Remember
CO2	Explain methods for handling data quality issues, missing values, outliers, and preparing datasets for analysis and modeling.	Level 2: Understand
CO3	Apply data preprocessing, feature engineering, encoding, scaling, and integration techniques to prepare datasets for machine learning.	Level 3 : Apply
CO4	Analyze data preprocessing strategies, evaluate workflow effectiveness, and ensure readiness of datasets for modeling and deployment.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction to Data Preparation: Role of data preparation in data science; Types of data and data sources; Data quality dimensions and common issues; Data preprocessing workflow; Introduction to Python data science environment; Overview of NumPy and Pandas; Loading, inspecting, and summarizing datasets.

Unit-II

Data Cleaning and Missing Data Handling: Data cleaning process; Detection of missing values; Missing data treatment methods; Handling noisy data and outliers; Duplicate and inconsistent data handling; Data validation and integrity checks using standard techniques.

Unit-III

Data Transformation and Feature Engineering: Data transformation concepts; Normalization and standardization; Scaling techniques – Min-Max, Z-score, Robust scaling; Encoding categorical

variables – label encoding and one-hot encoding; Discretization and binning; Feature construction and extraction; Logarithmic and power transformations; Introduction to feature selection methods.

Unit-IV

Data Integration and Model Readiness: Data integration techniques; Dataset merging and joining; Data aggregation and grouping; Handling data from multiple sources; Dimensionality reduction concepts; Sampling techniques; Data reduction strategies; Preparing datasets for machine learning models; Train-test split; Cross-validation readiness; Reproducible preprocessing workflows.

Suggested Readings:

1. Python for Data Analysis by Wes McKinney, 2nd Edition, O'Reilly Media, 2018.
2. Python Data Science Handbook – Jake VanderPlas, 2016, O'Reilly Media
3. Python for Data Analysis by Wes McKinney, 3rd Edition, O'Reilly Media, 2022.
4. Python Data Science Handbook: Essential Tools for Working with Data by Jake VanderPlas, 1st Edition, O'Reilly Media, 2016.
5. Data Wrangling with Python – Jacqueline Kazil, Katharine Jarmul, 2016, O'Reilly Media.4.
6. Practical Statistics for Data Scientists, Second Edition – Peter Bruce, Andrew Bruce, 2020, O'Reilly Media.
7. Data Science from Scratch: First Principles with Python by Joel Grus, 2nd Edition, O'Reilly Media, 2019.
8. Feature Engineering for Machine Learning: Principles and Techniques for Data Scientists – Alice Zheng, Amanda Casari, 2018, O'Reilly Media.

Useful Video Links:

Unit No.	Topics	Links	Source
Unit-I	Role of data preparation in data science	https://onlinecourses.nptel.ac.in/noc22_cs32/preview	NPTEL (IIT Madras)
	Introduction to Python data science environment	https://www.youtube.com/watch?v=tA42nHmmFKw	NPTEL (IIT Madras)
	Introduction to Numpy library	https://www.youtube.com/watch?v=O0IrNk1qoUE&list=PLZ2ps__7DhBb2cXAu5PevQ_mzgS3Fj3Fs&index=90	NPTEL (IIT Madras)
	Why Pandas	https://www.youtube.com/watch?v=HCxhHo8tV4U&list=PLZ2ps__7DhBb2cXAu5PevQ_mzgS3Fj3Fs&index=91	NPTEL (IIT Madras)
Unit-II	Data Cleaning with Python	https://www.youtube.com/watch?v=ZX8vmcSTCrc	YouTube (Tech Classes)
	Handling noisy data and outliers	https://www.youtube.com/watch?v=s8wUc49kKMU	NPTEL (IIT Bombay)
Unit-III	Feature Engineering	https://www.youtube.com/watch?v=BdL-cKUG4hE	YouTube (Intellipaat)
	Min-Max & Z-score Techniques	https://www.youtube.com/watch?v=IggqimQzsGI	YouTube (Gate Smashers)
Unit-IV	Basics of Data Integrations	https://www.youtube.com/watch?v=3_12AZ0CEeo	YouTube (365 Data Science)
	Nonlinear Dimensionality Reduction Techniques -I	https://www.youtube.com/watch?v=841lv79yUUQ	NPTEL(IISc Bengaluru)
	Train, Test, & Validation Sets	https://www.youtube.com/watch?v=ZblqTCFnH-M	YouTube (Greg Hogg)

Course code	MDS401A				
Course title	**Data Handling and Visualization**				
Scheme and Credits	L	T	P	**Credits**	**Semester-VII**
	3	0	0	**3**	
Course Objectives	The objectives of this course are • To introduce students to Python-based data handling tools and structured data preparation techniques required for effective visualization. • To develop the ability to create clear, well-structured, and customizable static visualizations for exploratory and explanatory analysis. • To enable students to analyze multivariate and time-oriented data using appropriate statistical and advanced visualization techniques. • To cultivate skills in interactive visualization and data storytelling while emphasizing ethical and responsible visual communication.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Recall Python libraries, data structures, plotting functions, and basic visualization concepts for exploratory data analysis.	Level 1: Remember
CO2	Explain visualization components, design principles, plot types, and techniques for effective data storytelling and communication.	Level 2: Understand
CO3	Apply Python tools to create, customize, and analyze static and interactive visualizations for datasets using Matplotlib, Seaborn, and Plotly.	Level 3 : Apply
CO4	Analyze datasets visually, compare plotting methods, detect patterns, and interpret multivariate, temporal, and interactive visual insights.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Data Handling Basics: Overview of Python libraries: Pandas, NumPy, Matplotlib, Seaborn, Plotly, Understanding DataFrames in Pandas (structure differences vs R), Data loading using Pandas: from CSV, Excel, JSON, URL, Basic DataFrame manipulations: indexing, slicing, merging, grouping, Introduction to tidy data in Python.

Unit-II

Basics of Visualization Analytics Problems: Key Visualization Concepts, Visualization goals, communication, perception, clarity, Plot components: figure, axes, ticks, labels, legends, themes, Creating basic plots in Matplotlib: line chart, bar chart, pie chart, Customizing plots: colors, markers, grids, annotations, Subplots and layout management (Matplotlib gridspec, subplot2grid), Color palettes, themes, style settings, Enhanced barplots, countplots, distribution plots, PairGrid, FacetGrid concepts.

Unit-III

Statistical & Multivariate Visualization: Violin plots, Boxen plots, Jointplots & pairplots, Heatmaps for categorical & correlation data, Clustermaps.
Time & Multi-Dimensional Visualization: Multi-axis plots, Rolling window visualization, Bubble charts, spider/radar charts, Area charts, stacked charts.

Unit-IV

Plotly Interactive Visualization: Introduction to Plotly, Interactive line, bar, scatter plots, Plotly Express vs. Plotly Graph Objects, Interactive legends, hover labels, animations, 3D visualizations (surface, scatter3D, mesh plots).
Plotly Interactive Visualization: Visualization for insights vs. aesthetics, Data storytelling principles, Layout design for dashboards (Plotly Dash – conceptual only), Choosing effective chart types, Ethical visualization: misleading charts, scale distortions.

Suggested Readings:

1. Python for Data Analysis by Wes McKinney, O'Reilly Media, 2018.
2. Python Data Science Handbook by Jake VanderPlas, O'Reilly Media, 2016.
3. Python Data Visualization Essentials Guide by Kalilur Rahman, BPB Publications, 2021.
4. Data Visualization with Python and JavaScript by Kyran Dale, O'Reilly Media, 2016.
5. Mastering Matplotlib by Kirthi Raman, Packt Publishing, 2015.

Useful Video Links:

Unit No.	Topics	Links	Sources
Unit-I	Data Frames in Pandas	https://youtu.be/6DTFlKF8QIg?si=en5tm53K2XQN6Mw9	NPTEL (IIT Madras)
	Data loading	https://youtu.be/On6r1_c1l_MU?si=tZvRvW-7ZL2PKaj7	NPTEL (IIT Madras)
	Numpy	https://youtu.be/rjY59WLMK2o?si=q92faGhp3hT69w_X	NPTEL (IIT Madras)
Unit-II	Matplotlib	https://youtu.be/eFByJkA3ti4?si=cJ0ncTkbPsvA2i2p	NPTEL (IIT Madras)
	Plot components: figure, axes	https://youtu.be/eFByJkA3ti4?si=gcSAChRE0sMu_yIv	NPTEL (IIT Madras)
Unit-III	Jointplots & pairplots	https://youtu.be/JhK2qVi5dC4?si=0mVubJza7r5s-6xp	NPTEL (IIT Madras)
	Spider Graph	https://youtu.be/ONtrmxyxTsw?si=xMClNbs2Wb5tjTEZ	NPTEL (IIT Madras)
Unit-IV	Scatter plots	https://youtu.be/eFByJkA3ti4?si=WAMwmAUPQlirnsJ1	NPTEL (IIT Madras)

Course code	MDS402A				
Course title	Big Data Analytics				
Scheme and Credits	L	T	P	Credits	Semester-VIII
	3	0	0	3	
Course Objectives	The objectives of this course are • To introduce the fundamentals of Big Data, its characteristics, challenges, and the data science process. • To familiarize students with Big Data platforms, data repositories, data ecosystems, and data formats. • To develop the ability to apply Big Data modeling, storage, ingestion, and management techniques for scalable systems. • To enable students to analyze Big Data integration and processing pipelines using appropriate tools and workflow management systems.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define fundamental concepts of Big Data, its characteristics (Six V), data science process, and foundations of Big Data systems.	Level 1: Remember
CO2	Explain Big Data platforms, data repositories, data types, file formats, and modern data ecosystem components.	Level 2: Understand
CO3	Apply appropriate Big Data models, data storage techniques, data ingestion methods, and processing tools for scalable data management.	Level 3 : Apply
CO4	Analyze Big Data integration and processing pipelines, including data querying, aggregation, analytical operations, and workflow management tools.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction to Big Data: Big Data: Why and Where, Application and Challenges, Characteristics of Big Data and Dimensions of Scalability, The Six V, Data Science: Getting Value out of Big Data, Steps in the Data science process, Foundations for Big Data Systems and Programming, Distributed file systems.

Unit-II

Data Repositories and Big Data Platforms: RDBMS, NoSQL, Data Marts, Data Lakes, ETL, and Data Pipelines, Foundations of Big Data, Big Data Processing Tools, Modern Data Ecosystem, Key Players, Types of Data, Understanding Different Types of File Formats, Sources of Data Using Service Bindings.

Unit-III

Introduction to Big Data Modeling and Management: Data Storage, Data Quality, Data Operations, Data Ingestion, Scalability and Security Traditional DBMS and Big Data Management

Systems, Real Life Applications, Data Model: Structure, Operations, Constraints, Types of Big Data Model.

Unit-IV

Big Data Integration and processing: Big Data Processing, Retrieving: Data Query and retrieval, Information Integration, Big Data Processing pipelines, Analytical operations, Aggregation operation, High level Operation, Tools and Systems: Big Data workflow Management.

Suggested Readings:

1. Big Data Analytics by Seema Acharya and Subhasini Chellappan, 2015, Wiley.
2. Intelligent Data Analysis by Michael Berthold and David J. Hand, 2007, Springer.
3. Big Data and Business Analytics by Jay Liebowitz, 2013, Auerbach Publications (CRC Press).
4. Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop by Tom Plunkett and Mark Hornick, 2013, McGraw-Hill/Osborne Media (Oracle Press).
5. Mining of Massive Datasets by Anand Rajaraman and Jeffrey David Ullman, 2012, Cambridge University Press.
6. Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics by Bill Franks, 2012, John Wiley & Sons.
7. Making Sense of Data by Glenn J. Myatt, 2007, John Wiley & Sons.
8. Big Data Glossary by Pete Warden, 2011, O'Reilly Media.
9. Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses by Michael Minelli, Michele Chambers, and Ambiga Dhiraj, 2013, Wiley Publications.
10. Big Data Analytics: Disruptive Technologies for Changing the Game by Arvind Sathi, 2012, MC Press.
11. Harness the Power of Big Data: The IBM Big Data Platform by Paul Zikopoulos, Dirk DeRoos, Krishnan Parasuraman, Thomas Deutsch, James Giles, and David Corrigan, 2012, Tata McGraw-Hill Publications.

Useful Video Links:

Unit No.	Topics	Links	Source
Unit-I	Introduction to Big Data	https://youtu.be/rvJgArru8dI?si=WKCCX-VosNczfSzj	NPTEL (IIT Kanpur)
	Hadoop Distributed File System	https://youtu.be/0QIv4kk18Kg?si=FxQeaoBlepztA0XK	NPTEL (IIT Kanpur)
Unit-II	NoSQL	https://youtu.be/-s29jUAkg70?si=um-_zk8Xq6wipHEd	NPTEL (IIT Kanpur)
	Data Lakes	https://youtu.be/LxcH6z8TFpI?si=nDW2KBeKh9vGW_FE	YouTube (IBM Technology)
Unit-III	Introduction to Spark (Data operations and scalability)	https://youtu.be/-5yf4vCUsbQ?si=KET1yMZZxsdnCA2f	NPTEL (IIT Kanpur)
	Data Modeling	https://youtu.be/WSNqcYqByFk?si=2JWVZDxJN5jzIPAQ	NPTEL (IIT Bombay)
Unit-IV	Big Data Pipeline	https://youtu.be/eDGa095uSyk?si=xYjXNotbYEf0YUgR	YouTube (StudyIQ IAS)
	Big Data Workflow Management System: OOZIE	https://youtu.be/cPLi8l_sehY?si=1lXn6RpHRrgdE7ub	YouTube (CEC)

Course Code	MLDS304A				
Course Title	Data Preparation and Preprocessing Lab				
Scheme and Credits	L	T	P	Credits	Semester-VI
	0	0	2	1	
Course Objectives	The objectives of this course are • To enable students to implement Python programs for loading and summarizing datasets using NumPy and Pandas. • To guide students in performing data cleaning by handling missing values, duplicates, inconsistencies, and outliers. • To provide hands-on practice in applying data transformation techniques such as scaling, encoding, and feature engineering. • To train students to prepare integrated and model-ready datasets using sampling and validation strategies.				
Assessment	25 Marks				
End Semester Practical Examination	25 Marks				
Total Marks	50				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Implement dataset loading, inspection, and summarization using NumPy & Pandas.	Level 2: Understand
CO2	Perform data cleaning, missing value handling, and data validation.	Level 3: Apply
CO3	Apply data transformation and feature engineering techniques for preprocessing.	Level 3: Apply
CO4	Analyze and organize datasets to create model-ready data using appropriate sampling, reduction, and splitting strategies.	Level 4: Analyze

List of Experiments:

Sr. No.	Content	COs
1.	Install and explore Python data science environment (NumPy, Pandas, Matplotlib).	CO1
2.	Load datasets and perform inspection and statistical summary.	CO1
3.	Detect and handle missing values using different techniques.	CO2
4.	Identify and treat noisy data and outliers.	CO2
5.	Remove duplicate and inconsistent records.	CO2
6.	Perform normalization and standardization (Min-Max, Z-Score, Robust scaling).	CO3
7.	Encode categorical variables using Label Encoding and One-Hot Encoding.	CO3
8.	Perform discretization and binning of continuous data.	CO3
9.	Construct new features and perform feature extraction.	CO3

10.	Apply feature selection methods (filter-based techniques).	CO4
11.	Merge and join datasets from multiple sources.	CO4
12.	Perform data aggregation and grouping operations.	CO4
13.	Apply sampling techniques and dimensionality reduction.	CO4
14.	Prepare dataset for machine learning (train-test split and cross-validation readiness).	CO4

Note: At least 10 experiments are to be performed by the students. Faculty members can add 2-3 extra experiments under topic beyond syllabus.

Virtual Lab Links:

Experiment Name	Virtual Lab Link	Source
Load Dataset & Summary	https://colab.research.google.com/drive/1M8xTPtJVcY5UZTZusL6jiqooRBamkYen?usp=sharing	Google Colab
Missing Value Handling	https://colab.research.google.com/drive/1M8xTPtJVcY5UZTZusL6jiqooRBamkYen?usp=sharing	Google Colab
Encode categorical variables	https://colab.research.google.com/drive/1M8xTPtJVcY5UZTZusL6jiqooRBamkYen?usp=sharing	Google Colab

Course Code	MLDS403A				
Course Title	Data Handling and Visualization Lab				
Scheme and Credits	L	T	P	Credits	Semester-VII
	0	0	2	1	
Course Objectives	The objectives of this course are • To explore Python visualization libraries (Matplotlib, Seaborn, Pandas, Plotly) to represent data effectively. • To visualize trends, distributions, and comparisons using line charts, bar/column charts, pie/donut charts, and histograms. • Analyze relationships and detect patterns through scatter plots, correlation plots, box plots, and violin plots. • To Create advanced visualizations like 3D plots, heatmaps, and stacked charts for complex datasets.				
Assessment	25 Marks				
End Semester Practical Examination	25 Marks				
Total Marks	50				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Identify and use major Python data visualization libraries (Matplotlib, Seaborn, Pandas, Plotly) for handling different types of data.	Level 2: Understand
CO2	Apply suitable visualization techniques (line, bar, pie, histogram) to represent trends, categorical data, proportions, and distributions.	Level 3: Apply
CO3	Construct advanced and interactive visualizations including scatter plots, 3D plots, heatmaps, and stacked bar charts using Seaborn and Plotly.	Level 3: Apply
CO4	Analyze multivariate datasets to interpret relationships, correlations, and statistical variations using box plots, violin plots, and correlation plots.	Level 4: Analyze

List of Experiments:

Sr. No.	Content	COs
1.	To study and explore data visualization libraries in Python, including Matplotlib, Seaborn, Pandas, and Plotly.	CO1
2.	Write a Python program to visualize data trends over time using line charts.	CO2
3.	Write a Python program to compare categorical data using bar charts and column charts.	CO2
4.	Write a Python program to represent proportions and percentages using pie charts and donut charts.	CO2
5.	Write a Python program to analyze data distribution using histograms.	CO2

6.	Write a Python program to identify relationships and correlations between variables using scatter plots and correlation plots.	CO3 CO4
7.	Write a Python program to visualize statistical summaries and detect outliers using box plots and violin plots.	CO4
8.	Write a Python program to draw 3D plots using the Plotly library.	CO3
9.	Write a Python program to generate a 6×6 heatmap using random data and visualize it with Seaborn.	CO3
10.	Write a Python program to plot a stacked bar chart displaying sales of multiple products across different quarters.	CO3

Note: At least 10 experiments are to be performed by the students. Faculty members can add 2-3 extra experiments under topic beyond syllabus.

Virtual Lab Links:

Experiment Name	Virtual Lab Link	Source
Visualize data trends over time using line charts	https://colab.research.google.com/github/ageron/handson-ml2/blob/master/tools_matplotlib.ipynb	Google Colab
Represent proportions and percentages using pie charts and donut charts	https://colab.research.google.com/drive/1NsncQ_M5W5F8Z03nOj713Wjf_eW8k0AQ?usp=sharing	Google Colab
Draw 3D plots using the Plotly library	https://colab.research.google.com/drive/1-luSy55lQQrpNhJ_-W_w__rdaBgtNub0?usp=sharing	Google Colab

Course code	MPDS404A				
Course title	Project				
Scheme and Credits	L	T	P	Credits	Semester-VIII
	0	0	4	2	
Course Objectives	The objectives of this course are • To identify an engineering problem through literature review and clearly define project objectives. • To learn fundamental engineering principles to propose a feasible solution methodology. • To inculcate skills in project planning, preliminary design, and use of appropriate engineering tools. • To enhance teamwork, technical documentation, and presentation skills.				
Assessment	50 Marks				
End Semester Practical Examination	50 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

The students expected to take up a project under the guidance of teacher from the college. The Project must be based on **Data Science** problems, which can be extended up to the full semester. The students may be asked to work individually or in a group normally not more than three students in a group (if any large/ big projects occur then strength of students' can be increased as per guide supervision). Viva-voce must be based on the preliminary reports submitted by the students related to the project.

Annexure 4.6 e

~~ANNEXURE 3.4(c)~~

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA (JHAJJAR)

An Autonomous Institute
'A' GRADE ACCREDITED BY NAAC

Evaluation Scheme & Syllabus

For

Minor Degree

in

Artificial Intelligence and Machine Learning

Department of Computer Science and Engineering

(Effective from the Session: 2025-26)

APPROVED BY AICTE, NEW DELHI AND AFFILIATED TO MDU, ROHTAK

Minor Degree
in
Artificial Intelligence and Machine Learning
Offered by the Department of Computer Science and Engineering

Artificial Intelligence and Machine Learning is interdisciplinary fields that integrate computer science, mathematics, statistics, and data analysis to develop intelligent systems capable of learning from data and making decisions with minimal human intervention. With the rapid advancement of digital technologies and the increasing adoption of automation, smart systems, and data-driven solutions across industries, government services, healthcare, finance, and research sectors, the demand for skilled professionals in Artificial Intelligence and Machine Learning has grown significantly. Recognizing their strategic importance in technological advancement and economic development, the government is actively promoting education, research, and innovation in AI and ML technologies. Therefore, universities and higher educational institutions are encouraged to incorporate Artificial Intelligence and Machine Learning into their academic programs.

In view of this, the Department of Computer Science and Engineering has introduced a Minor Degree in "**Artificial Intelligence and Machine Learning**" from the academic session **2025–26**. This program aims to enhance students' employability by providing specialized knowledge and practical skills in areas such as intelligent systems, machine learning algorithms, deep learning, natural language processing, and computer vision—domains that are often not extensively covered in the regular undergraduate curriculum. The program will enable students to develop strong expertise in Artificial Intelligence and Machine Learning and prepare them for diverse career opportunities in this rapidly evolving technological landscape.

This Minor Degree will require earning 20 credits. It will be an addition to the regular undergraduate program, implying that passing or failing it will not affect the results of the regular undergraduate program being pursued by the student. Upon successful completion of the course, a Minor Degree shall be awarded to the candidate. Students enrolled in B.Tech programs shall be eligible to pursue a Minor Degree, as outlined below:

Name of the Minor	B.Tech Program whose students are eligible to opt for Minor Degree
Artificial Intelligence and Machine Learning	All Branches except Computer Science and Engineering, CSE-Artificial Intelligence and Machine Learning and CSE-Data Science

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA, JHAJJAR (HR.)

Scheme of Studies and Examination

B.Tech Minor Degree in Artificial Intelligence and Machine Learning

w.e.f. 2025-26

Sr. No.	Sem	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Scheme (Marks)				Exam Duration in H
				Lecture (L)	Tutorial (T)	Lecture (L)			Assessment	End Semester Examination		Total	
										Theory	Practical		
1	IV	MAIML202A	Mathematics for AI	3	1	0	4	4	40	60		100	3
2	V	PCC-CSE-210A	Artificial Intelligence	3	0	0	3	3	40	60		100	3
3	VI	MAIML302A	Python for AI	3	0	0	3	3	40	60		100	3
4	VII	MAIML401A	Machine Learning	3	0	0	3	3	40	60		100	3
5	VIII	MAIML402A	Applied Artificial Intelligence	3	0	0	3	3	40	60		100	3
6	VI	MLAIML304A	Python for AI Lab	0	0	2	2	1	25		25	50	
7	VII	MLAIML403A	Machine Learning Lab	0	0	2	2	1	25		25	50	
8	VIII	MPAIML404A	Project	0	0	4	4	2	50		50	100	
Total Credits								**20**				**700**	

Note: To earn the required credits for the award of B. Tech Minor Degree students may choose either:

(i) To enroll in courses offered through NPTEL/MOOCs that must be equivalent to the prescribed courses in the approved scheme, subject to availability in any semester.

OR

(ii) To complete the prescribed courses in the same semester as offered by the department under the approved scheme and curriculum structure.

Course code	MAIML202A				
Course title	**Mathematics for AI**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	4	
Course Objectives	The objectives of this course are • To introduce fundamental probability and statistical concepts required to model uncertainty in Artificial Intelligence. • To explain multivariate probability and statistical inference techniques used in data-driven AI systems. • To present information theory and optimization methods that underpin machine learning and deep learning algorithms. • To enable application of advanced mathematical tools to design, train, and evaluate Artificial Intelligence models.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define fundamental concepts of probability, random variables, statistical measures, and information theory used in Artificial Intelligence.	Level 1: Remember
CO2	Explain multivariate probability, statistical inference, and optimization principles relevant to AI and machine learning models.	Level 2: Understand
CO3	Apply probability distributions, estimation methods, and optimization techniques to solve AI-related computational problems.	Level 3 : Apply
CO4	Analyze AI models using information-theoretic measures, regularization techniques, and statistical evaluation to improve performance and generalization.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit–I

Probability Theory for Artificial Intelligence: Fundamentals of probability- sample space and events, axioms of probability, conditional probability, and Bayes' theorem. Random variables- discrete and continuous cases, probability mass function, probability density function, and cumulative distribution function. Mathematical expectation concepts- mean, variance, standard deviation, moments, covariance, and correlation. Study of standard probability distributions- Bernoulli, Binomial, Poisson, Uniform, and Gaussian distributions, and their relevance in AI systems.

Unit–II

Multivariate Probability and Statistical Inference: Multivariate probability concepts- joint distributions, marginal, conditional distributions, and multivariate Gaussian distribution, Statistical inference fundamentals, sampling techniques, estimation theory, and the bias–variance tradeoff. Parameter estimation methods- point estimation, Maximum Likelihood Estimation (MLE), and Maximum

A Posteriori (MAP) estimation. Hypothesis testing concepts- null and alternative hypotheses, confidence intervals, and Type I and Type II errors.

Unit–III

Information Theory and Optimization Techniques for AI: Core information theory concepts: information content, entropy, joint and conditional entropy, cross entropy, and Kullback–Leibler (KL) divergence. Optimization fundamentals: formulation of optimization problems, convex sets, convex functions, and their properties. Unconstrained optimization techniques- gradient descent, batch, stochastic, and mini-batch gradient descent, momentum-based methods. Constrained optimization using Lagrange multipliers and Karush–Kuhn–Tucker (KKT) conditions, and regularization techniques including L1 (Lasso), L2 (Ridge), and Elastic Net.

Unit–IV

Advanced Mathematics and Applications in AI: Numerical optimization concepts including numerical stability, condition number, and approximation errors. Graph theory fundamentals covering graphs and their types, adjacency matrix, degree matrix, and graph Laplacian. Geometry in high-dimensional spaces- metrics, curse of dimensionality, and manifold hypothesis. Mathematical foundations of deep learning- Universal Approximation Theorem, loss landscapes, and over-parameterization. Applications of probability, statistics, optimization, and information theory in AI- Bayesian inference, Naïve Bayes classifier, probabilistic models, training machine learning models, model evaluation, regularization, and avoiding overfitting.

Suggested Readings:

1. Mathematics for Machine Learning by Marc Peter Deisenroth, A. Aldo Faisal, and Cheng Soon Ong, 2019, Cambridge University Press.
2. Deep Learning by Ian Goodfellow, Yoshua Bengio, and Aaron Courville, 2016, MIT Press.
3. Linear Algebra and Its Applications by Gilbert Strang, 2016, Cengage Learning.
4. Probability, Random Variables and Stochastic Processes by Athanasios Papoulis and S. Unnikrishna Pillai, 2002, McGraw-Hill Education.
5. Convex Optimization by Stephen Boyd and Lieven Vandenberghe, 2004, Cambridge University Press.

Useful Video Links:

Unit No.	Topics	Links	Source
Unit-I	Sample space, events, axioms	https://youtu.be/POv_YgCqAv8?si=c5bqoYWFCuU2c7mx	NPEL(IIT Kanpur)
	Random variables, PMF, PDF, CDF	https://www.youtube.com/playlist?list=PLyqSpQzTE6M_JclcDbrVyPnE0PixKs2JE	NPTEL(IIT Tirupati)
	Moments	https://youtu.be/vNNLvowQqoU?si=46OGZxJWxSUYu392	NPTEL(IIT Kharagpur)
Unit-II	Multivariate Gaussian	https://youtu.be/XbA9CmYAfVk?si=d4bNUD3Xuv1eve5q	NPTEL(IIT Madras)
	Bias–variance tradeoff	https://youtu.be/1_8zmpy_Q7w?si=jmOB5OfbujSkvch_	NPTEL(IIT Madras)
	Type I & II errors	https://youtu.be/qqVWgxWn2d4?si=bG4Nq_BVclYT1d8e	NPTEL(IIT Madras)
Unit-III	Convex sets & functions	https://youtu.be/KZPq0bGbqDY?si=ve6tOWLZZmJsHTp2	NPTEL(IIT Bombay)
	Elastic Net, L1	https://youtu.be/sdoSkZRrBZI?si=hf46X2Kj-zb1zilf	NPTEL(IISC Bengaluru)
Unit-IV	Numerical stability, condition number	https://youtu.be/TWAN_T66Cps?si=hLJFP0ZhYR_9djlv	NPTEL (IIT Roorkee)
	Graph Theory	https://youtube.com/playlist?list=PLEAYkSg4uSQ2fXcfrTGZdPuTmv98bnFY5&si=6Kit5UiOlmavcmel	NPTEL (IISER Pune)
	Bayesian inference, Naïve Bayes	https://youtu.be/1B_IrrEo5ds?si=vOBgekF_IRikDYwu	NPTEL(IIT Madras)

Course code	PCC-CSE-210A				
Course title	Artificial Intelligence				
Scheme and Credits	L	T	P	Credits	Semester-V (Common with B. Tech. CSE/AI&ML/ Data Science 4th Semester)
	3	0	0	3	
Course Objectives	The objectives of this course are • To introduce the fundamental concepts, history, and problem-solving nature of artificial intelligence. • To provide an understanding of core AI techniques for search, knowledge representation, reasoning, planning, and learning. • To develop the ability to apply appropriate AI methods to solve representative computational problems. • To familiarize students with modern AI systems, expert systems, neural networks, and emerging trends in artificial intelligence.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define fundamental concepts of artificial intelligence, problem characteristics, knowledge representation, learning paradigms, and current AI trends.	Level 1: Remember
CO2	Explain search strategies, knowledge representation schemes, reasoning under uncertainty, planning approaches, and learning methods used in artificial intelligence.	Level 2: Understand
CO3	Apply appropriate AI techniques such as search algorithms, logical reasoning, probabilistic methods, and learning models to solve representative AI problems.	Level 3 : Apply
CO4	Analyze AI problems to select suitable problem-solving, reasoning, planning, or learning approaches and evaluate their effectiveness.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction: Definition of AI, History of AI, nature of AI problems, examples of AI problems. **Problem solving by search:** Uninformed Search: Depth First Search (DFS), Breadth First Search(BFS). Informed Search: Best First Search, A*. Local Search: Hill Climbing. Problem Reduction Search: AO*. Population Based Search: Ant Colony Optimization, Genetic Algorithm. Game Playing: MinMax Algorithm, Alpha-Beta Pruning.

Unit-II

Knowledge Representation: Types of Knowledge, Knowledge Representation Techniques/schemes: Propositional Logic, Predicate Logic, Semantic nets, Frames, Knowledge representation issues, Rule based systems.

Unit-III

Reasoning under Uncertainty: Basics of Probability Theory, Probabilistic Reasoning, Bayesian Reasoning, Dempster-Shafer Theory.
Planning: Introduction to Planning, Representation of Planning, Partial-order Planning.

Unit-IV

Learning: Introduction to Learning, Types of Learning: Learning by Induction, Rote Learning, Symbol Based Learning, Identification Trees, Explanation Based Learning, Transformational Analogy, Introduction to Neural Networks, Expert Systems, and Current trends in Artificial Intelligence.

Suggested Readings:

1. Artificial Intelligence: A Modern Approach, Third Edition by Stuart Russell and Peter Norvig, 2010, Pearson Education.
2. Elaine Rich, Kevin Knight, & Shivashankar B Nair, Artificial Intelligence, McGraw Hill, 3rd ed.,2009.
3. Introduction to Artificial Intelligence & Expert Systems, Dan W Patterson, PHI., 2010.
4. Artificial intelligence, Patrick Henry Winston, 1992, Addition Wesley.

Useful Video Links:

Unit No.	Topics	Links
Unit-I	Introduction to AI	https://youtu.be/aF1tQCEXLXY
	DFS, BFS	https://youtu.be/TMLyKcBtHuo
	Hill Climbing	https://youtu.be/ZOvRZ7UJMjk
	A* Algorithm	https://youtu.be/yMcZvZayJUA
Unit-II	Propositional Logic	https://youtu.be/5fZ_RnhvGMQ
	Semantic Nets	https://youtu.be/RTmafl2rzEw
	Rule based System	https://youtu.be/6kRYg1QVcWo
Unit-III	Bayesian Reasoning	https://youtu.be/cMN6ykIYF_U
	Probability Theory	https://nptel.ac.in/courses/117105085
	Partial-order Planning	https://www.youtube.com/watch?v=kyCibTQQQBE
Unit-IV	Introduction to Neural Networks	https://www.youtube.com/watch?v=QIhHqMnd9Wo
	Expert Systems	https://www.youtube.com/watch?v=nF5c5w4arzU

Course code	MAIML302A				
Course title	Python for AI				
Scheme and Credits	L	T	P	Credits	Semester-VI
	3	0	0	3	
Course Objectives	The objectives of this course are • To introduce the fundamentals of Python programming, including syntax, data types, control structures, and file handling. • To develop structured programming skills using Python data structures, functions, and recursion. • To familiarize students with numerical and data manipulation libraries such as NumPy and Pandas for handling real-world data. • To enable students to visualize and interpret data effectively using Matplotlib for exploratory and analytical purposes.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define core Python programming concepts, data structures, and library functionalities.	Level 1: Remember
CO2	Explain the working principles of Python programs, NumPy arrays, Pandas data structures, and visualization components.	Level 2: Understand
CO3	Apply Python, NumPy, Pandas, and Matplotlib to perform data processing, analysis, and visualization tasks.	Level 3 : Apply
CO4	Analyze datasets by selecting appropriate data manipulation techniques and visualization methods to derive insights.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction: Installing Python; basic syntax, interactive shell, editing, saving, and running a script; data types; variables, assignments; numerical types; arithmetic operators and expressions; Loops and selection statements, Control statements String manipulations: subscript operator, indexing, slicing a string; text files: reading/writing text and numbers from/to a file; creating and reading a formatted file.

Unit-II

Lists, Tuple, dictionary and Design with functions: Basic list operators, replacing, inserting, removing an element; searching and sorting lists; Tuple: creating tuples, accessing elements, tuple immutability, operations, tuple methods, tuples vs. lists; dictionary literals, adding, and removing keys, accessing and replacing values; traversing dictionaries. Hiding redundancy, complexity; arguments and return values; Program structure and design. Recursive functions.

Unit-III

Introduction to NumPy: NumPy arrays, Array Indexing and Slicing, Array Operations, Array Manipulation, Linear Algebra with NumPy, Random Number Generation and Statistics.
Introduction to Pandas: Pandas Series, Pandas Data Frames, Data Frame Indexing and Selection, Data Cleaning and Pre-processing, Data Manipulation, Group by Operations, Merging, Joining, and Concatenating Data Frames, Input/output Operations.

Unit-IV

Matplotlib: Overview of Data Visualization in Python, What is Matplotlib? Features and Advantages, Matplotlib Architecture, Installation and Setup, Importing Matplotlib, Basic plotting concepts, Statistical & Categorical Plots (Bar Charts (Vertical and Horizontal, Histograms, Pie Charts, Scatter Plots, Error Bars), Advanced Plot Customization, Plotting with NumPy arrays, Plotting with Pandas DataFrames, Time series visualization, Handling large datasets, 3D Plotting, Applications of Matplotlib.

Suggested Readings:

1. Fundamentals of Python: First Programs by Kenneth Lambert, Course Technology, Cengage Learning, 2012.
2. Introduction to Computer Science Using Python: A Computational Problem-Solving by Dierbach, C. Focus, John Wiley & Sons, 2012.
3. Python – The Complete Reference by Brown, M. C., McGraw Hill Education.
4. Core Python Programming by Rao, R. N., Dream Tech Press.
5. Python Programming: Using Problem Solving Approach by Thareja, R., Oxford University Press.
6. Python Programming by Sridhar, S., Indumathi, J., & Hariharan, V. M., Pearson Education.
7. Python for Data Analysis by Wes McKinney, 3rd Edition, O'Reilly Media, 2022.
8. Python Data Science Handbook by Jake VanderPlas, O'Reilly Media.

Useful Video Links:

Unit No.	Topics	Links	Source
Unit-I	Variables and Input Statement	https://youtu.be/ruQb8jzkGyQ	NPTEL(IIT Madras)
	Data Types, Operators and Expressions	https://youtu.be/8n4MbjuDBu4	NPTEL(IIT Madras)
	Introduction to for loop	https://youtu.be/lvXuQ_x7Esl	NPTEL(IIT Madras)
	Introduction to while loop	https://youtu.be/KTvVNN7ia8o	NPTEL(IIT Madras)
	Reading and Writing to a File	https://www.youtube.com/watch?v=rYLJaAdgLhI	NPTEL(IIT Madras)
	Creating and reading a formatted file	https://www.youtube.com/watch?v=NBTSDtBy5bs	NPTEL(IIT Roorkee)
Unit-II	List operators	https://youtu.be/jMShssechMI	NPTEL(IIT Madras)
	Searching and sorting lists	https://youtu.be/4OxBvBXon5w	NPTEL(IIT Delhi)
	Tuples	https://youtu.be/mzx74TdGYbg	NPTEL(IIT Madras)
	Dictionary literals, adding, and removing elements	https://youtu.be/Aj7PwBI99A4	NPTEL(IIT Ropar)
	Recursive functions	https://youtu.be/Uo7RyqJaaRQ	NPTEL(IIT Ropar)
Unit-III	NumPy	https://youtu.be/pEyizxN3K84?si=mMhOKJ5el-sEwuSG	NPTEL(IIT Madras)
	Pandas	https://youtu.be/V-PozDJ7c1A?si=4o2rCAP_hJuUugE8	NPTEL(IIT Madras)
Unit-IV	Matplotlib	https://youtu.be/eFByJkA3ti4?si=sm1gY8G0rCRF6c6k	NPTEL(IIT Madras)
	Advanced Plot Customization	https://youtu.be/YxchP5MziC4?si=VqvKBbar-gT9EZxR	YouTube(Geo-Python)
	3D Plotting	https://youtu.be/7e3BGIXwQvo?si=5IIK1zkvL5XwwR-bi	YouTube(Finxter AI Nuggets)

Course code	MAIML401A				
Course title	Machine Learning				
Scheme and Credits	L	T	P	Credits	Semester-VII
	3	0	0	3	
Course Objectives	The objectives of this course are • To introduce the fundamental concepts, terminology, and evolution of Machine Learning along with its need and applications. • To familiarize students with the Machine Learning life cycle, data representation methods, and preprocessing techniques. • To develop an understanding of supervised and unsupervised learning paradigms and commonly used Machine Learning algorithms. • To enable students to analyze learning outcomes using appropriate performance evaluation metrics and error measures.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define fundamental concepts, terminology, and classifications of Machine Learning.	Level 1: Remember
CO2	Explain the Machine Learning life cycle, data representation methods, and working principles of learning algorithms.	Level 2: Understand
CO3	Apply suitable preprocessing techniques and Machine Learning algorithms to basic real-world datasets.	Level 3 : Apply
CO4	Analyze Machine Learning models by comparing algorithms and interpreting performance metrics.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction Machine Learning: Definition, History, Need, Features, Block diagrammatic representation of learning machines, Classification of Machine Learning: Supervised learning, Unsupervised learning, Reinforcement Learning, Machine Learning life cycle, Applications of Machine Learning.

Unit-II

Dimensionality Reduction Dimensionality reduction: Definition, Row vector and Column vector, how to represent a dataset, how to represent a dataset as a Matrix, Data preprocessing in Machine Learning: Feature Normalization, Mean of a data matrix, Column Standardization, Co-variance of a Data Matrix, Principal Component Analysis for Dimensionality reduction..

Course code	MAIML401A				
Course title	Machine Learning				
Scheme and Credits	L	T	P	Credits	Semester-VII
	3	0	0	3	
Course Objectives	The objectives of this course are • To introduce the fundamental concepts, terminology, and evolution of Machine Learning along with its need and applications. • To familiarize students with the Machine Learning life cycle, data representation methods, and preprocessing techniques. • To develop an understanding of supervised and unsupervised learning paradigms and commonly used Machine Learning algorithms. • To enable students to analyze learning outcomes using appropriate performance evaluation metrics and error measures.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define fundamental concepts, terminology, and classifications of Machine Learning.	Level 1: Remember
CO2	Explain the Machine Learning life cycle, data representation methods, and working principles of learning algorithms.	Level 2: Understand
CO3	Apply suitable preprocessing techniques and Machine Learning algorithms to basic real-world datasets.	Level 3 : Apply
CO4	Analyze Machine Learning models by comparing algorithms and interpreting performance metrics.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction Machine Learning: Definition, History, Need, Features, Block diagrammatic representation of learning machines, Classification of Machine Learning: Supervised learning, Unsupervised learning, Reinforcement Learning, Machine Learning life cycle, Applications of Machine Learning.

Unit-II

Dimensionality Reduction Dimensionality reduction: Definition, Row vector and Column vector, how to represent a dataset, how to represent a dataset as a Matrix, Data preprocessing in Machine Learning: Feature Normalization, Mean of a data matrix, Column Standardization, Co-variance of a Data Matrix, Principal Component Analysis for Dimensionality reduction..

Unit-III

Supervised Learning Supervised Learning: Definition, how it works. Types of Supervised learning algorithms k- Nearest Neighbours, Naïve Bayes, Decision Trees, Naive Bayes, Linear Regression, Logistic Regression, Support Vector Machines.

Unit-IV

Unsupervised Learning Unsupervised Learning: Clustering: K-means. Ensemble Methods: Boosting, Bagging, Random Forests. Evaluation: Performance measurement of models in terms of accuracy, confusion matrix, precision & recall, F1-score, receiver Operating Characteristic Curve (ROC) curve and AUC, Median absolute deviation (MAD), Distribution of errors

Suggested Readings:

1. Introduction to Machine Learning by Ethem Alpaydin, Prentice Hall of India, 2006.
2. The Elements of Statistical Learning: Data Mining, Inference, and Prediction (2nd Edition) by Trevor Hastie, Robert Tibshirani, and Jerome Friedman, Springer, 2009.
3. Pattern Recognition and Machine Learning by Christopher M. Bishop, Springer, 2010.
4. Pattern Classification by Richard O. Duda, Peter E. Hart, and David G. Stork, John Wiley & Sons, 2012.
5. Neural Networks and Learning Machines by Simon O. Haykin, Pearson Education, 2016.

Useful Video Links:

Unit No.	Topics	Links	Source
Unit-I	Definition, History, Features of ML	https://youtu.be/oX0sfqHsGMI?si=HmvFRInXHS2mxsdt	NPTEL (IIIT-Delhi)
	Types of ML	https://youtu.be/fC7V8QsPBec?si=C6SFLiFetMmzjhv1	NPTEL (IIT-Madras)
Unit-II	Principal Component Analysis	https://youtu.be/hkCT-6KJAK0?si=REHs_XXvLh4NS4OJ	NPTEL(IIT Kharagpur)
	Dimensionality Reduction	https://youtu.be/0P9gUYQ38cI?si=gKuCjKu7iIUUJjZB	NPTEL(IISc Bangalore
Unit-III	Supervised Learning	https://youtu.be/OTAR0kT1swg?si=-uIrst7xSFi_0Gk-	NPTEL (IIT-Madras)
	Support Vector Machines	https://youtu.be/JUR6m7-jXaY?si=mnqq8YOO_k79zU9G	NPTEL (IIT-Madras)
Unit-IV	Bagging	https://youtu.be/enD2BvWSukI?si=5XRVXWkqHcMUqOkr	NPTEL (IIT-Madras)
	Boosting	https://youtu.be/i4OvvmRIz4A?si=-LiawZoaMyH5rZry	NPTEL (IIT-Madras)

Course code	MAIML402A				
Course title	Applied Artificial Intelligence				
Scheme and Credits	L	T	P	Credits	Semester-VIII
	3	0	0	3	
Course Objectives	The objectives of this course are • To introduce core concepts and applications of Applied Artificial Intelligence. • To explain methods for processing text, images, temporal data, and user preferences. • To apply AI models for real-world problem solving. • To analyze the effectiveness and challenges of AI techniques.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define fundamental concepts and challenges in Applied Artificial Intelligence.	Level 1: Remember
CO2	Explain the principles and techniques used in NLP, Computer Vision, Time Series, and Recommendation Systems.	Level 2: Understand
CO3	Apply suitable AI models to text, image, forecasting, and recommendation problems.	Level 3 : Apply
CO4	Analyze AI solutions based on performance, suitability, and limitations.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction to NLP: Overview, scope, and evolution of Natural Language Processing, NLP in Artificial Intelligence, Challenges in NLP.

Linguistic Foundations for NLP: Lexical Analysis, Morphological Analysis, Syntactic Analysis (Parsing), Semantic Analysis, Discourse Analysis, Pragmatic Analysis, Text Processing and Normalization, Introduction to NLP Tools and Libraries.

Unit-II

Introduction to Computer Vision: Overview of Computer Vision and Image Processing, Applications of Computer Vision.

Image Representation: Digital image representation, Image types and formats, Color models (RGB, Grayscale, HSV), Image Preprocessing and Enhancement, Feature Extraction and Detection, Image Classification and Recognition.

Unit-III

Introduction to Time Series: Definition and characteristics of time series data, Applications of time series analysis, Components of Time Series, Time Series Visualization and Preprocessing.
Classical Time Series Models: Auto-Regressive (AR) models, Moving Average (MA) models, ARIMA models, Seasonal ARIMA (SARIMA).
Forecasting Technique: Model selection, Forecast accuracy measures, Applications of time series forecasting.

Unit-IV

Recommendation Systems: Introduction to Recommendation Systems, Need and importance of recommendation systems, Real-world motivation and examples.
Types of Recommendation Systems: Content-Based Recommendation Systems, Collaborative Filtering, Knowledge-Based Systems .
Recommendation Techniques: User-based and Item-based Collaborative Filtering, Matrix Factorization techniques, Hybrid Recommendation Systems, Evaluation and Challenges.

Suggested Readings:

1. Computer Vision: Algorithms and Applications by Richard Szeliski, 2011.
2. Natural Language Understanding by James Allen, 1994.
3. Introduction to Time Series and Forecasting by Peter J. Brockwell & Richard A. Davis, 2016.
4. Forecasting: Principles and Practice by Rob J. Hyndman & George Athanasopoulos, 2021.
5. Recommender Systems Handbook by Francesco Ricci, Lior Rokach & Bracha Shapira, 2022.
6. Recommender Systems: An Introduction by Dietmar Jannach et al., 2011.
7. Introduction to Natural Language Processing by Jacob Eisenstein, 2019.

Useful Video Links

Unit No.	Topics	Links	Source
Unit-I	Introduction to NLP	https://youtu.be/XRpJMxLaLeA?si=DCvumrsBSVhGEViG	NPTEL (IIT Bengaluru)
	Text Processing	https://youtu.be/7ok49o24SDw?si=QU0TmC5422oiz6us	NPTEL (IIT Kharagpur)
Unit-II	Image Representation	https://youtu.be/a4yd0Au8QLg?si=R4mqSUssVHgNG6Mz	NPTEL (IIT Delhi)
	Colour Image Processing	https://www.youtube.com/watch?v=svgZodJgKaU	NPTEL (IIT Kharagpur)
Unit-III	Introduction to Time Series	https://youtu.be/bc_7XnEt7TU?si=viOrGSvAS5kAZKNR	NPTEL (IIT Madras)
	ARIMA Models	https://www.youtube.com/watch?v=dXND1OEBABI	YouTube (Aric LaBarr)
Unit-IV	Collaborative Filtering	https://youtu.be/h9gpufJFF-0?si=wo_FnVDL19wSqSVA	Stanford University
	Introduction to Recommendation Systems	https://youtu.be/1JRrCEgiyHM?si=WPTsJajCQDm_qgve	Stanford University

Course Code	MLAIML304A				
Course Title	Python for AI Lab				
Scheme and Credits	L	T	P	Credits	Semester-VI
	0	0	2	1	
Course Objectives	The objectives of this course are • To enable students to implement Python programs using core language constructs and file handling. • To develop the ability to apply data structures and modular programming for problem solving. • To provide hands-on experience with NumPy and Pandas for data manipulation and analysis. • To train students in visualizing data effectively using Matplotlib for analytical insights.				
Assessment	25 Marks				
End Semester Practical Examination	25 Marks				
Total Marks	50				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Explain the syntax, control structures, string operations, and file handling mechanisms of Python through guided laboratory exercises.	Level 2: Understand
CO2	Develop Python programs using lists, tuples, dictionaries, and functions (including recursion) to solve structured computational problems.	Level 3: Apply
CO3	Apply NumPy and Pandas libraries to perform array-based computation, data cleaning, manipulation, and basic statistical analysis on real-world datasets.	Level 3: Apply
CO4	Analyze datasets and interpret results by designing appropriate 2D/3D visualizations using Matplotlib with customized and optimized plots.	Level 4: Analyze

List of Experiments

Sr. No.	Content	COs
1.	Study the basic features and installation of Python.	CO1
2.	Write a Python program to compute the G.C.D. of two numbers.	CO1
3.	Write a Python program to find the square root of a number.	CO1
4.	Write a Python program to find the power of a number.	CO1
5.	Write a Python program to find the maximum in a list of numbers.	CO2
6.	Write a Python program to implement linear search and binary search in a list.	CO2

7.	Write a Python program to sort the element using selection sort, insertion sort and merge sort	CO2
8.	Write a Python program to compute first "n" prime numbers	CO2
9.	Write a Python program to find the most frequent word in a text file.	CO2
10.	Write a Python program to create and perform operations on arrays using NumPy	CO3
11.	Write a Python program to apply Pandas for manipulating a dataset and performing grouped statistical operations.	CO3
12.	Write a program in Python to create bar charts, histograms, pie charts, and scatter plots.	CO4
13.	Write a program in Python to plot data using NumPy arrays.	CO4
14.	Write a program in Python to visualize data using Pandas DataFrame.	CO4
15.	Write a program in Python to create a 3D plot using Matplotlib.	CO4

Note: At least 10 experiments are to be performed by the students. Faculty members can add 2-3 extra experiments under topic beyond syllabus.

Virtual Lab Links

Experiment Name	Virtual Lab Link	Source
Loops in Python	https://python-iitk.vlabs.ac.in/exp/loops/	Virtual Labs
File Handling in Python	https://python-iitk.vlabs.ac.in/exp/file-operators/index.html	Virtual Labs
List, Dictionary in Python	http://python-iiith.vlabs.ac.in/exp/complex-datatypes/index.html	Virtual Labs

Course Code	MLAIML403A				
Course Title	Machine Learning Lab				
Scheme and Credits	L	T	P	Credits	Semester-VII
	0	0	2	1	
Course Objectives	The objectives of this course are • To provide hands-on exposure to fundamental concepts and workflow of Machine Learning. • To enable students to preprocess, represent, and transform datasets suitable for Machine Learning tasks. • To develop the ability to implement supervised and unsupervised Machine Learning algorithms using Python. • To train students in comparing, and analyzing Machine Learning models using appropriate performance metrics.				
Assessment	25 Marks				
End Semester Practical Examination	25 Marks				
Total Marks	50				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Explain the basic concepts, workflow, and types of Machine Learning through guided laboratory demonstrations and experiments.	Level 2: Understand
CO2	Implement data preprocessing techniques and dimensionality reduction methods such as PCA for Machine Learning tasks.	Level 3: Apply
CO3	Apply supervised learning algorithms to build predictive models using Python-based Machine Learning libraries.	Level 3: Apply
CO4	Analyze and evaluate Machine Learning models using appropriate performance metrics and error distribution techniques.	Level 4: Analyze

List of Experiments

Sr. No.	Content	COs
1.	Study the basic concepts, applications, and life cycle of Machine Learning using Python libraries.	CO1
2.	Write a Python program to represent a dataset using row vectors, column vectors, and matrix representation.	CO2
3.	Write a Python program to perform feature normalization and column standardization on a dataset.	CO2
4.	Write a Python program to compute mean, covariance matrix, and visualize data variance.	CO2
5.	Write a Python program to implement Principal Component Analysis (PCA) for dimensionality reduction.	CO2

6.	Write a Python program to implement k-Nearest Neighbours (k-NN) classification algorithm.	CO3
7.	Write a Python program to implement Naïve Bayes classifier for a given dataset.	CO3
8.	Write a Python program to implement Decision Tree classification and visualize the tree.	CO3
9.	Write a Python program to implement Linear Regression and Logistic Regression models.	CO3
10.	Write a Python program to implement Support Vector Machine (SVM) for classification.	CO3
11.	Write a Python program to implement K-Means clustering and visualize clusters.	CO3
12.	Write a Python program to implement ensemble techniques such as Bagging, Boosting, and Random Forests.	CO3
13.	Write a Python program to evaluate classification models using confusion matrix, accuracy, precision, recall, and F1-score.	CO4
14.	Write a Python program to plot ROC curve and compute AUC for a classification model.	CO4
15.	Write a Python program to analyze model errors using MAD and error distribution plots.	CO4

Note: At least 10 experiments are to be performed by the students. Faculty members can add 2-3 extra experiments under topic beyond syllabus.

Virtual Lab Links

Experiment Name	Virtual Lab Link	Source
Dataset Representation using rows and columns	https://colab.research.google.com/drive/186nx47CNlqGiDEkpshA04dwT6lq9gQ9Q5?usp=sharing	Google Colab
Decion Tree Classification	https://colab.research.google.com/drive/1wJBt5QZFRx3cjXtyywvvwDuyZzs1xj9k?usp=sharing	Google Colab
K-Means clustering.ipynb	https://colab.research.google.com/drive/1Yb1fMvzu1trKUeXVAf9XV00geS-yLyUO?usp=sharing	Google Colab

Course code	MPAIML404A				
Course title	Project				
Scheme and Credits	L	T	P	Credits	Semester-VIII
	0	0	4	2	
Course Objectives	The objectives of this course are • To identify an engineering problem through literature review and clearly define project objectives. • To learn fundamental engineering principles to propose a feasible solution methodology. • To inculcate skills in project planning, preliminary design, and use of appropriate engineering tools. • To enhance teamwork, technical documentation, and presentation skills.				
Assessment	50 Marks				
End Semester Practical Examination	50 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

The students expected to take up a project under the guidance of teacher from the college. The Project must be based on **Artificial Intelligence and Machine Learning** problems, which can be extended up to the full semester. The students may be asked to work individually or in a group normally not more than three students in a group (if any large/ big projects occur then strength of students' can be increased as per guide supervision). Viva-voce must be based on the preliminary reports submitted by the students related to the project.

DEPARTMENT OF ELECTRICAL ENGINEERING

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, JHAJJAR

An Autonomous Institute | NAAC 'A' Grade Institute | Affiliated to MDU, Rohtak

Minutes of 3rd meeting of Board of Studies of Electrical Engineering Department

The 3rd meeting of Board of Studies of Electrical Engineering Department was held on 26.12.2025 at 11:00 A.M in the Conference Hall of the Institute.

The following members were present for the BOS meeting:

SN	Name of the Member	Affiliation/Organization	Designation within Board of Studies
1	Dr. Joginder Singh	HOD, GITAM, Kablana	Chairperson
2	Dr. Alok Prakash Mittal	Subject Expert (Adjunct Professor, NSUT Delhi), Outside Parent University	Member
3	Dr. Naresh Kumar Yadav	Subject Expert (Professor, DCRUST Murthal), Outside Parent University	Member
4	Dr. Vipin Kumar	Subject Expert (Assistant Professor, UIET, MDU Rohtak), University Nominee	Member
5	Dr. Garima Tiwari	Assistant Professor, GITAM Kablana	Member
6	Mr. Abhishake Jain	Assistant Professor, GITAM Kablana	Member
7	Mr. Deshveer	Assistant Professor, GITAM Kablana	Member
8	Mr. Ankush	Assistant Professor, GITAM Kablana	Member
9	Mr. Brijesh	Assistant Professor, GITAM Kablana	Member
10	Mr. Ajay Lakra	Assistant Professor, GITAM Kablana	Member
11	Mr. Ishu	Assistant Professor, GITAM Kablana	Member
12	Mr. Ravi	Assistant Professor, GITAM Kablana	Member
13	Mr. Amit Goyal	Industry/ Corporate Sector (Balaji Transformers)	Member
14	Mr. Rajesh Sharma	Alumni	Member

At the outset the Chairperson welcomed all the members present in the meeting. The agenda items, as circulated prior to the meeting, were taken up for discussion.

HOD EE

Agenda wise Discussion and Resolutions

Item No. 3.1
Confirmation of the minutes of 2nd Meeting of the Board of Studies (BOS) of Electrical Engineering Department held on 27.05.2025.

The minutes of 2nd meeting of the Board of Studies of Electrical Engineering Department held on 27.05.2025 (Annexure-3.1 Page No. 1 to 3 already circulated) be confirmed.

Item No. 3.2
Follow up action report of the decisions taken in the 2nd Meeting of Board of Studies held on 27.05.2025.

Follow up action of the decisions taken in the 2nd Meeting of Board of Studies held on 27.05.2025 be noted (Annexure 3.2 Pages No. 4 already circulated).

Item No. 3.3
Scheme of Examinations and Syllabus of Certificate Course on "Solar PV Installation and Maintenance" from Academic Session 2025-26.

Resolved that Scheme of Examinations and Syllabus of Certificate Course on "Solar PV Installation and Maintenance" from Academic Session 2025-26 (Annexure 3.3 Page No. 5-7) be approved and further resolved that the Scheme of Examinations and Syllabus of the above is recommended to the Academic Council for approval.

Item No. 3.4
Scheme of Examinations and Syllabus of Minor Degree/Honors (Hons.)/Specialization in "Electric Vehicles" from Academic Session 2025-26.

Resolved that Scheme of Examinations and Syllabus of Minor Degree/Honors (Hons.)/Specialization in "Electric Vehicles" from Academic Session 2025-26 (Annexure 3.4 Page No. 8-22) be approved and further resolved that the Scheme of Examinations and Syllabus of the above is recommended to the Academic Council for approval.

Item No. 3.5
Minor correction in the Course outcomes of two courses of B. Tech Electrical Engineering 2nd Year from Academic Session 2025-26.

Resolved that the Minor changes in the Course Outcomes of two courses of B. Tech Electrical Engineering 2nd Year be approved and further resolved that the minor changes in the Course outcomes are recommended to the Academic Council for approval of courses given below.

Course Code	Course Title
PCC-EE-209A	Electrical Engineering Materials
PCC-EE-201A	Analog Electronics

HOD EE

Item No. 3.6

Review of the Panel of Examiners for Theory and Practical's of B. Tech and M. Tech programs for academic year 2025-26.

The panel of examiners Theory and Practical's of B.Tech and M.Tech programs for academic year 2025-26 be reviewed and approved. The same can be sent to the Controller of Examinations of the Institute for the Information (Annexure 3.5 Page No. 23-24).

Item No. 3.7

Approval of Ordinance for M.Tech Electrical Power Systems w.e.f. 2024-25.

The approval of Ordinance for M.Tech Electrical Power Systems w.e.f. 2024-25 be reviewed and approved (Annexure 3.6 Page No. 25-35) and further resolved that the Ordinance for M.Tech of the above is recommended to the Academic Council for approval.

The meeting concluded with the thanks to the Chair.

Chairperson
Board of Studies
Electrical Engineering Deptt

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT

AN AUTONOMOUS INSTITUTE | NAAC 'A' GRADE | AFFILIATED TO MDU ROHTAK

CERTIFICATE COURSE ON

Solar PV Installation & Maintenance

SESSION: 2025-26

Eligibility Criteria: At least senior secondary examination (10+2)/ITI/DIPLOMA with at least 50% marks (47.5% in case of SC/ST/Blind/Visually/Differently abled etc. candidates of Haryana only) from board of school education Haryana, Bhiwani or any other examination recognized by Maharshi Dayanand University, Rohtak as equivalent thereto.

Duration: 6 Months (Offering twice in an academic year)

Course Credits: 3

No. of Seats: 30

The reservation of seats is as given below

Sr. No.	Name of Program	Break of seats as per State Govt. Reservation Policy							DA/PwD/ PH/ESM/ DFF##	EWS**	No. of Sanctioned Seats
		AIC	EWS*	HOGC	SC#		BC (A)	BC (B)			
					OSC	DSC					
1	Certificate Course on Solar PV Installation & Maintenance	4	-	11	3	3	4	3	1	1	30

Note: In the event of vacant seats remaining after the final date of allotment based on reservations, these may be allocated to general category candidates.

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SCHEME AND SYLLABUS CERTIFICATE COURSE

Course Code	CC-SPV-01				
Category	Certificate Course				
Course Title	Solar PV Installation & Maintenance				
Scheme and Credits	L	T	P	Credits	
	3	0	0	3	
Course Objectives	The objectives of this course are • To introduce the fundamentals of Solar PV system. • To provide knowledge of PV system Installation (ON Grid & OFF Grid) • To familiarize learners with operation & maintenance of rooftop PV Sytem.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Recall solar energy fundamentals, PV modules, system types, and component functions for rooftop applications	Level 1: Remember
CO2	Explain the PV system components, grid tied, islanded system, protection, safety, O&M.	Level 2: Understand
CO3	Apply site survey methods, sizing calculations, and prepare system design and SLDs for domestic and industrial PV systems.	Level 3: Apply
CO4	Analyze grid-tied, off-grid, and hybrid PV system performance, protection strategies, and operational behavior under varying conditions.	Level 4: Analyze

Note: The Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each, and the remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, the first being compulsory and selecting one from each unit.

Unit No.	Contents
Unit-I	**Fundamentals of Solar Energy**: Solar radiation basics: GHI, DNI, insolation, seasons. PV effect, I–V and P–V characteristics, fill factor, efficiency. Types of PV cells: Mono, Poly, PERC, Bifacial, Thin-film. PV module ratings, nameplate parameters, testing standards (IEC, IS). Overview of solar PV applications: Grid-tied, Off-grid, Hybrid, PV system components (Electrical & Mechanical).
Unit-II	**PV System Design, Sizing and Installation:** Site survey techniques & shading analysis (Solar pathfinder, apps), Load estimation: domestic vs industrial, Array sizing, inverter sizing, battery sizing (for hybrid/off-grid), Calculation of system yield & performance ratio, Selection of protection devices & cable, Designing single line diagram (SLD) for rooftop systems, Rooftop structural assessment basics, Installation (Electrical & Mechanical), Safety.
Unit-III	**Grid Integration & Islanded Operation:** Grid-Tied Systems: Net metering, gross metering policies, Anti-islanding, protection coordination, Synchronization requirements, Working of grid-tied inverters, Export limitation control (industrial), Islanded / Off-Grid / Hybrid Systems: Battery-based operation (DC/AC coupled), Changeover between grid–battery–solar, EMS (Energy Management Systems) in industrial plants, Operation in blackout/standalone mode, Diesel generator (DG) integration & PV-DG synchronization basics.
Unit-IV	**Operation & Maintenance (O&M)**: Routine inspection, cleaning, torque checks, Inverter diagnostics, fault codes. Testing of modules: IV curve tracing, insulation resistance, Battery maintenance, Troubleshooting common faults: String failures, Low generation, Earthing failures, Hot spots, loose connections.

Suggested Readings:

- Singh, B.R. and Singh, O., 2016. Future scope of solar energy in India. SAMRIDDHI: J Phys Sci Eng Technol, 8(1).
- Rajput, S.K., 2017. SOLAR ENERGY Fundamentals, Economic and Energy Analysis.
- https://mnre.gov.in/en/solar-standard-specification-benchmark-cost/
- Policies and Guidelines | MINISTRY OF NEW AND RENEWABLE ENERGY | India

HOD EE

~~Annexure 3.4~~

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA (JHAJJAR)

An Autonomous Institute

'A' GRADE ACCREDITED BY NAAC

Evaluation Scheme & Syllabus For

Minor/Honors (Hons.)/Specialisation Degree

in

Electric Vehicles

(Effective from the Session: 2025-26)

APPROVED BY AICTE, NEW DELHI AND AFFILIATED TO MDU, ROHTAK

HOD EE

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA, JHAJJAR (HR.)

Scheme of Studies and Examination

Minor in Electric Vehicles

w.e.f. 2025-26

Sr. No.	Semester	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Scheme (Marks)				Exam Duration in (hr.)
				Lecture (L)	Tutorial (T)	Practical (P)			Assessment	End Semester Examination		Total	
										Theory	Practical		
1	IV	MEEEV202A	Fundamentals of Electric Vehicles	3	0	0	3	3	40	60		100	3
2	V	MEEEV301A	Introduction to Electric and Hybrid Vehicles	3	1	0	4	4	40	60		100	3
3	VI	MEEEV302A	Battery Cell Technology for EV	3	0	0	3	3	40	60		100	3
4	VI	MEEEV304A	Project	0	0	4	4	2	50		50	100	3
5	VII	MEEEV401A	Electric Vehicle Dynamics and Electric Motor Drives	3	0	0	3	3	40	60		100	3
6	VIII	MEEEV402A	Charging Infrastructure	3	0	0	3	3	40	60		100	3
7	IV	MEEEV204A	Fundamentals of Electric Vehicles Lab	0	0	2	2	1	25		25	50	3
8	VII	MEEEV403A	Power Electronics and Drives for EVs Lab	0	0	2	2	1	25		25	50	3
							Total Credits	20				700	

Note: To earn the required credits for the award of B.Tech Minor/Honors (Hons.)/Specialization Degree, students may choose either:

(i) To enroll in courses offered through NPTEL/MOOCs that must be equivalent to the prescribed courses in the approved scheme, subject to availability in any semester.

OR

(ii) To complete the prescribed courses in the same semester as offered by the department under the approved scheme and curriculum structure.

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GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA

Course Code	**MEEEV202A**					
Category	Professional Core Courses					
Course Title	**Fundamentals of Electric Vehicles**					
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**	
	3	0	0	**3**		
Course Objectives	The objectives of this course are: • To understand the basics, components, and classification of Electric and Hybrid Vehicles and their comparison with ICE vehicles. • To learn vehicle fundamentals, performance, transmission, and braking systems for EVs and HEVs. • To gain knowledge of electric motors, their characteristics, and power electronic converters used in EVs • To analyse hybrid architectures and perform powertrain sizing for EVs and HEVs.					
Assessment	40 Marks					
End Semester Examination	60 Marks					
Total	100 Marks					
Duration of Exam	03 Hours					

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Recall basic concepts, components, classifications, and history of Electric and Hybrid Electric Vehicles.	Level 1: Remember
CO2	Explain vehicle resistances, performance parameters, EV/HEV layouts, architectures, motors, and converter operations.	Level 2: Understand
CO3	Apply formulas to compute tractive effort, torque, braking performance, and size EV/HEV powertrain components.	Level 3: Apply
CO4	Analyze and compare EV and HEV technologies, motor characteristics, and powertrain architectures to evaluate performance.	Level 4: Analyse

Note: The examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each, and the remaining eight questions of 12 marks each will be set by taking two questions from each unit. The students have to attempt five questions in total, with the first being compulsory and selecting one from each unit.

Unit-I

Electric Vehicles: History, Basics of Electric Vehicles, Components of Electric Vehicles, General Layout of EV, EV classification & Comparison with Internal Combustion Engine: Technology, Advantages & Disadvantages of EV, National Policy for adoption of EVs.

Unit-II

Vehicle Fundamentals: Vehicle resistance, Types: Rolling Resistance, grading resistance, Aerodynamic drag, vehicle performance, calculating the Acceleration Force, maximum speed, finding the Total Tractive Effort, Torque required on the Drive Wheel, Transmission: Differential, clutch & gearbox, Braking performance.

HOD EE

Hybrid Electric Vehicles: History, Components of Hybrid Electric Vehicle, General Layout of Hybrid EV, Comparison with Electric Vehicles, Advantages & Disadvantages of Hybrid EV.

Unit-III

Vehicle Architecture & Design: Hybrids Based on Architecture, Hybrids Based on Transmission Assembly, Hybrids Based on Degree of Hybridisation. Power Train Component Sizing: EV Powertrain sizing, HEV Powertrain Sizing, HEV Powertrain Sizing Example.

Unit-IV

Motors and Converters: Principle and working of DC Motor, Characteristics & Types of DC Motors-Overview, Speed Torque characteristics of Permanent magnet Motor, BLDC Motor, and Induction motor, Comparison of all motors. Introduction of DC-DC, AC-AC, AC-DC, DC-AC converters, four-quadrant operation, Driver circuits.

Suggested Readings:

- Electric Vehicle Technology Explained by John Lowry and James Larminie, Wiley.
- Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals, External, and Design by Mehrdad Ehsani and Yimin Gao, CRC Press.
- Electric and Hybrid Vehicles: Design Fundamentals by Iqbal Hussain, CRC Press.
- Build Your Own Electric Vehicle by Seth Leitman and Bob Brant, McGraw Hill.
- Introduction to Hybrid Vehicle System Modeling and Control by Wei Liu.
- Electric and Hybrid Electric Vehicles by I.Husain ,CRC Press 2003, second edition.

Useful Video links:

Unit No.	Topics	Links
Unit-I	Basics of Electric Vehicles	https://nptel.ac.in/courses/108106170
	Components of an Electric Vehicle	https://nptel.ac.in/courses/108106170
Unit-II	Hybrid Electric Vehicles	https://youtu.be/_xM7X8k9g0s
Unit-III	Power Train Component Sizing	https://youtu.be/61VupMVdIK8
Unit-IV	Principle and working of DC Motor	https://youtu.be/NiHPu5PltCY
	BLDC Motor	https://youtu.be/EcXIxNf-4Ws?list=PLJpKI3Fm4KzzxxDzhkObVrU_iaL1cm4u

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD EE

Course Code	MEEEV301A				
Category	Professional Core Courses				
Course Title	**Introduction to Electric and Hybrid Vehicles**				
Scheme and Credits	L	T	P	**Credits**	**Semester-V**
	3	1	0	4	
Course Objectives	The objectives of this course are: • To understand the evolution of transportation, fundamentals of EVs, and their environmental, social, and economic impacts. • To study configurations and operating principles of EVs, HEVs, PHEVs, and fuel cell vehicles. • To gain knowledge of EV propulsion systems, motors, power electronics, control, and charging technologies. • To Analyse EV thermal management, safety standards, policies, and future trends in smart and sustainable mobility.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Recall basic concepts of EVs, HEVs, ICE vehicles, components, charging systems, and policies.	Level 1: Remember
CO2	Explain the working principles of EV propulsion, energy storage, motors, power electronics, and technology comparisons.	Level 2: Understand
CO3	Apply EV system concepts to select suitable configurations, motors, batteries, and charging methods.	Level 3: Apply
CO4	Analyze EV systems, infrastructure, thermal management, safety, policies, and future mobility trends.	Level 4: Analyze

Note: The examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each, and the remaining eight questions of 12 marks each will be set by taking two questions from each unit. The students have to attempt five questions in total, with the first being compulsory and selecting one from each unit.

Unit-I

Introduction to Electric Vehicles, History & Impact: History of Transportation, History and Resurgence of Vehicular Electrification, Challenges and Way Forward for EVs, Environmental, Social, and Economic Impact of EV Adoption.

Vehicle Dynamics and Internal Combustion Engine (ICE) Basics: Vehicle Dynamics – I, Vehicle Dynamics – II, Overview, Operation and Characteristics of ICE Vehicles, Comparison of ICE Vehicles and Electric Vehicles.

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HOD EE

Unit-II

Electric Vehicles & Hybrid Electric Vehicle (HEV) Configuration: Basics of Electric Vehicles, Hybrid EV Configuration and Operation – I, Hybrid EV Configuration and Operation – II, Hybrid EV Configuration and Operation – III.

Plug-in HEV, Fuel Cell Vehicles & Technology Comparison: Plug-in Hybrid Electric Vehicle (PHEV) and Operation, Fundamentals of Hydrogen Fuel Cell Vehicle (FCV), Power Management Techniques, Comparison of EV, HEV, PHEV, and FCV Technologies.

Unit-III

EV Propulsion Systems Motors, Control and Charging Technologies: Electric Propulsion System Structure and Components, Power Electronics Converters in EV Powertrains, Electronic Control Unit (ECU) in EV & HEVs, Ultracapacitors, Flywheels and Fuel Cell Technology. Induction Motor, PMSM, BLDC and SRM Motors – Principles & Control, EV Charging Infrastructure in India, Types of EV Charging, Architecture and Working of EV Charging Systems, Operation and Control of EV Charging Systems, AC-DC Converters with PFC, DC-DC Converters, RES Integration for EV Charging, Wireless EV Charging Systems.

Unit-IV

Thermal Management & Safety in EVs: EV Thermal Management Guidelines, Battery Thermal Management, Thermal Management of Motors and Power Converters, Safety Standards in EVs, Battery Recycling Guidelines.

Policies, Standards & Future Trends in EV Infrastructure: Policies and Economics for Grid Integration of EV Charging, Charging Specifications & Standards in EV Industry, Business Models and Economics of Vehicular Electrification, Role of Artificial Intelligence (AI) in EV Systems, Concept of Vehicle-to-Everything (V2X) and Smart Mobility.

Suggested Readings:

- Modern Electric Vehicle Technology, by C.C. Chan and K.T. Chau, Oxford University Press.
- Modern Electric, Hybrid Electric, and Fuel Cell Vehicles, by Ehsani, M., Gao, Y., Longo, S., and Ebrahimi, K., CRC Press, 2018.
- Electric and Hybrid Vehicles: Design Fundamentals, by Iqbal Husain, Third Edition, CRC Press, 2021.
- Electric Propulsion System for Electric Vehicular Technology: A Review, by Kumar, Lalit, and Shailendra Jain, Renewable and Sustainable Energy Reviews 29 (2014): 924-940.

Useful Video links:

Unit No.	Topics	Links
Unit-I	Introduction to Electric Vehicles	https://youtu.be/gDOnBwjF55U?list=PLZnygY81tHUyzqioA7oXed6qsztizMH8c
	Vehicle Dynamics	https://nptel.ac.in/courses/107106080
	Impact of EV Adoption	https://youtu.be/tBMHJ-6Wflk
Unit-II	Basics of Electric Vehicles	https://youtu.be/3E1SXG7VkQk?list=PLyqSpQzTE6M9spod-UH7Q69wQ3uRm5thr
Unit-III	DC-DC Converters with control for EV Charging	https://youtu.be/ZWv2AGLiXqQ
Unit-IV	Battery Thermal Management	https://youtu.be/Y5NOQWTqJIo

HOD EE

Course Code	**MEEEV302A**				
Category	Professional Core Courses				
Course Title	**Battery Cell Technology for EV**				
Scheme and Credits	L	T	P	**Credits**	**Semester- VI**
	3	0	0	3	
Course Objectives	The objectives of this course are: • To understand the principles of electrochemical energy storage by studying battery fundamentals. • To analyze battery materials, energy storage mechanisms, and degradation phenomena in lithium-ion and emerging battery technologies. • To study battery materials, energy storage mechanisms, and degradation. • To develop knowledge of cell engineering, electrochemical characterization techniques, battery management systems, and integration of batteries into electric vehicles				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	**Skills Demonstrated**	**RBT Level**
CO1	Recall electrochemical cell fundamentals, kinetics concepts, battery materials, and basic cell engineering principles.	Level 1: Remember
CO2	Explain thermodynamics, overpotentials, energy storage mechanisms, electrochemical techniques, and battery performance in EVs.	Level 2: Understand
CO3	Apply electrochemical equations, kinetic models, material concepts, and diagnostic techniques to analyze battery behavior and safety.	Level 3: Apply
CO4	Analyze cell design, degradation, modelling, BMS integration, and EV adoption challenges using electrochemical and engineering principles.	Level 4: Analyse

Note: The Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each, and the remaining eight questions of 12 marks each will be set by taking two questions from each unit. The students have to attempt five questions in total, with the first being compulsory and selecting one from each unit.

Unit-I

Electrochemical Cell Fundamentals: Electrochemical cells: conversion of reaction rate to current density, conversion of potential to Gibbs free energy, Faraday constant (C and Ah), non-faradaic current and capacitor behavior, metal–solution interface, galvanic potential. Electrochemical series, galvanic and electrolytic cells, Nernst equation. Basic definition of cells, anatomy of a cell, internal processes, cell materials and chemistry.

Unit-II

Kinetics, Voltage Losses & Battery Performance: Voltage losses and kinetics: overpotential (activation, ohmic, concentration), Butler–Volmer kinetics, Tafel kinetics, Faraday's laws, coulombic efficiency. Cells in vehicles and battery metrics, cell power and C-rate (fast charging), battery performance challenges, battery life and degradation, battery safety and thermal runaway.

Unit-III

Battery Materials & Energy Storage Mechanisms: Primary and secondary batteries, Li/Li-ion batteries, Na-ion battery materials. Anode and cathode materials, non-aqueous electrolytes, solid electrolyte interface (SEI), cathode electrolyte interface (CEI). Energy storage mechanisms (intercalation, conversion, alloying), irreversible capacity loss, theoretical capacity, volume strain, zero-strain materials, solid-state and superionic conductors.

Unit-IV

Cell Engineering, Characterization & EV Integration: Cell requirements and specifications, cell technology roadmap (current, near-term, long-term), cell manufacturing process, design and sizing, cell cost. Cell modelling and diagnostics. Electrochemical techniques: cyclic voltammetry, chronoamperometry, chronopotentiometry, differential pulse voltammetry, galvanostatic charge–discharge, dQ/dV analysis, impedance spectroscopy, GITT, symmetric cell analysis, Li^+ transport number. Battery pack design, internal management, BMS, battery reuse and recycling, EV adoption in India: challenges and recommendations.

Suggested Readings:

- Electric and Hybrid Vehicles: Design Fundamentals by Iqbal Hussain, CRC Press,2003.
- Modern Electric, Hybrid Electric and Fuel Cell Vehicles- Fundamentals, External and Applications by Mchrdad Ehsani, Yimi Gao, Sebastian E.gay and Ali Emadi, CRC Press, 2004.
- Electric Vehicles Technology Explained by James Larminie, John Lowry, Wiley Publications, 2013.
- Super capacitors- materials, Systems and Applications by F. Beguin and E. Frackowiak, Wiley-VCH Verlag GmbH & Company, 2013.
- Fuel Cells and Hydrogens: From Fundamentals to Applied Research by V. Hacker, S.Mitsushima, Elsevier, 2018.
- Electric Powertrain: Energy Systems, Power Electronics and Drives for Hybrid, Electric and Fuel Cell Vehicles, By John G. Hayes and G. Abas Goodarzi, Wiley Publication.

Useful Video Links:

Unit No.	Topics	Links
Unit-I	Electrochemical Cell Fundamentals	https://youtu.be/9Z-FrvcPa-E?si=RCRgvDFnaVwjCtSo
Unit-II	Kinetics, Voltage Losses & Battery Performance	https://youtu.be/Eb7pv0oOf_k?si=e7LZtnTDyRTBzjcL https://youtu.be/62363H_I_Qk?si=josMfPpSDNBK_lat
Unit-III	Battery Materials & Energy Storage Mechanisms	https://youtu.be/no4vRKvKxcU?si=5odxvOC0iEQr13Go
Unit-IV	Cell Engineering, Characterization & EV Integration	https://www.youtube.com/live/tU8YKLKPMMA?si=iKFoxaEo_0E4fveh

HOD EE

Course Code	MEEEV304A				
Category	Project Courses				
Course Title	Project				
Scheme and Credits	L	T	P	Credits	Semester-VI
	0	0	4	2	
Course Objectives	The objectives of this course are: • To identify suitable research topics in Electrical Engineering for independent investigation. • To understand research methodologies, documentation, and referencing aligned with existing literature. • To develop technical writing skills using appropriate tools, formats, and referencing techniques. • To analyze, interpret, and synthesize research findings within a defined research scope or topic.				
Assessment	50 Marks				
End Semester Examination	50 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Identify complex engineering problems relevant to project work based on domain knowledge and real-world challenges.	Level 1: Remember
CO2	Describe the workflow, technical background, and tools required for planning and executing engineering projects.	Level 2: Understand
CO3	Apply appropriate methods, tools, and techniques to carry out project development and prepare technical documentation.	Level 3: Apply
CO4	Analyze the key stages of project development to ensure systematic execution and identify performance issues.	Level 4: Analyze
CO5	Evaluate alternative approaches and select suitable methodologies to achieve optimal and feasible project outcomes.	Level 5: Evaluate
CO6	Design innovative and practical engineering solutions to address societal and industrial needs.	Level 6: Create

Project Guidelines:

- Students shall undertake projects individually or in small teams (2–4 members).
- Projects must be approved by the department project committee before commencement.
- Regular progress reviews will be conducted throughout the semester.

Course Code	**MEEEV401A**				
Category	Professional Core Courses				
Course Title	**Electric Vehicle Dynamics and Electric Motor Drives**				
Scheme and Credits	L	T	P	**Credits**	**Semester-VII**
	3	0	0	**3**	
Course Objectives	The objectives of this course are • To introduce the fundamentals of electric vehicles and develop an understanding of vehicle dynamics and traction requirements. • To impart knowledge of electric motor drive systems, including DC and induction motor drives, used in electric vehicle applications. • To develop competency in modelling and control of advanced motor drives such as PMSM, IM vector control, and switched reluctance motor drives. • To enable analysis and evaluation of power electronic converters and motor drive architectures through practical case studies of modern electric vehicles.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Identify fundamentals of electric vehicles, vehicle dynamics, motor drives, and power electronic converters.	Level 1: Remember
CO2	Explain vehicle dynamic modelling, operating principles of DC, induction, PMSM, BLDC and SRM drives, and control concepts.	Level 2: Understand
CO3	Apply modelling and control techniques for vehicle dynamics, motor drives, vector control, and PWM converters in EV systems.	Level 3: Apply
CO4	Analyze and compare EV drive systems, motor control strategies, converter topologies, and real-world EV case studies.	Level 4: Analyse

Note: The examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each, and the remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, with the first being compulsory and selecting one from each unit.

Unit-I

Introduction to Electric Vehicles and Vehicle Dynamics: Introduction to electric vehicles and classification of Evs, Components and architecture of electric vehicles, Fundamentals of vehicle dynamics, Forces acting on electric vehicles, Longitudinal vehicle dynamics modelling, Tractive effort, rolling resistance, aerodynamic drag and gradient resistance, Basics of vehicle dynamics simulation for electric vehicles.

Unit-II

DC Drives and Induction Motor Drives for Electric Vehicles: Fundamentals of electric drives and power electronics for electric vehicle applications, DC motor characteristics and applications in Evs, Modelling and control of DC motor drives, Basics of induction motors. Mathematical modelling of induction motor, V/f control technique for induction motor drives, Power electronic converters and PWM techniques for induction motor drives.

Unit-III

PMSM Drives and Vector Control Techniques: Introduction to Permanent Magnet Synchronous Motors for EV applications. Modelling of PMSM drives. Mathematical modelling of general cylindrical rotor machines in a stationary reference frame. Concept of rotating reference frames. Modelling of PMSM in rotor flux-oriented reference frame. Vector control of PMSM drives. Sensored vector control of PMSM drive. Advanced modelling and control aspects of PMSM for electric vehicles.

Unit-IV

Advanced Motor Drives and EV Case Studies: Modelling of an induction motor in rotor flux oriented reference frame, Sensored and sensor-less vector control of induction motor drives, Magnetic materials and B-H curve characteristics, Principle of operation of a switched reluctance motor, Configurations of SRM and computation of step angle, Power converter realisation and control of SRM, Basics of BLDC motor drives, Converter realisation and control of BLDC drives, Case study of high-end electric vehicles and their drive systems.

Suggested Readings

- R. Krishnan, "Electric Motor Drives - Modeling, Analysis & Control", PHI Learning Private Ltd, 2009.
- L. Ashok Kumar, S. Albert Alexander, "Power Converters for Electric Vehicles", CRC Press, Taylor & Francis Group, 2021
- James Larminie, John Lowry, Electric Vehicle Technology Explained, Wiley, 2003.
- C.C Chan, K.T Chau: Modern Electric Vehicle Technology, Oxford University Press Inc., New York 2001

Useful Video links

Unit No.	Topics	Links
Unit-I	Introduction to Electric Vehicles and Vehicle Dynamics	https://youtu.be/L2HbpEMfryM?si=QghjLafduLlt6_rD
Unit-II	DC Drives and Induction Motor Drives for Electric Vehicles	https://youtu.be/bHrWjMVOpag?si=F0gviD5fgVkbkmqb
Unit-III	PMSM Drives and Vector Control Techniques	https://youtu.be/apM4GUnqLo?si=fJoR2wLw9XbQNMpr
Unit-IV	Advanced Motor Drives and EV Case Studies	https://youtu.be/ZAzTH4HOUvc?si=jWhIEOyyCLzEYHr9

Course Code	**MVEEE402A**				
Category	Professional Core Courses				
Course Title	**Charging Infrastructure**				
Scheme and Credits	L	T	P	**Credits**	**Semester- VIII**
	3	0	0	3	
Course Objectives	The objectives of this course are: • To understand the fundamentals of EV charging systems, EVSE types, classifications, and standards. • To learn the principles, modelling, and control of AC–DC converters used in EV chargers. • To examine isolated DC-DC converters and their control strategies. • To analyze charging procedures, communication protocols, and overall challenges in modern EV charging infrastructure.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Recall the basic concepts of EV charging systems, EVSE types, charging classifications, and standards.	Level 1: Remember
CO2	Explain the operating principles and control of AC–DC and isolated DC–DC converters used in EV chargers.	Level 2: Understand
CO3	Apply suitable converter topologies and control methods for different EV charging applications.	Level 3: Apply
CO4	Analyze charger performance, losses, soft-switching, protocols, and communication (Type-2, CCS-2) in EV charging systems.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction to Charging System: Electric Vehicle Supply Equipment (EVSE) for on-board charger, EVSE for off-board charger, Charging Infrastructure Challenges, Classification and standards.

Unit-II

AC-DC power converters: Various types of AC-DC converters, Single phase Boost derived topologies: operating principles, modelling and control, Single phase Bridgeless topologies: operating principles, modelling and control, Three phase AC-DC converter: operating principles, modelling and control

Unit-III

Isolated DC-DC converters: Various types of isolated converters, Losses and soft-switching criteria, Phase-shift full bridge: operating principles and control, Dual active bridge: operating principles, modulation and control.

Unit-IV

Charging procedure, protocols and communication: AC type2, DC CCS2 charging system.

Suggested Readings:

- Automotive Electrical and Electronic Systems, by Tom Denton, 5th Edition, Routledge, 2018.
- Electric and Hybrid Vehicles: Design Fundamentals, by Iqbal Husain, CRC Press, 2021.
- Fundamentals of Power Electronics, by Robert W. Erickson, and Dragan Maksimovic, 3rd, Springer, 2020.
- Power Electronics: Essentials and Applications, by L.Umanand, Wiley India, 2012.
- Power Electronics – Converters, Applications and Design, by Mohan N., Underland T.M. and Robbins W.P., 3rd Ed., Wiley India.

Useful Video links:

Unit No.	Topics	Links
Unit-I	Introduction to Charging System	https://youtu.be/xPIFmwKonu8
	Electric Vehicle Supply Equipment (EVSE) for on-board charger	https://nptel.ac.in/courses/108107715
	EVSE for off-board charger	https://nptel.ac.in/courses/108107715
Unit-II	Single phase Boost derived topologies	https://nptel.ac.in/courses/108107715
	Three-phase AC-DC converter	https://youtu.be/rACh_DwIf7E
Unit-III	Various types of isolated converters	https://nptel.ac.in/courses/108107715
	Dual active bridge	https://youtu.be/XsicKDSRQhk
	Phase-shift full bridge	https://youtu.be/YINqDUxMemQ
Unit-IV	AC type2 charging system	https://nptel.ac.in/courses/108107715
	DC CCS2 charging system	https://youtu.be/cEaVn-3aSNk

Course code	**MEEEV204A**				
Category	Lab Courses				
Course title	**Fundamentals of Electric Vehicles Lab**				
Scheme and Credits	L	T	P	**Credits**	**Semester- IV**
	0	0	2	1	
Course Objectives	The objectives of this course are: • To understand and apply DC/AC power conversion techniques. • To analyze performance and control of electrical machines and transmission systems. • To explore electric/hybrid vehicle technologies and efficiency comparisons.				
Course Pre-requisite	Physics of 12th Standard				
Assessment	25 Marks				
End Semester Practical Examination	25 Marks				
Total	50 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skill Demonstrated	RBT Level
CO1	Understand the working principles of converters, electrical machines, and automotive systems.	Level 2: Understand
CO2	Apply simulation and experimental methods to study power electronic devices and motor control.	Level 3: Apply
CO3	Analyze performance of motors, transmission, and braking systems.	Level 4: Analyze
CO4	Evaluate efficiency and compare electric/hybrid vehicles with conventional IC engines.	Level 5: Evaluate

List of Experiments

Sr. No.	Content
1	Experiment for the conversion of DC-to-DC voltage using a converter.
2	Simulation for AC-to-AC conversion.
3	Simulation for AC to DC conversion.
4	Simulation for DC to AC conversion.
5	Study of 3-Phase Induction Motor.
6	Speed control of a DC motor using an IGBT.
7	To perform speed reversal of the DC Shunt Motor.
8	Study of various elements of transmission systems (Clutch, Differentials, Gearbox, etc.)
9	Calculate and compare the Brake Power and Mechanical Efficiency of an IC Engine and an electrical motor of the same configuration.
10	Study of various types of Braking systems.
11	Case study of any Electric/ Hybrid car manufactured/sale in India.

Note: At least 10 experiments are to be performed by the students. Faculty members can add 2-3 extra experiments if they feel useful to add.

Course code	**MEEEV403A**				
Category	Professional Core Courses (Lab Course)				
Course title	**Power Electronic Drives and Controllers for Electric Vehicle Lab**				
Scheme and Credits	L	T	P	**Credits**	**Semester-VII**
	0	0	2	1	
Course Objectives	The objectives of this course are: • To develop the skills related to Power Electronics drives. • To analyze the important parameters for converters and Controllers				
Assessment	25 Marks				
End-of-Semester Practical Examination	25 Marks				
Total	50 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	**Skills Demonstrated**	**RBT Level**
CO1	Explain characteristics of power devices and electrical machines.	Level 2: Understand
CO2	Apply test procedures to control speed of DC and AC motor drives.	Level 3: Apply
CO3	Analyze the characteristics of converter-fed AC & DC motor drives.	Level 4: Analyze
CO4	Evaluate drive performance by experimental and simulation results.	Level 5: Evaluate

List of Experiments

Sr. No.	**Content**
1	To draw V-I characteristics of power diode.
2	To draw the V-I characteristics of a Schottky diode.
3	To draw V-I characteristics of IGBT & GTO.
4	To perform a load test on a DC shunt motor.
5	To perform speed control of a DC shunt motor.
6	To draw speed-torque characteristics of a DC series motor.
7	Modelling and simulation of Permanent Magnet Brushless DC motor with MATLAB/Simulink.
8	Modelling and simulation of a switched reluctance motor with MATLAB/Simulink.
9	To perform single phase bridge converter drive
10	To perform single phase AC motor control drive
11	To draw Speed – Torque Characteristics of a 3-phase Induction Motor using a VSI Inverter
12	To draw Speed – Torque Characteristics of a 3-phase Induction Motor using a CSI Inverter

Virtual Lab Links

Experiment Name	**Virtual Lab Link**
To draw the V-I characteristics of the IGBT	https://pe-iitr.vlabs.ac.in/exp/bipolar-transistor/simulation.html
To draw the V-I characteristics of a power diode.	https://pe1-iitd.vlabs.ac.in/exp/controlled-switching/
To perform single phase bridge converter drive	https://pe1-iitd.vlabs.ac.in/exp/single-phase-controlled/
To perform single phase AC motor control drive	https://pe1-iitd.vlabs.ac.in/exp/single-phase-voltage-controller/

Note: At least 10 experiments are to be performed by the students. Faculty members can add 2-3 extra experiment if they feel useful to add.

Annexure 4.8 a

Ganga Institute of Technology and Management, Kablana
(An Autonomous Institute under Maharshi Dayanand University, Rohtak)

Minutes of 3rd Meeting of Board of Studies of Civil Engg. Department held on 23.12.2025

3rd Meeting of the Board of Studies (BOS) of the Civil Engineering Department was held on 23.12.2025 at 11:45 A.M. in the Conference Hall of the Institute.

The following members were present in the meeting:

Name of the Member	Affiliation/Organization	Designation within Board of Studies
Ms. Sheela Malik	Chairperson	HOD &Assistant Professor, Civil, GITAM, Kablana
Dr. Isha Verma	Member	Subject Expert (Assistant Professor, Civil, UIET, MDU Rohtak), University Nominee
Dr. Vikas Garg	Member	Subject Expert (Professor, Civil,Central University Mahendergarh), Outside Parent University
Dr. Mahesh Pal	Member	Subject Expert (Professor, Civil,NIT Kurukshetra) Outside Parent University
Mr. Bhupender Malik	Member	Assistant Professor, Civil, GITAM Kablana
Md. Anzar Rabbani	Member	Assistant Professor, Civil, GITAM Kablana
Mr. Mukesh	Member	Assistant Professor, Civil, GITAM Kablana
Ms. Anju	Member	Assistant Professor, Civil, GITAM Kablana
Ms. Muskan	Member	Assistant Professor, Civil, GITAM Kablana
Mr. Akhilesh	Member	Assistant Professor, Civil, GITAM Kablana
Mr. Sachin Dalal	Member	Assistant Professor, Civil, GITAM Kablana
Mr.Himalaya	Member	Assistant Professor, Civil, GITAM Kablana
Mr. Prince	Member	Assistant Professor, Civil, GITAM Kablana
Ms. Jyoti	Member	Assistant Professor, Civil, GITAM Kablana
Ms. Pinki	Member	Assistant Professor, Civil, GITAM Kablana
Ms. Nirmala	Member	Assistant Professor, Civil, GITAM Kablana
Mr. Chetan	Member	Assistant Professor, Civil, GITAM Kablana
Dr. Tinku Biswas	Member	Industry/ Corporate Sector
Mr. Aman Dalal	Member	Alumni

At the outset, the Chairperson welcomed all the members present in the meeting. The agenda items, as circulated earlier, were taken up for discussion.

The further proceeding is as under: -

Item No. 3.1

Confirmation of the Minutes of the 2nd Meeting of the Board of Studies of Civil Engineering Department held on 25.05.2025

The minutes of the 2nd Meeting of the Board of Studies of Civil Engineering Department held on 25.05.2025 (Annexure–3.1, Page 1-3 already circulated) be confirmed.

Item No. 3.2

Follow-up Action Report on the decisions taken in the 2nd BOS meeting of Civil Engineering Department held on 25.05.2025

Resolved that the follow-up action taken on the decisions taken in the 2nd 3eeting of the Board of Studies of Civil Engineering Department held on 25.05.2025 (Annexure–3.2, Page No. 4) be noted.

Item No. 3.3

Proposal to offer Certificate Course on "Building Planning, Drafting and Quantity Estimation" from Academic Session 2025–26

The BOS discussed the proposed Certificate Course, covering all academic and administrative aspects, including the title of the course, objectives, eligibility criteria, duration, credit structure, scheme of examinations and detailed syllabus.

Resolved that the Certificate Course on "Building Planning, Drafting and Quantity Estimation" be approved. Furthermore that the same is recommended to the Academic Council for approval (Annexure–3.3, Page 5-7).

Item No. 3.4

Proposal to start Minor and Honours Degree on "Green Technology and Sustainability Engineering" from Academic Session 2025–26

The Board of Studies deliberated upon the proposals to start Minor/Honours degree on "Green Technology and Sustainability Engineering".

Resolved that the Minor Degree in "Green Technology and Sustainability Engineering" for B.Tech program other than Civil Engineering and Honours Degree in "Green Technology and Sustainability Engineering" for B.Tech Civil Engineering was approved and recommended to Academic Council for approval (Annexure–3.4, Page 8-23).

Item No. 3.5

Review of the Panel of Examiners for B.Tech. and M.Tech. Programs (2025–26)

The Board of Studies reviewed the existing Panel of Examiners for Theory and Practical's of B.Tech. and M.Tech. programs for the Academic Year 2025–26. The eligible examiners were added in the panel.

The revised Panel of examiners is attached as Annexure 3.5 (Page 24- 25).

Item No. 3.6

No other item was discussed.

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD-CIVIL

Chairperson
Board of Studies
Civil Engineering Deptt

Annexure 4.8 b

~~Annexure 3.3~~

DEPARTMENT OF CIVIL ENGINEERING
GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT
AN AUTONOMOUS INSTITUTE | NAAC 'A' GRADE | AFFILIATED TO MDU ROHTAK

1. Certificate Course on "Building Drawing, Drafting and Quantity Estimation"

SESSION: 2025-26

Eligibility Criteria: At least senior secondary examination (10+2) with at least 50% marks (47.5% in case of SC/ST/Blind/Visually/Differently abled etc. candidates of Haryana only) from board of school education Haryana, Bhiwani or any other examination recognized by Maharshi Dayanand University, Rohtak as equivalent thereto.

Duration: 6 Months (Offering twice in an academic year)

Course Credits: 3

No. of Seats: 30

The reservation of seats is as given below

Sr. No.	Name of Program	Break of seats as per State Govt. Reservation Policy							DA/PwD/ PH/ESM/ DFF##	EWS**	No. of Sanctioned Seats
		AIC	EWS*	HOGC	SC#		BC (A)	BC (B)			
					OSC	DSC					
1	Certificate course on "Building Drawing, Drafting and Quantity Estimation"	4	-	11	3	3	4	3	1	1	30

Note: In the event of vacant seats remaining after the final date of allotment based on reservations, these may be allocated to general category candidates.

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DEPARTMENT OF CIVIL ENGINEERING
GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT
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SCHEME AND SYLLABUS CERTIFICATE COURSE

Course Code	**CC-BDDE-01**				
Category	Certificate Course				
Course Title	Building Drawing, Drafting and Quantity Estimation				
Scheme and Credits	L	T	P	**Credits**	
	3	0	0	**3**	
Course Objectives	The objectives of this course are • Introduce basic concepts of building drawings used in civil engineering. • Develop skills in manual preparation of simple 2D building plans. • Train students to prepare basic building drawings using AutoCAD. • Enable students to perform basic quantity calculations from drawings. • Prepare students for entry-level roles in drafting and site assistance.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Note: The Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each, and the remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, the first being compulsory and selecting one from each unit.

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Identify and explain standard drawing sheet sizes, scales, conventional symbols, and views used in building drawings.	Level 1: Remember
CO2	Prepare simple two-dimensional residential building drawings manually by applying standard drawing conventions.	Level 2: Understand
CO3	Draft basic residential building plans using AutoCAD in accordance with standard drafting practices.	Level 3: Apply
CO4	Analyze building drawings to calculate basic quantities and prepare Bills of Quantities (BOQ) and Bills of Services (BOS).	Level 4: Analyze

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD-CIVIL

Unit No.	Contents
Unit-I	**Basics of Building Drawings:** Introduction to building drawings and their role in construction, Importance of drawings in planning, execution and estimation, Standard drawing sheet sizes (A0–A4) as per BIS standards, Drawing scales and applications, Types of lines, line weight hierarchy and lettering standards, Plan, Elevation and Section – concepts and interpretation, Basic building components: foundation, plinth, walls, lintel, slab, roof, Overview of Building Bye-laws: setbacks, FAR, height regulations, ventilation and lighting provisions, Common civil engineering symbols, Introduction to relevant IS codes: IS 962 – Architectural and Building Drawing, IS 1200 – Method of Measurement (overview).
Unit-II	**Manual Drawing of 2D Civil Plans:** Use of drawing instruments and sheet layout, Preparation of: (Line plan, Centre line plan, Detailed building plan, Foundation plan, Roof plan, Front elevation, Sectional view), Dimensioning principles and labeling standards, Line weight hierarchy and standard symbols, Neatness, clarity, balance and professional presentation, Preparation of a small complete residential building project (manual drawing set).
Unit-III	**AutoCAD Drafting for Building Plans:** Introduction to AutoCAD interface and workspace, Drawing setup, units and limits, Basic drawing and editing commands, Use of layers and layer management, Object snaps (OSNAP) and precision drafting tools, Text styles and dimension styles, Hatching and gradient tools, Creation and use of blocks, Preparation of: Complete 2D residential building plan, Foundation plan, Roof plan, Elevation and section, Preparation of a complete working drawing set, Layout creation, plotting scales and printing, Exporting drawings (PDF format).
Unit-IV	**Basic Quantity Estimation, BOQ and BOS:** Introduction to quantity estimation and its importance, Reading quantities from drawings, Methods of estimation: Centre Line Method, Long Wall–Short Wall Method, Calculation of quantities for: Earthwork, PCC and RCC, Brickwork, Preparation of: BOQ (Bill of Quantities), Abstract of Cost, Introduction to: Measurement Book (MB) concept, CPWD / PWD Schedule of Rates (SOR), Basic rate analysis concept, Basic use of MS Excel for quantity tabulation and cost calculation.

Suggested Readings:

- Arora, S. P., & Bindra, S. P. (2019). Building construction and drawing. Dhanpat Rai Publications.
- Bhatt, N. D. (2018). Engineering drawing (53rd ed.). Charotar Publishing House.
- Chakraborti, B. (2017). Estimating, costing, specification and valuation (7th ed.). Khanna Publishers.
- Kumar, B. S., & Ganesan, K. (2014). Building drawing. Tata McGraw-Hill Education.
- National Building Code of India. (2016). National Building Code of India. Bureau of Indian Standards.
- Shah, M. G., Kale, C. M., & Patki, S. Y. (2016). Building drawing with an integrated approach. Tata McGraw-Hill Education.
- Tickoo, S. (2020). AutoCAD 2020 and AutoCAD LT 2020 essentials. CADCIM Technologies.

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~~Annexure 3.4~~

Annexure 4.8 c

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA (JHAJJAR)

An Autonomous Institute
'A' GRADE ACCREDITED BY NAAC

Evaluation Scheme & Syllabus

For

Minor Degree/Specialization

in

Green Technology & Sustainability Engineering

Department of Civil Engineering

(Effective from the Session: 2025-26)

APPROVED BY AICTE, NEW DELHI AND AFFILIATED TO MDU, ROHTAK

HOD-CIVIL
GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA, JHAJJAR (HR.)

Scheme of Studies and Examination

Minor Degree in Green Technology & Sustainability Engineering

w.e.f. 2025-26

Sr. No.	Semester	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Scheme (Marks)				Exam Duration in
				Lecture (L)	Tutorial (T)	Practical (P)			Assessment	End Semester Examination		Total	
										Theory	Practical		
1	IV	GTSE-202A	Environmental Impact Assessment	3	0	0	3	3	40	60		100	3
2	V	GTSE-301A	Building Materials as a Cornerstone to Sustainability	3	0	0	3	3	40	60		100	3
3	VI	GTSE-302A	Strategies for Sustainable Design	3	0	0	3	3	40	60		100	3
4	VII	GTSE-401A	Admixtures and Special Concretes	3	0	0	3	3	40	60		100	3
5	VIII	GTSE-402A	Smart Cities	3	0	0	3	3	40	60		100	3
6	VII	LGTSE-403A	Admixtures and Special Concretes Lab	0	0	2	2	1	25		25	50	
7	V	SM-GTSE-303A	SEMINAR	0	0	2	2	1	25		25	50	
8	VI	PROJ-GTSE-304A	PROJECT	0	0	4	4	2	50		50	100	
							Total Credits	**19**	**300**	**300**	**100**	**700**	

Note: To earn the required credits for the award of B.Tech. Minor/Honors (Hons.)/Specialization Degree, students may choose either:

(i) To enroll in courses offered through NPTEL/MOOCs that must be equivalent to the prescribed courses in the approved scheme, subject to availability in any semester.

OR

(ii) To complete the prescribed courses in the same semester as offered by the department under the approved scheme and curriculum structure.

Malik

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Course Code	GTSE-202A				
Course Title	Environmental Impact Assessment				
Scheme and Credits	L	T	P	Credits	Semester-IV
	3	0	0	3	
Course Objectives	To develop an understanding of Environmental Management and EIA frameworks and to apply, analyze, and evaluate EIA procedures, tools, legal provisions, public participation, reporting, and decision-making processes for effective impact mitigation and Environmental Management Plan (EMP) preparation using practical case studies.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Recall basic concepts of Environmental Management, and EIA in environmental systems.	Level 1: Remember
CO2	Explain legal, policy, and regulatory frameworks governing Environmental Impact Assessment.	Level 2: Understand
CO3	Apply EIA procedures such as screening, scoping, baseline data collection, and appropriate methodologies.	Level 3 : Apply
CO4	Analyze environmental impacts using EIA methods, tools, techniques, and public participation processes.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit No.	Contents
Unit-I	Introduction to Environment Management & EIA, Legal, Policy & Regulatory Framework, EIA Procedure - Scoping & Screening and Establishing Baseline Conditions.
Unit-II	EIA Methodologies: EIA Methods, Tools and Techniques.
Unit-III	Public Involvement in EIA, Impact Management - Mitigation & Preparation of Environment Management Plans (EMP), EIA Reporting & Review of EIA Quality.
Unit-IV	Decision Making & Project Management, Implementation & Follow up, EIA Case Examples.

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Suggested Readings

- Canter, L. W. (1996). Environmental impact assessment (2nd ed.). McGraw-Hill.
- Glasson, J., Therivel, R., & Chadwick, A. (2012). Introduction to environmental impact assessment (4th ed.). Routledge.
- International Association for Impact Assessment. (1999). Principles of environmental impact assessment best practice. IAIA.
- Jay, S., Jones, C., Slinn, P., & Wood, C. (2007). Environmental impact assessment: Retrospect and prospect. Environmental Impact Assessment Review, 27(4), 287–300. https://doi.org/10.1016/j.eiar.2006.12.001
- Morris, P., & Therivel, R. (Eds.). (2009). Methods of environmental impact assessment (3rd ed.). Routledge.
- Noble, B. F. (2015). Introduction to environmental impact assessment: A guide to principles and practice (3rd ed.). Oxford University Press.
- Sadler, B. (1996). Environmental assessment in a changing world: Evaluating practice to improve performance. International Study of the Effectiveness of Environmental Assessment.
- Therivel, R., & Wood, G. (2018). Strategic environmental assessment (2nd ed.). Routledge.
- United Nations Environment Programme. (2002). Environmental impact assessment training resource manual. UNEP.
- United Nations Environment Programme. (2018). Assessing environmental impacts: A global review of legislation. UNEP.
- Wood, C. (2003). Environmental impact assessment: A comparative review. Longman Environmental Planning Series.
- World Bank. (1999). Environmental assessment sourcebook. World Bank Publications.
- Government of India, Ministry of Environment, Forest and Climate Change. (2006). Environmental Impact Assessment Notification. MoEFCC.

Useful Video Links

Unit No.	Topic	Link
Unit-I	**Introduction to Environment Management & EIA**	https://youtu.be/9-MEVIXr3Ko?si=oZXgYyr-G-U-fFyS
	EIA Procedure	https://youtu.be/8vymfIfip2w?si=jUTYSib0yriqSP7R
Unit-II	**EIA Methodologies**	https://youtu.be/6TgNwkYZg_8?si=Bhs6WQJmA4Xh_C7x
Unit-III	**Public Involvement in EIA**	https://youtu.be/NR2N57wFOog?si=YP9Bh7wtpbpf2NMj
	EIA Reporting & Review of EIA Quality	https://youtu.be/o70_CrRG62M?si=ELUVSjVcbTIDmPhR
Unit-IV	**Decision Making & Project Management**	https://youtu.be/ZJ8xTZKves4?si=UR60udr9-FqOzNDu
	EIA Case Examples	https://youtu.be/rAy-IviWh_M?si=vIiNrtaCABPGECow

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD-CIVIL

Course Code	GTSE-301A				
Course Title	Building Materials as a Cornerstone to Sustainability				
Scheme and Credits	L	T	P	Credits	Semester-V
	3	0	0	3	
Course Objectives	To develop a comprehensive understanding of conventional, alternative, innovative, advanced, and smart building materials, and to apply, analyze, evaluate, and integrate their properties, environmental impacts, and functional performance for sustainable and intelligent construction solutions..				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Identify and classify conventional, vernacular, and alternative building materials and their environmental issues.	Level 1: Remember
CO2	Explain the properties and sustainability aspects of traditional and waste-based building materials.	Level 2: Understand
CO3	Apply innovative and alternative materials for sustainable construction practices.	Level 3 : Apply
CO4	Analyze the performance and environmental benefits of advanced building materials.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit No.	Contents
Unit-I	Introduction to Building materials, their classification, environmental issues, Vernacular Materials, Mud- Traditional Material, Mud as a Building material.
Unit-II	Stone as a building Material, Thatch ,Bamboo, Binders Strawbale, Laterite Quarry Waste, Alternate building material Fly ash, Furnace Slag, Cross Laminated Timber, Construction and Demolition waste, Hempcrete, Phosphogypsum, Aerated Concrete, Alternate aggregate, Innovative Building Materials - Introduction.
Unit-III	Bio-luminescent paints, Milk Paints and Recycled Plastics, Agro bricks, Light emitting materials – concrete, CO_2 Absorbing Concrete, Mycelium Composite Bricks, Fibre Reinforced Concrete, Geo-polymer Concrete, Introduction to Advanced Building Materials, Carbon sequestration by building materials, Eco-bind Tiles, Permeable Concrete.

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Unit-IV	Introduction to smart materials and its types, Facade systems: Smart Windows, Liquid Crystal Display, Photochromics, Thermochromic materials, Phase change materials, Adhesion changing smart materials, Photo adhesive smart materials, Titanium dioxide (tio2) products, Mechanochrmics, Thermochromics, Electrochromic, Nano cellulose composite bricks, electroluminescent, Recap and conclusions.

Suggested Readings

- Ashby, M. F. (2013). Materials and the environment: Eco-informed material choice (2nd ed.). Butterworth-Heinemann.
- Berge, B. (2009). The ecology of building materials (2nd ed.). Architectural Press.
- Binici, H., Aksogan, O., Shah, T., & Eken, M. (2015). Investigation of fibre reinforced mud brick as a building material. Construction and Building Materials, 78, 318–325. https://doi.org/10.1016/j.conbuildmat.2014.12.093
- Bouhadda, Y., et al. (2019). Bio-based building materials and carbon sequestration. Journal of Cleaner Production, 221, 841–855. https://doi.org/10.1016/j.jclepro.2019.02.156
- Calkins, M. (2012). Materials for sustainable sites: A complete guide to the evaluation, selection, and use of sustainable construction materials. Wiley.
- Chandra, S., & Berntsson, L. (2003). Lightweight aggregate concrete: Science, technology, and applications. William Andrew Publishing.
- Davies, J. (2011). Building with earth: Design and technology of a sustainable architecture. Birkhäuser.

Useful Video Links

Unit No.	Topic	Link
Unit-I	**Introduction to Building materials**	https://youtu.be/8AwTVpfgcE0?si=gP1kQ-QfvI195gdm
	Mud as a Building material	https://youtu.be/X9OaNXfyj_Y?si=ijbVQHrwPMISi2ln
Unit-II	**Laterite Quarry Waste**	https://youtu.be/S6NSABtlpao?si=7EmhO4V37vTPd5yP
	Bamboo	https://youtu.be/4M9Ay4L7gXk?si=VxtN5WiOTpBzH_mS
Unit-III	**Light emitting materials**	https://youtu.be/ey_sFm5luWQ?si=5oOY6AeVh7VwQ8Yj
	Introduction to Advanced Building Materials	https://youtu.be/mTBa--U7K_o?si=yR6jldGGtQ_Q-f89
Unit-IV	**Adhesion changing smart materials**	https://youtu.be/djS5z1JmEjQ?si=b_UAoex8xEHxZKrT
	Introduction to smart materials and its type	https://youtu.be/-ibRO0iVknQ?si=SSiU4-aJqTqh9XoP

Malik
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Course Code	GTSE-302A				
Course Title	Strategies for Sustainable Design				
Scheme and Credits	L	T	P	Credits	Semester-VI
	3	0	0	3	
Course Objectives	To analyze sustainability concepts and environmental issues in built and industrial systems, evaluate policies, standards and life-cycle impacts, and create responsible, energy-efficient and human-centric design solutions aligned with SDGs and emerging sustainable practices.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define and recall fundamental concepts of sustainability, sustainable development, environmental, social and economic (ESE) dimensions, and global sustainability frameworks..	Level 1: Remember
CO2	Explain sustainability concepts, ESE aspects, climate change, pollution and energy dependence.	Level 2: Understand
CO3	Apply 3R principles, conventions, and human comfort strategies for sustainable built environments.	Level 3 : Apply
CO4	Analyze environmental impacts, vernacular responses, and ecosystem health through design alternatives	Level 4: Analyze
CO5	Evaluate developmental policies, life-cycle impacts, standards (NBC/ECBC/GRIHA), SDGs, and sustainability tools.	Level 5: Evaluate
CO6	Design sustainable, net-zero and nature-inspired solutions supported by emerging technologies and case studies.	Level 6: Create

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit No.	Contents
Unit-I	ESE Aspects of Sustainability and Climate Change Mitigation, Current National and International Scenario of SD and Dependence on Energy.
Unit-II	Impact of Pollutions and Design Processes with Alternative Solutions for Health of Ecosystem, Policy, Growth, Development and 3R's for Consumption.
Unit-III	NBC, ECBC, and SA Methods such as GRIHA ,UN SDG and System Design tools, Vernacular and Responsive Design using Net-Zero Energy, Lighting, Ventilation, Views, etc., for Human Comfort.
Unit-IV	Design for Sustainability and Nature as Inspiration, International Conventions, Laws and Emerging Technologies for SD,SD Case Studies and Summary.

Patik

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Suggested Readings

- Ashby, M. F. (2013). Materials and the environment: Eco-informed material choice (2nd ed.). Butterworth-Heinemann.
- Bhamra, T., & Lofthouse, V. (2007). Design for sustainability: A practical approach. Gower Publishing.
- Brundtland, G. H. (1987). Our common future. Oxford University Press.
- Cabeza, L. F. (Ed.). (2014). Life cycle assessment (LCA) and energy analysis of buildings and the built environment. Elsevier.
- Charter, M., & Tischner, U. (2001). Sustainable solutions: Developing products and services for the future. Greenleaf Publishing.
- Fiksel, J. (2015). Design for environment: A guide to sustainable product development (2nd ed.). McGraw-Hill.
- Givoni, B. (1998). Climate considerations in building and urban design. Van Nostrand Reinhold.
- Intergovernmental Panel on Climate Change. (2022). Climate change 2022: Mitigation of climate change. Cambridge University Press.
- International Organization for Standardization. (2006). ISO 14040: Environmental management—Life cycle assessment—Principles and framework. ISO.
- Kibert, C. J. (2016). Sustainable construction: Green building design and delivery (4th ed.). Wiley.

Useful Video Links

Unit No.	Topic	Link
Unit-I	Introduction of Strategies for Sustainable Design	https://youtu.be/2NEluSrn6fY?si=FZqjgi_7Ms1M82fP
	Perspectives on Sustainability in Industrial Design	https://youtu.be/KzKM1Il7O3g?si=BxApBV02RWn7N4BT
Unit-II	Impact of Pollutions	https://youtu.be/_DtVX1OQPnk?si=rTAZIoYZM8O15DmC
	Environmental Impact Assessment	https://youtu.be/xPO1qIZOtY0?si=kyi_bTMpKpaw55LX
Unit-III	System Design tools	https://youtu.be/BWJCsgXTFdY?si=rqxwpPYf8nCf5Mgg
	UN SDG	https://youtu.be/rHF7Uzto5Ug?si=xtYxTPQsQZYz43nC
Unit-IV	Nature as Inspiration	https://youtu.be/4-fKQ9EuJWE?si=vSQ9hYyMW5YqUbL-
	Laws and Emerging Technologies for SD	https://youtu.be/Hud_D_AT27A?si=DQEjRtGrjGatbScw

Atalik

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD-CIVIL

Course Code	GTSE-401A				
Course Title	Admixtures and Special Concretes				
Scheme and Credits	L	T	P	Credits	Semester-VII
	3	0	0	3	
Course Objectives	To provide students with knowledge of cement chemistry, admixtures, and special concretes so they can design and evaluate high-performance and sustainable concrete mixes for modern construction.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Recall basic concepts of cement and components of concrete.	Level 1: Remember
CO2	Explain the role and effects of chemical and mineral admixtures in concrete.	Level 2: Understand
CO3	Use admixtures and mix design techniques to improve concrete performance.	Level 3 : Apply
CO4	Analyze the rheology and properties of special concretes under different conditions.	Level 4: Analyze
CO5	Evaluate sustainability and life-cycle aspects to recommend suitable concrete solutions.	Level 5: Evaluation

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit No.	Contents
Unit-I	Cement and concrete performance - An overview.
Unit-II	Chemical admixtures: Introduction & Water reducers, Set controllers, Standards on chemical admixtures & Air entraining agents, Understanding concrete rheology, Viscosity modifying agents, Shrinkage reducing admixtures, & Other specialty admixtures.
Unit-III	Mineral Admixtures: Introduction, classification and pozzolanic activity, Fly ash and Silica fume, GGBFS, Metakaolin and LC3, Agricultural ashes, characterization techniques Life Cycle Assessment.
Unit-IV	Special Concretes: High strength concrete and ultra high performance concrete, Self compacting concrete and mass concreting and lightweight concrete, High density concrete and concrete for 3D printing.

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Suggested Readings

- Aïtcin, P.-C. (2000). High-performance concrete. CRC Press.
- American Concrete Institute. (2010). ACI 212.3R: Report on chemical admixtures for concrete. ACI.
- American Concrete Institute. (2017). ACI 234R: Guide for the use of silica fume in concrete. ACI.
- American Concrete Institute. (2018). ACI 233R: Slag cement in concrete and mortar. ACI.
- Bentur, A., &Mindess, S. (2007). Fibre reinforced cementitious composites (2nd ed.). CRC Press.
- Hewlett, P., & Liska, M. (Eds.). (2019). Lea's chemistry of cement and concrete (5th ed.). Butterworth-Heinemann.
- Malhotra, V. M., & Mehta, P. K. (1996). Pozzolanic and cementitious materials. Gordon and Breach.
- Mehta, P. K., & Monteiro, P. J. M. (2014). Concrete: Microstructure, properties, and materials (4th ed.). McGraw-Hill Education.
- Neville, A. M. (2011). Properties of concrete (5th ed.). Pearson Education.

Useful Video Links

Unit No.	Topic	Link
Unit-I	Introduction	https://youtu.be/rJSxTY6u9NU?si=sg3Kzo4kXw-81aMj
	Cement chemistry and concrete performance	https://youtu.be/z21gfQ9zItE?si=WbhA2L_el6XWGfCm
Unit-II	Chemical admixtures: Introduction	https://youtu.be/eUhnvguuA2M?si=FzkjiE9w1DTctXiM
	Water reducers	https://youtu.be/OJbd1Z2OA_s?si=lCipvYkDaNOasbzl
Unit-III	Mineral Admixtures: Introduction	https://youtu.be/IfeGqnXOGmg?si=J3f9ZWwTSD2IczFv
	Fly ash and Silica fume	https://youtu.be/_VuCMDbKKXg?si=YWlwx-wXzTqKwEXe
Unit-IV	Self compacting concrete	https://youtu.be/h6dUtWHlG5I?si=cTNlIq3wauyCk0ai
	High density concrete and concrete for 3D printing	https://youtu.be/Ge0ZdmmHPBg?si=hXpxIceem3Pzh8Kc

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Course code	LGTSE-403A				
Course title	Admixtures and Special Concretes Lab				
Scheme and Credits	L	T	P	**Credits**	**Semester-VII**
	0	0	2	1	
Course Objectives:	To enable students to understand materials and admixtures used in concrete, perform practical mix procedures, analyze concrete behavior, and evaluate suitable solutions for modern construction				
Class work	25 Marks				
Exam	25 Marks				
Total	50 Marks				
Duration of Exam					

Course Outcomes: After studying this course, the students will be able to:

COs	Skills Demonstrated	RBT Level
CO1	Identify materials and admixtures used in concrete.	Level 1:Remember
CO2	Describe the effect of admixtures on concrete behavior.	Level 2:Understand
CO3	Perform practical concrete mix preparation and testing.	Level 3:Apply
CO4	Analyze test results of fresh and hardened concrete.	Level 4:Analyze

LIST OF EXPERIMENTS

1. Study of cement chemistry and concrete performance.
2. Work-ability tests using water-reducing and set-controlling admixtures.
3. Testing of air-entraining admixtures and air content.
4. Rheology tests using viscosity and shrinkage-reducing admixtures.
5. Pozzolanic activity test of fly ash and silica fume.
6. Strength test of concrete with GGBFS, Meta-kaolin and LC3.
7. Characterization of agricultural ashes with basic LCA study.
8. Preparation and testing of special concretes (HSC, SCC, lightweight, high-density, 3D-printing).

Useful Video links:

Exp. No	Topics	Links
1	Work-ability tests using water-reducing and set-controlling admixtures.	https://youtu.be/B16svG4QrzY
2	Pozzolanic activity test of fly ash and silica fume.	https://youtu.be/biDjGm7J9q8
3	Strength test of concrete with GGBFS	https://youtu.be/0QqJqiMM2FQ?si=OC_xg5hSup7Y_roY
4	Preparation and testing of special concretes	https://youtu.be/-Ld6_jVBld8

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Course Code	GTSE-402A				
Course Title	SMART CITIES				
Scheme and Credits	L	T	P	Credits	Semester-VIII
	3	0	0	3	
Course Objectives	Upon successful completion of this course, students will be able to: • Comprehend the core concepts, components, and global frameworks of smart cities. • Understand the role of civil engineering in developing sustainable urban infrastructure, including smart mobility, energy systems, and waste management. • Reflect on how digital technologies like IoT, GIS, BIM, and AI are applied in urban planning and governance.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Identify the core concepts, stages of evolution, major components, and global frameworks of smart cities along with the objectives of India's Smart Cities Mission.	Level 1: Remember
CO2	Describe the role of civil engineering in planning and designing sustainable urban infrastructure systems.	Level 2: Understand
CO3	Apply digital technologies such as IoT, GIS, BIM, and data analytics to address urban infrastructure and environmental management challenges.	Level 3 : Apply
CO4	Analyze smart city systems in terms of sustainability, energy efficiency, environmental impact, urban resilience, and service integration.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit No.	Contents
Unit-I	Introduction to Smart Cities, Smart Governance & Digital Infrastructure, Smart Mobility & Transport : Basics of urban mobility, Intelligent Transportation Systems (ITS)
Unit-II	Smart Urban Infrastructure, Smart Energy Systems & Sustainability, Environmental Systems in Smart Cities : Air quality & pollution sensors, Wastewater treatment & reuse

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Unit-III	Digital Technologies in Smart Cities, Urban Planning & Land Use, Green Buildings & Sustainable Urban Form : Green building concepts, Energy-efficient architecture, Role of urban design in smart planning
Unit-IV	Resilient Cities & Disaster Management : Urban flood mitigation, Seismic planning & structural safety, Emergency services & early warning, Future Trends & Student Projects

Suggested Readings

- Batty, M. (2013). The new science of cities. MIT Press.
- Caragliu, A., Del Bo, C., & Nijkamp, P. (2011). Smart cities in Europe. Journal of Urban Technology, 18(2), 65–82.
- Giffinger, R., Fertner, C., Kramar, H., Kalasek, R., Pichler-Milanović, N., & Meijers, E. (2007). Smart cities: Ranking of European medium-sized cities. Centre of Regional Science, Vienna University of Technology.
- Hall, R. E., Bowerman, B., Braverman, J., Taylor, J., Todosow, H., & Von Wimmersperg, U. (2000). The vision of a smart city. Brookhaven National Laboratory Report.
- Harrison, C., Eckman, B., Hamilton, R., Hartswick, P., Kalagnanam, J., Paraszczak, J., & Williams, P. (2010). Foundations for smarter cities. IBM Journal of Research and Development, 54(4), 1–16. https://doi.org/10.1147/JRD.2010.2048257
- Hollands, R. G. (2008). Will the real smart city please stand up? City, 12(3), 303–320. https://doi.org/10.1080/13604810802479126
- Kitchin, R. (2014). The data revolution: Big data, open data, data infrastructures and their consequences. Sage Publications.

Useful Video Links

Unit No.	Topic	Link
Unit-I	Smart Cities: Concepts, Mission & Governance	https://nptel.ac.in/courses/105106832 https://youtu.be/AJxaH8OE4qs
Unit-II	Smart Urban Infrastructure & Services	https://youtu.be/eWh6XrDZHHE
Unit-III	Building Resilient Smart City Platforms	https://youtu.be/HavvZzTQJnU?si=xHOT-Lh4M5Bn9xCp
Unit-IV	Sustainable Cities	https://youtu.be/1kJKnebjtQs

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Course code	SM-GTSE-303A				
Course title	SEMINAR				
Scheme and Credits	L	T	P	**Credits**	**Semester-V**
	0	0	2	1	
Course Objectives:	Upon successful completion of this course, students will be able to: • To enable students to identify and study emerging topics related to sustainable and green infrastructure in civil engineering. • To develop the ability to review and analyze scientific literature, technical reports, and case studies related to sustainability in the built environment. • To enhance students' technical writing, presentation, and communication skills through preparation of seminar reports and presentations. • To encourage students to critically evaluate modern technologies, materials, and practices used for sustainable infrastructure development.				
Class work	25 Marks				
Exam	25 Marks				
Total	50 Marks				
Duration of Exam					

COURSE CONTENT

During the semester, the students have to:

• Select a topic related to Sustainable and Green Infrastructure, such as sustainable building materials, environmental impact assessment, sustainable design strategies, smart cities, special concretes, or other emerging technologies in civil engineering.

• Conduct a comprehensive literature review on the selected topic using research papers, technical reports, standards, and relevant case studies.

• Analyze and summarize the sustainability aspects, environmental impacts, and practical applications of the selected topic.

• Prepare and deliver a technical seminar presentation highlighting objectives, methodology, findings, and future scope.

• Submit a detailed seminar report based on the literature review and analysis.

• Students are encouraged to prepare a review/technical paper based on their work for possible presentation or publication in a national conference, international conference, or journal, if feasible.

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Course code	**PROJ-GTSE-304A**				
Course title	PROJECT				
Scheme and Credits	L	T	P	**Credits**	**Semester-VI**
	0	0	**4**	2	
Course Objectives:	Upon successful completion of this course, students will be able to: • To enable students to apply the concepts of sustainable and green infrastructure to solve real-world civil engineering problems. • To develop the ability to identify, analyze, and formulate engineering problems related to sustainable materials, environmental management, smart infrastructure, and sustainable design. • To provide experience in research methodology, literature review, data analysis, modelling, design, or experimental investigation related to sustainable infrastructure systems. • To enhance students' skills in teamwork, project planning, and technical problem solving while executing a project under faculty guidance.				
Class work	50 Marks				
Exam	50 Marks				
Total	100 Marks				
Duration of Exam					

The objective of Project Work is to enable students to undertake an in-depth study on a topic related to Sustainable and Green Infrastructure, integrating knowledge from environmental impact assessment, sustainable materials, smart cities, sustainable design strategies, and advanced concretes. The project may involve theoretical, experimental, analytical, design-based, or field-oriented work under the guidance of a faculty supervisor from the department and, where possible, in collaboration with industry or research organizations.

The assignment should normally include:

1. Selection and in-depth study of a topic related to sustainable and green infrastructure such as sustainable construction materials, environmental assessment, smart urban systems, sustainable design, special concretes, or related emerging technologies.
2. Comprehensive literature review using research papers, technical reports, standards, and case studies to understand the current developments in the selected area.
3. Identification and formulation of the problem, including defining objectives, scope, methodology, and preparation of an action plan for carrying out the study.

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4. Detailed analysis/design/modelling/simulation/experimental investigation related to the selected problem, emphasizing sustainability, environmental performance, and practical applicability.
5. Development and evaluation of proposed solutions, including data analysis, interpretation of results, and discussion on sustainability benefits and limitations.
6. Preparation of a technical/review paper based on the project work for possible presentation in a conference or publication in a journal, if feasible.
7. Preparation and submission of a detailed project report/dissertation in the prescribed format for evaluation by the department.
8. Final seminar presentation and demonstration of the project work before a departmental committee.

Annexure 4.9 a

DEPARTMENT OF APPLIED SCIENCE AND HUMANITIES
GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, JHAJJAR
An Autonomous Institute | NAAC 'A' Grade Institute | Affiliated to MDU, Rohtak

Minutes of 3rd meeting of Board of Studies of Department of Applied Science and Humanities

The 3rd meeting of Board of Studies of Department of Applied Science and Humanities was held on 11th Feb 2026 at 11.00 am in Board Room of the Institute.

The following members were present for Board of Studies meeting:

S. No	Name	Affiliation/Organization	Designation within Board of Studies
1	Prof. Anurag Jain	Professor and Head, Department of Applied Science and Humanities, GITAM, Kablana	Chairperson
2	Prof. S.P. Khatkar	Professor, Emeritus, Department of Chemistry, M.D. University, Rohtak	University Nominee
3	Prof. Phool Singh	Professor, Department of Mathematics under SoET, Central University of Haryana, Mahendergarh	Subject Expert, Outside Parent University
4	Prof. Kulvinder Singh	Professor, Department of Physics, Deen Dayal Upadhyay College, Delhi University	Subject Expert, Outside Parent University (Online)
5	Prof. Aman Aggarwal	Director , GITAM, Kablana,	Special Invitee
6	Dr. Sweta Chauhan	Professor, Physics, GITAM, Kablana	Member
7	Dr. Paramjeet Sangwan	Professor, Mathematics, GITAM, KAblana	Member
8	Dr. Prem Ballabh	Associate Professor, Chemistry, GITAM, Kablana	Member
9	Dr. Ankita Saini	Assistant Professor, Chemistry, GITAM, Kablana	Member
10	Dr. Suman Devi	Professor, English, GITAM, Kablana	Member
11	Dr. Aarti	Assistant Professor, Chemistry, GITAM, Kablana	Member
12	Mr. Aseem Harit	Assistant Professor, Mathematics, GITAM, Kablana	Member
13	Dr. Kuldeep	Assistant Professor, Mathematics, GITAM, Kablana	Member

14	Ms. Kshitij Upadhyay	Assistant Professor, Physics, GITAM, Kablana	Member
15	Ms. Suman Singh	Assistant Professor, English, GITAM, Kablana	Member
16	Ms. Aditi Kashyap	Assistant Professor, English, GITAM, Kablana	Member
17	Ms. Supriya	Assistant Professor, Mathematics, GITAM, Kablana	Member
18	Ms. Vidhi	Assistant Professor, Mathematics, GITAM, Kablana	Member
19	Mr. Punit	Assistant Professor, Mathematics, GITAM, Kablana	Member
20	Ms. Ritu	Assistant Professor, Mathematics, GITAM, Kablana	Member
21	Dr. Naveen	Assistant Professor, Mathematics, GITAM, Kablana	Member
22	Dr. Ekta	Assistant Professor, Physics, GITAM, Kablana	Member
23	Dr. Jitender Kumar	HOD (FTS), GITAM, Kablana	Special Invitee
24	Dr. Joginder Singh	HOD (EE), GITAM, Kablana	Special Invitee

At the outset the Chairperson welcomed all the members present in the meeting. The agenda items, as circulated prior to the meeting, were taken up for discussion.

Item No.3.1

Confirmation of the minutes of 2nd meeting of Board of Studies held on 27th May 2025.

The minutes of 2nd meeting of the Board of Studies of Department of Applied Science and Humanities held on 27th May 2025 **(Annexure-3.1 Pages 1-4)** already circulated be confirmed.

Item No.3.2

Follow up action report on the decisions taken in the 2nd meeting of Board of Studies held on 27th May 2025.

The follow up action report on the decisions taken in the 2nd meeting of Board of Studies held on 27th May 2025 **(Annexure 3.2 Page 5)** already circulated be confirmed.

Item No.3.3

To discuss and approve the Examination Pattern (Examiner note for paper setting).

The Board of Studies, in its meeting held on 27th May 2025, approved the ordinance, scheme of examinations and syllabi of B.Tech 1st year vide Resol. 2.3. Resolved that the guidelines for the paper setter was approved and send to the Academic Council for approval **(Annexure 3.3 Page 6)**.

Item No. 3.4

Minor correction in the Syllabus, Course Code, Course Objectives and Course Outcomes of Engineering Mathematics-III for B.Tech Electrical Engineering 4th Sem.

The Board of studies, in its meeting held on 27th May 2025, approved the Syllabus of Engineering Mathematics-III of B. Tech Sem-III/IV vide Resol. 2.4. Resolved that Board of Studies approved the minor correction in the syllabus, course code, course objectives and course outcomes of Engineering Mathematics-III for B.Tech Electrical Engineering 4th Sem effective from the academic session 2025–26 and same is recommended to the Academic Council for approval **(Annexure 3.4 Pages 7-11).**

Item No.3.5

Any other item with the permission of the Chair.

No additional discussion was made.

The meeting concluded with the thanks to the Chair.

Chairperson
Board of Studies
Department of Applied Science and Humanities

~~Annexure 3.3~~

Annexure 4.9 b

Guidelines to Examiners for paper setter

Existing Examination Pattern	Amended Examination Pattern
For End Semester-60 Marks	
Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.	No Change
For End Semester-45 Marks	
Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts **(preferably 2 from each unit/section)** of 1.5 marks each and remaining eight questions of 9 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.	Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts **(covering all units)** of 1.5 marks each and remaining eight questions of 9 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
For End Semester-30 Marks	
Examiner will set nine questions in total. Question one will be compulsory. Question one will have 4 parts **(preferably 2 from each unit/section)** of 1.5 marks each and remaining eight questions of 6 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.	Examiner will set nine questions in total. Question one will be compulsory. Question one will have 4 parts **(covering all units)** of 1.5 marks each and remaining eight questions of 6 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Chairperson
Board of Studies
Department of Applied Science and Humanities

Existing Syllabus:

Course Code	**BSC-MEE-201A**				
Category	Basic Science Courses				
Course Title	**Engineering Mathematics-III**				
Scheme and Credits	L	T	P	**Credits**	**Semester-III/IV**
	3	1	0	4	
Course Objectives	The objectives of this course are to • Understand and classify first and second-order linear partial differential equations, and apply appropriate solution techniques including complementary function and particular integral methods. • Solve and analyze physical models such as wave and diffusion equations using methods like separation of variables.				
Course Pre-requisite	Mathematics up to 12^{th} Standard and Engineering Mathematics-I & II				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define partial differential equations and probability distributions including their properties and physical relevance.	Level 1: Remember
CO2	Classify second-order PDEs using complementary functions and particular integrals.	Level 2: Understand
CO3	Apply probability concepts, including conditional probability and Bayes' Theorem, for real-world problems using discrete and continuous distributions.	Level 3: Apply
CO4	Analyze numerical methods (Bisection, Newton-Raphson, Euler, Runge- Kutta) for solving equations and ODEs with a focus on accuracy and efficiency.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Definition of Partial Differential Equations, First order linear partial differential equations, Partial Differential Equations of higher order: Second-order linear partial differential equations and their classification, Solution to homogenous and non-homogenous linear partial differential equations of second order by complimentary function and particular integral method, Initial and boundary conditions, Separation of variables method to simple problems in Cartesian coordinates.

Unit-II

Solution of polynomial and transcendental equations – Bisection method, Regula-Falsi method and Newton-Raphson method, Finite differences, Interpolation using Newton's forward and backward difference formulae, Newton's divided difference and Lagrange's formulae, Numerical integration, Trapezoidal rule and Simpson's 1/3rd and 3/8 rules, Taylor's series, Euler and modified Euler's

methods, Runge-Kutta method of fourth order for solving first and second order ordinary differential equations. Matrix inversion.

Unit-III

Measures of central tendency, Moments, Skewness and Kurtosis Basic concept of Probability, Conditional probability, Bayes' theorem, Discrete random variables, Binomial distribution, Poisson distribution, Expectation of discrete random variables, Variance of a sum, Correlation coefficient, Continuous random variables and their properties, Distribution functions, Normal Distribution.

Unit-IV

Testing of hypothesis, Test of significance, Large sample test for single proportion, Difference of proportions, Tests for single mean, Difference of means and Difference of standard deviations, Test for ratio of variances, Chi-square test for goodness of fit and Independence of attributes

Suggested Readings:

- B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers
- B. V. Ramana, Higher Engineering Mathematics, Tata McGraw-Hill Publishing Company Limited
- N. P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications
- P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand and Company
- S. S. Sastry, Introductory Methods of Numerical Analysis, PH
- Business Statistics by T.R. Jain and S.C. Aggarwal, VK Global Publications Pvt. Ltd.

Useful Video links:

Unit No.	Topics	Links
Unit I	Definition of Partial Differential Equations.	https://www.youtube.com/watch?v=KIZqe4UC1jk
	Solution to homogenous and non-homogenous linear partial differential equations	https://www.youtube.com/watch?v=5eZbgxmpK3Q&t=520s
	Initial and boundary conditions of partial differential equations of second order	https://www.youtube.com/watch?v=PVUfuiuWaZQ
Unit II	Bisection method, Regula-Falsi method and Newton-Raphson method	https://www.youtube.com/watch?v=3j0e_FhQt5U&list=PLU6SqdYcYsfIk1VhXx1YNPFU67ym6gae8
	Interpolation using Newton's forward and backward difference formulae, Newton's divided difference and Lagrange's formulae	https://www.youtube.com/watch?v=Y-yMQvYplU https://www.youtube.com/watch?v=zdyUwzOm1zw https://www.youtube.com/watch?v=2h0R0Uka1HI
	Numerical integration, Trapezoidal rule and Simpson's 1/3rd and 3/8 rules	https://www.youtube.com/watch?v=EA76ONWBgK4&list=PLhSp9OSVmeyJBkLSO51JFPSEIIoeRiaJv
Unit III	Basic concept of Probability, Conditional probability, Bays' theorem	https://youtu.be/60vHy2IA4o4 https://www.youtube.com/watch?v=ZFMcWe_SNyI https://www.youtube.com/watch?v=-ELHOnLwE9U

Unit IV	Testing of Hypothesis & Levels of significance, Large Sample Test	https://nptel.ac.in/courses/video/11105090/1.2.3.html
	Chi-Square Test	https://youtu.be/SiCsNo-UXds?feature=shared
	Miscellaneous	https://onlinecourses.nptel.ac.in/noc22_ma81/preview

Revised Syllabus:

Course Code	**BSC-MEE-202A**					
Category	Basic Science Courses					
Course Title	**Engineering Mathematics-III**					
Scheme and Credits	L	T	P	**Credits**	**Semester-III/IV**	
	3	1	0	4		
Course Objectives	The objectives of this course are to To provide fundamental knowledge of partial differential equations, numerical methods, probability, and statistical concepts relevant to engineering problems. To make the students familiar with analytical and numerical techniques for solving differential equations and problems involving probabilistic and statistical models. To emphasize the application of appropriate mathematical and statistical methods in the modelling, analysis, and solution of engineering problems.					
Course Pre-requisite	Mathematics up to 12th Standard and Engineering Mathematics-I & II					
Assessment	40 Marks					
End Semester Examination	60 Marks					
Total	100 Marks					
Duration of Exam	03 Hours					

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Recall fundamental concepts, definitions, formulae, and standard methods related to partial differential equations, probability and statistics and numerical methods.	Level 1: Remember
CO2	Explain the fundamental concepts of partial differential equations, probability distributions, statistical measures and numerical methods.	Level 2: Understand
CO3	Apply appropriate analytical, numerical and statistical methods and techniques to solve engineering problems.	Level 3: Apply
CO4	Analyze engineering problems to select suitable methods for their solution and interpret the results.	Level 4: Analyze

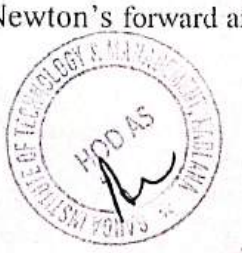
Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Definition of Partial Differential Equations, First order linear partial differential equations, Partial Differential Equations of higher order: Second-order linear partial differential equations and their classification, Solution to homogenous and non-homogenous linear partial differential equations of second order by complimentary function and particular integral method, Initial and boundary conditions, Separation of variables method to simple problems in Cartesian coordinates.

Unit-II

Numerical Methods: Solution of polynomial and transcendental equations – Bisection method, Regula-Falsi method and Newton-Raphson method, Interpolation using Newton's forward and



backward difference formulae, Newton's divided difference and Lagrange's formulae, Numerical integration, Trapezoidal rule and Simpson's 1/3rd and 3/8 rules.

Unit-III

Measures of central tendency, Moments, Skewness and Kurtosis Basic concept of Probability, Conditional probability, Bayes' theorem, Discrete random variables, Binomial distribution, Poisson distribution, Expectation of discrete random variables, Variance of a sum, Correlation coefficient, Continuous random variables and their properties, Distribution functions, Normal Distribution.

Unit-IV

Testing of hypothesis, Test of significance, Large sample test for single proportion, Difference of proportions, Tests for single mean, Difference of means and Difference of standard deviations, Test for ratio of variances, Chi-square test for goodness of fit and Independence of attributes.

Suggested Readings:

- B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers
- B. V. Ramana, Higher Engineering Mathematics, Tata McGraw-Hill Publishing Company Limited
- N. P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications
- P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand and Company
- S. S. Sastry, Introductory Methods of Numerical Analysis, PH
- Business Statistics by T.R. Jain and S.C. Aggarwal, VK Global Publications Pvt. Ltd.

Useful Video links:

Unit No.	Topics	Links
Unit I	Definition of Partial Differential Equations.	https://www.youtube.com/watch?v=KIZqe4UC1jk
	Solution to homogenous and non-homogenous linear partial differential equations	https://www.youtube.com/watch?v=5eZbgxmpK3Q&t=520s
	Initial and boundary conditions of partial differential equations of second order	https://www.youtube.com/watch?v=PVUfuiuWaZQ
Unit II	Bisection method, Regula-Falsi method and Newton-Raphson method	https://www.youtube.com/watch?v=3j0e_FhOt5U&list=PLU6SqdYcYsfJk1VhXxIYNPFU67ym6gae8
	Interpolation using Newton's forward and backward difference formulae, Newton's divided difference and Lagrange's formulae	https://www.youtube.com/watch?v=Y-yMQvYpltU https://www.youtube.com/watch?v=zdyUwzOm1zw https://www.youtube.com/watch?v=2h0R0UkaIHI
	Numerical integration, Trapezoidal rule and Simpson's 1/3rd and 3/8 rules	https://www.youtube.com/watch?v=EA76ONWBgK4&list=PLhSp9OSVmeyJBkLSO51JFPSEHocRiaJy
Unit III	Basic concept of Probability, Conditional probability, Bays' theorem	https://youtu.be/6t0vHy2IA4o4 https://www.youtube.com/watch?v=ZFMcWe_SNyI https://www.youtube.com/watch?v=-ELHOnLwE9U
Unit IV	Testing of Hypothesis & Levels of significance, Large Sample Test	https://aucec.digimat.in/nptel/courses/video/111105090L72.html
	Chi-Square Test	https://youtu.be/SICsNb-VXds?feature=shared
	Miscellaneous	https://onlinecourses.nptel.ac.in/noc22_ma85/preview

HOD AS

Annexure 4.10 a

DEPARTMENT OF MANAGEMENT

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, JHAJJAR

AN AUTONOMOUS INSTITUTE | NAAC'A'GRADE INSTITUTE | AFFILIATED TO MDU, ROHTAK

Minutes of 3rd meeting of Board of Studies of Management Department

The 3rd meeting of Board of Studies of Management Department was held on 26.12.2025 at 11: A.M. in the Conference Hall of the Institute.

The following members were present for the BOS meeting:

SN	Name of the Member	Affiliation/Organization	Designation within Board of Studies
1	Dr Punam Devi	HoD& Professor, MGMT, GITAM, Kablana	Chairman
2	Dr. Pardeep Ahlawat	Subject Expert (Professor, IMSAR, MDU, Rohtak), University Nominee	Member
3	Dr. Sanjay Bhayana	Subject Expert (Professor, NIFTEM, Sonipat), Outside Parent University	Member
4	Dr. Ashutosh Nigam	Subject Expert (Professor, J. C. Bose University of S&T, YMCA, Faridabad) Outside Parent University	Member
5	Dr. Dipika	Professor, MGMT, GITAM Kablana	Member
6	Dr. Payush	Professor, MGMT, GITAM Kablana	Member
7	Dr. Bhawana Yadav	Associate Professor, MGMT, GITAM Kablana	Member
8	Dr. Manisha	Associate Professor, MGMT, GITAM Kablana	Member
9	Dr. Deepti	Associate Professor, MGMT, GITAM Kablana	Member
10	Dr. Anju	Assistant Professor, MGMT, GITAM Kablana	Member
11	Mr. Ajay Kumar	Assistant Professor, MGMT, GITAM Kablana	Member
12	Ms. Preeti Sharma	Assistant Professor, MGMT, GITAM Kablana	Member
13	Mr. Sachin Gupta	Assistant Professor, MGMT, GITAM Kablana	Member
14	Mr. Umesh Bhardwaj	Assistant Professor, MGMT, GITAM Kablana	Member
15	Ms. Shalu	Assistant Professor, MGMT, GITAM Kablana	Member
16	Ms. Manju	Assistant Professor, MGMT, GITAM Kablana	Member
17	Ms. Bhumika Samal	Assistant Professor, MGMT, GITAM Kablana	Member
18	Ms. Sangeeta Gupta	Assistant Professor, MGMT, GITAM Kablana	Member
19	Ms. Divya	Assistant Professor, MGMT, GITAM Kablana	Member
20	Ms. Asha	Assistant Professor, MGMT, GITAM Kablana	Member
21	Mr. Joginder Singh Grewal	Assistant Professor, MGMT, GITAM Kablana	Member
22	Ms. Poonam Garg	Assistant Professor, MGMT, GITAM Kablana	Member
23	Ms. Annu	Assistant Professor, MGMT, GITAM Kablana	Member
24	Ms. Divya	Assistant Professor, MGMT, GITAM Kablana	Member
25	Ms. Navin Kumari	Assistant Professor, MGMT, GITAM Kablana	Member
26	Ms. Nisha	Assistant Professor, MGMT, GITAM Kablana	Member
27	Ms. Sweety	Assistant Professor, MGMT, GITAM Kablana	Member
28	Mr. ManojRathi	Assistant Professor, MGMT, GITAM Kablana	Member
29	Ms. Suman	Assistant Professor, MGMT, GITAM Kablana	Member

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At the outset the Chairperson welcomed all the members present in the meeting. The agenda items, as circulated prior to the meeting, were taken up for discussion.

Agenda wise Discussions and Resolution

Item No. 3.1

Confirmation of the minutes of 2nd Meeting of the Board of Studies (BOS) of Management Department held on 27.05.2025.

Resolved that the minutes of 2nd Meeting of the Board of Studies (BOS) of Management Department held on 27.05.2025 (Annexure 3.1 Pages 1-4 already circulated) be confirmed.

Item No. 3.2

Follow up action report of the decisions taken in the 2nd Meeting of Board of Studies held on 27.05.2025.

Resolved that the Follow up action report of the decisions taken in the 2nd Meeting of Board of Studies held on 27.05.2025 be noted.

Items	Particulars	Follow-up Action
2.3	Approval of minor modification in the scheme under the Structure of the Postgraduate Program (MBA) by introducing a new course category titled "Discipline Elective Courses" for specialization courses and separately categorizing credits of Discipline Specific Courses and Discipline Elective Courses w.e.f. 2025–26 vide reso. No. 3 of its meeting held on 27.05.2025.	The recommendations of the BOS approved by Academic Council vide **Reso. No. 3.10 (A)** in its meeting held on 03.07.2025 conveyed to all concerned. The approved scheme was uploaded on the Institute website.
2.4	Approval of the Scheme of Examinations and Syllabus of BBA 1st (B-Scheme) and BBA 3rd (A-Scheme) Semester from Academic Session 2025–26 vide reso. No. 4 of its meeting held on 27.05.2025.	Approved by Academic Council vide **Reso. No. 3.10 (B)** of its meeting held on 03.07.2025 conveyed to all concerned. The approved Scheme of Examinations and Syllabus of BBA 1st (B-Scheme) and BBA 3rd (A-Scheme) Semester for Academic Session 2025–26 were uploaded on the Institute website.
2.5	Approval of the Scheme of Examinations and Syllabus of MBA 3rd Semester from Academic Session 2025–26 vide reso. No. 5 of its meeting held on 27.05.2025.	Approved by Academic Council vide **Reso. No. 3.10 (C)** of its meeting held on 03.07.2025 conveyed to all concerned. The approved Scheme of Examinations and Syllabus of MBA 3rd Semester for Academic Session 2025–26 were uploaded on the Institute website.
2.6	Panel of examiners for Theory and Practical of BBA and MBA Programs for the Academic Year 2025–26 vide Resolution No. 6 of the meeting held on 27.05.2025.	The panel of examiners for Theory and Practical of BBA and MBA Programs for the Academic Year 2025–26 conveyed to all concerned.

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2.7	Review and approval of syllabus of B.Tech courses from the session 2025–26.The syllabus of Fundamentals of Management and Organisational Behaviour, Economics for Engineers, and Universal Human Values–II: Understanding Harmony and Ethical Human Conduct, being management-related courses for B.Tech programs, were reviewed and approved, effective from the session 2025–26 vide reso. No. 7 of its meeting held on 27.05.2025.	The syllabus of B.Tech courses, namely Fundamentals of Management and Organisational Behaviour, Economics for Engineers, and Universal Human Values–II: Understanding Harmony and Ethical Human Conduct, effective from the session 2025–26 have been informed to all concerned department.

Item No. 3.3

Scheme of Examinations and Syllabus of the 4th Semester of MBA Programme from Academic Session 2025–26.

Resolved that the Scheme of Examinations and Syllabus of the 4th Semester of the MBA Programme approved and further resolved that the same is recommended to Academic Council for approval. (Annexure-3.2 Pages 05-114).

Item No. 3.4

Review and Approval of the Panel of Examiners for Paper Setting and Practical/Project Examinations for the MBA programme.

Resolved that the Panel of Examiners for paper setting and practical/project examinations for the MBA Programme be approved and sent to the COE of the (Annexure-3.3 Pages 115-122).

Item No. 3.5

(a) Amendment in Credit Structure and Course Category under Scheme-A (BBA, BBA (Honours), and BBA (Honours with Research).

Existing Credit Structure of the BBA (A-Scheme) Program for 2024-25				
Sr. No.	**Category**	**Breakup of Credits**		
		BBA	**BBA (H)**	**BBA (With Research)**
1	Discipline-Specific Courses (DSC) /Major Course	76	116	104
2	Minor (MIC)/ Minor Vocational (MICV)/ Skill Enhancement Courses (SEC)/Internship	37	45	45
3	Multidisciplinary Courses	09	09	09
4	Ability Enhancement Course	08	08	08
5	Value Added Course	06	06	06
6	Research Project/Dissertation			12
	Total Credits	**136**	**184**	**184**

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Amended credit structure of the BBA (A-Scheme)Program w.e.f. 2025-26				
Sr. No.	Category	Breakup of Credits		
		BBA	BBA (H)	BBA (Honors with Research)
1	Discipline-Specific Courses (DSC)/Major Course	76	116	104
2	Minor (MIC)/ Minor Vocational (MICV)/ Skill Enhancement Courses (SEC)/Internship	37	45	45
3	Multidisciplinary Courses	09	09	09
4	Ability Enhancement Course	08	08	08
5	Value Added Course	06	06	06
6	Research Project/Dissertation	04	04	16
	Total Credits	**140**	**188**	**188**

Resolved that the amended Credit Structure and Course Category under Scheme-A of BBA, BBA (Honours), and BBA (Honours with Research) w.e.f. 2025–26 be approved and recommended to Academic Council for further approval.

(b) Scheme of Studies and Examinations of BBA (A-Scheme), BBA (Honours), and BBA (Honours with Research) from 4th Semester onwards and syllabus of BBA 4th semester.

Resolved that the A-Scheme of Studies and Examinations of BBA, BBA (Honours), and BBA (Honours with Research) from the 4th Semester onwards and syllabus of BBA 4th semester be approved and recommended to Academic Council for further approval (Annexure-3.4 Pages 123-154).

(c) Scheme of Examinations of BBA (B-Scheme) from 1st - 8th semester and Syllabus of 2nd Semester BBA (B-Scheme).

Resolved that the Scheme of Examinations of BBA (B-Scheme) from 1st-8th semester and Syllabus of 2nd Semester BBA (B-Scheme) be approved. Further resolved that the same is recommended to Academic Council for further approval (Annexure-3.5 Pages 155-189).

Item No. 3.6

Approval of the Panel of Examiners for Paper Setting and Practical Examinations for the BBA Programme.

Resolved that the Panel of Examiners for paper setting and practical examinations for the BBA 1st semester and 2nd semester (B-Scheme) and BBA 4th (A-Scheme) semester be approved and the same is sent to COE, GITAM (Annexure-3.6 Pages 190-193).

Item No. 3.7

(a) Scheme of Examinations and Syllabus of Certificate Course on "Digital Marketing" from Academic Session 2025–26.

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Resolved that the Scheme of Examinations and Syllabus of the Certificate Course on "Digital Marketing" from Academic Session 2025–26 be approved and recommended to Academic Council for Approval (Annexure-3.7 Pages 194-196).

(b) Scheme of Examinations and Syllabus of Certificate Course on "Tally ERP 9" from Academic Session 2025–26.

Resolved that the Scheme of Examinations and Syllabus of the Certificate Course on "Tally ERP 9" from Academic Session 2025–26 be approved and recommended to Academic Council for approval (Annexure-3.8 Pages 197-199).

Item No. 3.8

Approve of Ordinance of MBA Programme from Academic Session 2025–26.

Resolved that the Board of Studies approved the Ordinance of the MBA Programme. Further resolved that same is recommended to Academic Council for approval (Annexure-3.9 Pages 200-208).

The Meeting concluded with thanks to the Chair.

Chairperson
Board of Studies
Deptt. of Management

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Annexure 4.10 b

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Approved by AICTE, New Delhi and Affiliated to MDU, Rohtak
NAAC 'A' GRADE

5

SCHEME AND SYLLABI
OF
2-YEAR MASTERS OF BUSINESS ADMINISTRATION PROGRAM (MBA)
WITH EFFECT FROM THE ACADEMIC SESSION 2025-26

~~Annexure 3.2~~

Scheme of Examination
MBA – 4th Semester
w.e.f. 2025-26

Second year of 2-Year MBA Program (NHEQF Level 6.5): Fourth Semester

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Schedule (Marks)				Exam Duration in H
				L	T	P			Assessment	End Semester Examination	Practical/ Viva Voce	Total	
1	Discipline Specific Course	DSC-MBA-202A	Entrepreneurship Development	3	1	0	4	4	25	50	25	100	3
2	Specialization	Refer Table No.-2		3	1	0	4	4	40	60	-	100	3
3	Specialization	Refer Table No.-2		3	1	0	4	4	40	60	-	100	3
4	Specialization	Refer Table No.-2		3	1	0	4	4	40	60	-	100	3
5	Specialization	Refer Table No.-2		3	1	0	4	4	40	60	-	100	3
6	Skill Enhancement Course	SEC-MBA-206A	Data Analysis using Excel	3	0	0	3	3	25	50	-	75	3
		LC-MBA-208A	Data Analysis using Excel Lab	0	0	2	2	1	10	-	15	25	3
	Internship	INT-MBA-210A	Internship Report	-	-	-	-	4	50	-	50	100	3
	Project Work	PR-MBA-212A	Project Work	-	-	-	-	4	50	-	50	100	3
		TOTAL CREDIT						**24**				**700**	
Total Credits (24+24+24+24) for 2-Year MBA												**96 Credits**	

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Note

1. Students completing the program successfully shall be awarded a 2-year PG Degree in Business Administration upon securing 96 credits.
2. The students are required to choose either SEC 4 or Internship 4 or Project Work 2.
3. In the case of Project Work2, the topic of the Research Project to be submitted for evaluation in the fourth Semester shall be submitted by the student along with a brief synopsis after finalization within first month of the Semester in consultation with the faculty member allotted as Research Supervisor by the HOD.
4. Each student in the course of Entrepreneurship Development will present a business idea developed during the semester and the same will be evaluated by a panel of external examiner(s) comprising one from industry and the other from academia recommended by the PG BOS of GJIMT along with one internal examiner recommended by the HOD.

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Table-II
Discipline Elective Courses for MBA 4th Semester

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Schedule (Marks)				Exam Duration in H
				L	T	P			Assessment	End Semester Examination	Practical /Viva Voce	Total	
1	Discipline Elective Course-Marketing	DEC-MKT-MBA-212A	Integrated Marketing Communication	3	1	0	4	4	40	60	-	100	3
2	Discipline Elective Course-Marketing	DEC-MKT-MBA-214A	Product and Brand Management	3	1	0	4	4	40	60	-	100	3
3	Discipline Elective Course-Marketing	DEC-MKT-MBA-216A	Sales and Distribution Management	3	1	0	4	4	40	60	-	100	3
4	Discipline Elective Course-Marketing	DEC-MKT-MBA-218A	Customer Engagement Marketing	3	1	0	4	4	40	60	-	100	3
5	Discipline Elective Course-Marketing	DEC-MKT-MBA-220A	Advanced Selling and Negotiation Skills	3	1	0	4	4	40	60	-	100	3
6	Discipline Elective Course-Finance	DEC-FIN-MBA-222A	Financial and Commodity Derivatives	3	1	0	4	4	40	60	-	100	3
7	Discipline Elective Course-Finance	DEC-FIN-MBA-224A	International Financial Management	3	1	0	4	4	40	60	-	100	3
8	Discipline Elective Course-Finance	DEC-FIN-MBA-226A	Investment Management	3	1	0	4	4	40	60	-	100	3
9	Discipline Elective Course-Finance	DEC-FIN-MBA-228A	FinTech for Business Innovation	3	1	0	4	4	40	60	-	100	3
10	Discipline Elective Course-Finance	DEC-FIN-MBA-230A	Management of Financial Services	3	1	0	4	4	40	60	-	100	3
11	Discipline Elective Course-HR	DEC-HR-MBA-232A	Training and Development	3	1	0	4	4	40	60	-	100	3
12	Discipline Elective Course-HR	DEC-HR-MBA-234A	Performance Management Systems	3	1	0	4	4	40	60	-	100	3
13	Discipline Elective Course-HR	DEC-HR-MBA-236A	Organizational Change and Intervention Strategies	3	1	0	4	4	40	60	-	100	3
14	Discipline Elective Course-HR	DEC-HR-MBA-238A	Leadership and Teamwork in Organizations	3	1	0	4	4	40	60	-	100	3

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15	Discipline Elective Course-HR	DEC-HR-MBA-240A	Managing Workforce Stress	3	1	0	4	4	40	60	-	100	3
16	Discipline Elective Course-IT	DEC-IT-MBA-242A	Business Intelligence and Analytics	3	1	0	4	4	40	60	-	100	3
17	Discipline Elective Course-IT	DEC-IT-MBA-244A	Systems Analysis and Design	3	1	0	4	4	40	60	-	100	3
18	Discipline Elective Course-IT	DEC-IT-MBA-246A	Programming in Visual Basic	3	1	0	4	4	40	60	-	100	3
19	Discipline Elective Course-IT	DEC-IT-MBA-248A	Enterprise Resource Planning	3	1	0	4	4	40	60	-	100	3
20	Discipline Elective Course-IT	DEC-IT-MBA-250A	Data Mining for Business Decisions	3	1	0	4	4	40	60	-	100	3
21	Discipline Elective Course-IB	DEC-IB-MBA-252A	Cross Cultural and Global Management	3	1	0	4	4	40	60	-	100	3
22	Discipline Elective Course-IB	DEC-IB-MBA-254A	Management Of Multinational Corporations	3	1	0	4	4	40	60	-	100	3
23	Discipline Elective Course-IB	DEC-IB-MBA-256A	International Logistics	3	1	0	4	4	40	60	-	100	3
24	Discipline Elective Course-IB	DEC-IB-MBA-258A	International Marketing	3	1	0	4	4	40	60	-	100	3
25	Discipline Elective Course-IB	DEC-IB-MBA-260A	International Financial Market	3	1	0	4	4	40	60	-	100	3
26	Discipline Elective Course-AGB	DEC-AGB-MBA-262A	Agricultural Input Marketing And Post- Harvest Management	3	1	0	4	4	40	60	-	100	3
27	Discipline Elective Course-AGB	DEC-AGB-MBA-264A	Life Stock Business Management	3	1	0	4	4	40	60	-	100	3
28	Discipline Elective Course-AGB	DEC-AGB-MBA-266A	Agricultural Marketing Management	3	1	0	4	4	40	60	-	100	3
29	Discipline Elective Course-AGB	DEC-AGB-MBA-268A	Agri Supply Chain and Logistics Management	3	1	0	4	4	40	60	-	100	3
30	Discipline Elective Course-AGB	DEC-AGB-MBA-270A	International Trade in Agri-Business	3	1	0	4	4	40	60	-	100	3
31	Discipline Elective Course-OM	DEC-OM-MBA-272A	Transportation Management	3	1	0	4	4	40	60	-	100	3
32	Discipline Elective Course-OM	DEC-OM-MBA-274A	Warehouse Management and Inventory Control	3	1	0	4	4	40	60	-	100	3
33	Discipline Elective Course-OM	DEC-OM-MBA-276A	Supply Chain Analytics	3	1	0	4	4	40	60	-	100	3

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34	Discipline Elective Course-OM	DEC-OM-MBA-278A	Service Operations Management	3	1	0	4	4	40	60	-	100	3
35	Discipline Elective Course-OM	DEC-OM-MBA-280A	Project Management	3	1	0	4	4	40	60	-	100	3
36	Discipline Elective Course-BA	DEC-BA-MBA-282A	Economics for Business Strategy	3	1	0	4	4	40	60	-	100	3
37	Discipline Elective Course-BA	DEC-BA-MBA-284A	Econometrics for Business Analytics	3	1	0	4	4	40	60	-	100	3
38	Discipline Elective Course-BA	DEC-BA-MBA-286A	Predictive Business Analytics	3	1	0	4	4	40	60	-	100	3
39	Discipline Elective Course-BA	DEC-BA-MBA-288A	Time Series Data Analysis	3	1	0	4	4	40	60	-	100	3
40	Discipline Elective Course-BA	DEC-BA-MBA-290A	Market Microstructure	3	1	0	4	4	40	60	-	100	3
41	Discipline Elective Course-PP	DEC-PP-MBA-292A	Public Finance Administration	3	1	0	4	4	40	60	-	100	3
42	Discipline Elective Course-PP	DEC-PP-MBA-294A	Risk and Disaster Management	3	1	0	4	4	40	60	-	100	3
43	Discipline Elective Course-PP	DEC-PP-MBA-296A	Developmental Economics	3	1	0	4	4	40	60	-	100	3
44	Discipline Elective Course-PP	DEC-PP-MBA-298A	Right To Information Act	3	1	0	4	4	40	60	-	100	3
45	Discipline Elective Course-PP	DEC-PP-MBA-300A	Legal Institutional Dynamics	3	1	0	4	4	40	60	-	100	3

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Scheme of Examination
MBA – 4th Semester
w.e.f. 2025-26

Option 2: Course work & Research work

Second year of 2-Year MBA Program (NHEQF Level 6.5): Fourth Semester

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Schedule (Marks)				Exam Duration in H
				L	T	P			Assessment	End Semester Examination	Practical/ Viva Voce	Total	
1	Skill Enhancement Course	SEC-MBA-206A	Data Analysis using Excel	3	0	0	3	3	25	50	-	75	3
		LC-MBA-208A	Data Analysis using Excel Lab	0	0	2	2	1	10	-	15	25	3
2	Internship	INT-MBA-210A	Internship Report	-	-	-	-	4	50	-	50	100	3
3	Research Thesis/Project - II	RT-MBA-212A	Research Thesis/Project	-	-	-	-	20	200	200	100	500	3
		TOTAL CREDIT						**24**				**600**	
Total Credits (24+24+24+24) for 2-Year MBA												**96 Credits**	

Note:

1. Students completing the program successfully shall be awarded a 2-year PG Degree in Business Administration upon securing 96 credits.
2. Students who opted for option 3 should submit a project report/synopsis of at least 50 pages comprising of literature survey, identification of research problem, plan of work, methodology as well as practical work (if any) at the end of the third semester and the same will be evaluated by internal and external examiners.
3. The student should continue the research work in the fourth semester based on the project work/synopsis submitted at the end of the third semester. The final thesis/ project report will be evaluated by the internal and external examiners.
4. The viva voce in respect of the final thesis/project report shall be conducted by a Board of Examiners, consisting of one internal faculty member to be appointed by the Director and two external examiners from the Industry and Academic field (ordinarily not below the rank of Associate Professor and/or any professional working at a senior position from industry) out of the panel recommended by the BOS of Department of Management Studies of GITAM. (Two members shall form the quorum).

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Scheme of Examination
MBA – 4th Semester
w.e.f. 2025-26

Option 3: Only Research Work

Second year of 2-Year MBA Program (NHEQF Level 6.5): Fourth Semester

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Schedule (Marks)				Exam Duration in H
				L	T	P			Assessment	End Semester Examination	Practical/ Viva Voce	Total	
1	Skill Enhancement Course	SEC-MBA-206A	Data Analysis using Excel	3	0	0	3	3	25	50	-	75	3
		LC-MBA-208A	Data Analysis using Excel Lab	0	0	2	2	1	10	-	15	25	3
2	Internship	INT-MBA-210A	Internship Report	-	-	-	-	4	50	-	50	100	3
3	Research Thesis/Project - II	RT-MBA-212A	Research Thesis/Project	-	-	-	-	20	200	200	100	500	3
		TOTAL CREDIT						**24**				**600**	
Total Credits (24+24+24+24) for 2-Year MBA												**96 Credits**	

Note:

1. Students completing the program successfully shall be awarded a 2-year PG Degree in Business Administration upon securing 96 credits.
2. Students who opted for option 3 should submit a project report/synopsis of at least 50 pages comprising of literature survey, identification of research problem, plan of work, methodology as well as practical work (if any) at the end of the third semester and the same will be evaluated by internal and external examiners.
3. The student should continue the research work in the fourth semester based on the project work/synopsis submitted at the end of the third semester. The final thesis / project report will be evaluated by the internal and external examiners.
4. The viva voce in respect of the final thesis/project report shall be conducted by a Board of Examiners, consisting of one internal faculty member to be appointed by the Director and two external examiners from the Industry and Academic field (ordinarily not below the rank of Associate Professor and/or any professional working at a senior position from industry) out of the panel recommended by the BOS of Department of Management Studies of GITAM. (Two members shall form the quorum).

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Course Code	**DSC-MBA-202A**				
Category	Discipline Specific Courses				
Course Title	**Entrepreneurship Development**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To gain knowledge of concepts, theories, and processes of entrepreneurship. 2. To influence entrepreneurship and its role in economic development. 3. To familiarize with institutional support systems available for entrepreneurship in India. 4. To understand the basics of Intellectual Property Rights and their relevance to entrepreneurial ventures. 5. To prepare a structured project report and comprehensive business plan for a startup.				
Assessment	25 Marks				
End Semester Examination	50 Marks				
Practical/ Viva Voce	25 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	**Skills Demonstrated**	**RBT Level**
CO1	**Explain** entrepreneurship concepts, processes, feasibility analysis, business planning, functional management, support institutions, and IPR.	Level 2: Understand
CO2	**Determine** the tools to generate ideas, prepare feasibility studies, project reports, business plans, and solve small business challenges using institutional & IPR support.	Level 3: Apply
CO3	**Apply** entrepreneurial frameworks to develop a venture model through opportunity identification, feasibility analysis, business planning, functional strategies, and use of support institutions and IPR tools.	Level 3: Apply
CO4	**Analyze** entrepreneurial opportunities, feasibility results, organizational forms, small business issues, institutional frameworks, and IPR strategies.	Level 4: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

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Unit No.	Contents
Unit-I	**Entrepreneurship:** Concept, theories, process, factors impacting emergence of entrepreneurship, Growth of entrepreneurship environment in India, Role of entrepreneurship in economic development, Traits of successful entrepreneurs; Managerial vs. entrepreneurial approach, Entrepreneurial promotion in India. Entrepreneur Vs. Entrepreneurship; Entrepreneur Vs. Administrator.
Unit-II	**Starting the venture:** Creative thinking, Business idea generation (Business cases on entrepreneurship), Environmental scanning pertaining to business idea: Feasibility study: Market feasibility, Technical/ Feasibility operations, financial feasibility, Project Report.
Unit-III	**Functional Plans:** Drawing a business plan, selecting organization type for business, Organization structure and Job designs, Designing financial plan: Investment, Incomes and Expenditure, Banking and Accounts, understanding profitability.
Unit-IV	**Role of Support Institutions and Management of Small Business :** Role of Director of Industries, DIC, DCMSME, SIDBI, Small Industries Development Corporation (SIDC), MSME (D-I), NSIC, NISBUED, State Financial Corporation (SFC); Functional areas application for Small Enterprises like Marketing Management issues; Production Management issues; Finance Management issues; Human Resource Management issues; Export Marketing. Understanding IPR: Patents, Trademarks, Copy rights, Trade secrets, Licensing, Franchising.

Suggested Readings:

- Entrepreneurship by Hisrich, Robert D., Michael Peters and Dean Shephered, Tata McGraw Hill, New Delhi.
- Entrepreneurship Theory and Practice by Kalpana, Anmol Publication Pvt. Ltd, Delhi.
- Entrepreneurship Development & Small Business Enterprises by Charantimath, Poornima, Pearson Education
- Essentials of Entrepreneurship and Small Business Management by Scarborough N. M. and Cornwall J. R., Pearson Education
- Entrepreneurship New Venture Creation by Holt D. H., Pearson Education.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Entrepreneurship - Introductory	https://nptel.ac.in/courses/110106141
Unit-II	Entrepreneurship Essentials	https://onlinecourses.nptel.ac.in/noc25_ge11/preview
Unit-III	Business Development	https://nptel.ac.in/courses/110106164
Unit-IV	Innovation, Business Models and Entrepreneurship	https://nptel.ac.in/courses/110107094

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Course Code	DEC-MKT-MBA- 212A				
Category	Discipline Elective Course-Marketing				
Course Title	**Integrated Marketing Communication**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To understand the concept, components, and significance of marketing communication and the integrated marketing communication (IMC) mix, including factors and models influencing effective communication strategies. 2. To develop the ability to manage and plan the marketing communication process, including segmentation, targeting, promotional strategy formulation, budgeting, and integration of communication programmes. 3. To gain knowledge of advertising and media planning techniques, including creative strategy development, media selection, scheduling, budgeting, and evaluation of advertising effectiveness across traditional and contemporary platforms. 4. To analyze and apply various promotional tools and approaches, such as sales promotion, personal selling, public relations, direct marketing, and global communication, while understanding the legal and ethical aspects of IMC.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Describe** the key concepts, elements, and models of marketing and integrated marketing communication (IMC).	Level-2 Understand
CO2	**Apply** the marketing communication process by classifying segments, selecting targets, using promotional strategies, budgeting effectively, and integrating communication programmes.	Level-3 Apply
CO3	**Apply** advertising and media planning techniques by developing creative strategies, selecting suitable media, and evaluating advertising effectiveness across traditional and digital platforms.	Level-3 Apply
CO4	**Analyze** promotional tools like sales promotion, personal selling, public relations, and direct marketing, considering global, legal, and ethical aspects of IMC.	Level-4 Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Introduction to Marketing Communication and Its Models** – Concept of marketing communication, marketing communication mix, factor affecting marketing communication mix, drivers of integrated marketing mix; models of marketing communication – Blade Box Model, AIDAS model, Lavidge Steiner model, DAGMAR model, PCB model; marketing communication planning process.
Unit-II	**Managing the Marketing Communication Process** – Analysis of promotional opportunities, concepts of segmentation and target marketing, promotional strategy of formulation and competitive positioning, determination of promotional objectives, deciding promotional appropriation, integrating marketing communication programme, commissioning and contracting external resources.
Unit-III	**Advertising and Media Planning** – Advertising plan, creative strategy, advertising appeal, creative formats, stages of creative strategy – idea generation, copy writing, layout, copy testing and diagnosis; media planning – traditional and contemporary media; media objectives – reach, frequency, cost etc.; media strategy, media scheduling, media planning models, key issues in advertising – comparative advertising, web advertising; advertising agency – functions and types, outdoor advertising.
Unit-IV	**Emerging Issues and Wider Dimensions of Integrated Marketing Communication** – Sales promotions, personal selling, direct marketing, public relations, publicity and corporate advertising, unconventional promotional media, marketing communication budgeting, measuring promotional performance, global marketing communication, global challenges in promotion of Indian brand, legal and ethical issues in integrated marketing communication.

Suggested Readings:

- Advertising and Promotion – An IMC Perspective by Shah, Kruti and Alan D Souza, Tata McGraw Hill, New Delhi.
- Integrated Advertising, Promotion and Marketing Communications by Kenneth E. Clow, Pearson Education.
- Advertising and Promotion by Belch, George and Belch, Michael; Tata McGraw Hill, New Delhi.
- Advertising and IMC by Moriarty, Sandra and Wells, William, Pearson Education.
- Advertising Management by Jethwaney, Jaishree and Jain, Shruti; Oxford University, New Delhi.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Defining Marketing Communication, Marketing, and IMC	https://nptel.ac.in/courses/110107158
Unit-II	Communication Process and Reflexivity in IMC	https://terna.digimat.in/nptel/courses/video/110107158/L11.html
Unit-III	Advertising and Media Planning	https://nptel.ac.in/courses/110105625
Unit-IV	Ethics and Marketing Communication	https://nptel.ac.in/courses/110107158

Course Code	DEC-MKT-MBA-214A				
Category	Discipline Elective Course-Marketing				
Course Title	**Product and Brand Management**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To understand the fundamental concepts, key terminology, and significance of branding in creating customer value and achieving market differentiation. 2. To develop the ability to identify, build, and measure brand equity through effective marketing and communication strategies. 3. To acquire knowledge and skills for planning, implementing, and evaluating branding strategies across various markets and industry sectors. 4. To understand the dynamics of brand management in global contexts, including brand extension, revitalization, and adaptation to international and digital environments.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** the fundamental concepts, elements, and significance of branding and strategic brand management in marketing.	Level-2 Understand
CO2	**Apply** the principles of brand equity to develop strategies for building, positioning, and maintaining strong brands.	Level-3 Apply
CO3	**Apply** effective brand marketing, communication, and digital branding strategies within legal and ethical frameworks.	Level-3 Apply
CO4	**Analyze** brand growth, extension, and globalization strategies to evaluate their impact across different markets and sectors.	Level-4 Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Introduction of Branding terminology and basic branding concepts -** brand awareness, brand personality, brand image, brand identity, brand loyalty, brand equity, major branding decisions: selecting a brand name, brand extension decision, family versus individual brand names, multiple branding, private versus national branding, importance of branding ; Brand Differentiation and Positioning Strategies; Branding and Consumer Behavior.

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Unit-II	**Brand Equity and Strategic Brand Management** - Branding challenges and opportunities, concept of brand equity, sources and benefits of brand equity, customer based Brand equity, designing marketing programme to build brand equity, measurement of brand equity, Strategic brand management process, concept of Brand positioning and repositioning, Identifying and establishing brand positioning and values.; Brand Value Chain Analysis.
Unit-III	**Strategic Implementation of Branding and Digital Engagement** - Planning and implementing brand marketing programmes, designing marketing programs, measuring and interpreting brand performance, Legal aspects of Branding, Copyright, Trademarks and IPR, designing and implementing branding strategies; Brand building and communication, E- Branding, handling brand name changes; Brand Crisis Management and Recovery Strategies; Role of Social Media and Influencer Marketing in Branding.
Unit-IV	**Brand Growth, Extension, and Global Branding Strategies** - New products and brand extension, evaluating brand extension opportunities, reinforcing brands, revitalizing brands, managing brands over geographic boundaries and market segments, rationale for going international, global marketing programs- advantage and disadvantage, standardization versus customization, global brand Strategy. Branding in rural marketing, branding in specific sectors: retail, industrial, service brands.

Suggested Readings:

- Strategic Brand Management by Kevin Lane Keller, Pearson Education.
- Managing Brand Equity by David A. Aaker, Free Press, New York.
- Understanding Brands by Don Cowley, Kogan Page.
- Strategic Brand Management by J.N. Kapferer, Free Press.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Introduction to Product and Brand Management	https://nptel.ac.in/courses/110107161
Unit-II	Brand Positioning and Repositioning	https://dituniversity.digimat.in/nptel/courses/video/110104167/L17.html
Unit-III	Designing Marketing Programs to Build Brand Equity	https://nptel.ac.in/courses/110107161
Unit-IV	Brand Extension	https://nptel.ac.in/courses/110107161

Course Code	DEC-MKT-MBA-216A				
Category	Discipline Elective Course-Marketing				
Course Title	**Sales and Distribution Management**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To understand the role and functions of sales management within the broader marketing framework. 2. To develop knowledge of sales planning, forecasting, budgeting, and organizational design. 3. To learn effective methods for recruiting, training, motivating, and evaluating a sales force. 4. To gain insights into channel management, territory design, and ethical issues in sales operations.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** the concepts, functions, and structure of sales management.	Level-2 Understand
CO2	**Apply** effective sales plans, forecasts, and budgets for achieving sales goals.	Level-3 Apply
CO3	**Apply** suitable techniques and motivate a sales team to enhance productivity and performance.	Level-3 Apply
CO4	**Analyze** sales performance and apply ethical practices in managing sales and distribution channels.	Level-4 Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Introduction to Sales Management -** Role of Sales Management in Marketing, Nature and Responsibilities of Sales Management, Modern Roles and Required Skills for Sales Managers. Theories of Selling. Sales Planning: Importance, approaches and process of sales planning; Sales forecasting; Sales budgeting. Sales Organization: Purpose, principles and process of setting up a sales organization; Sales organizational structures; Field sales organization; determining size of sales force.
Unit-II	**Sales Force and Territory Management -** Need, procedure for setting up sales territories; Time management; Routing. Sales Quotas: Purpose, types of quotas, administration of sales quotas. Managing the Sales-force: Recruitment, selection, training, compensation, motivating and leading the sales-force; Sales meetings and contests. Sales Forecasting – Concepts, Methods, and Importance.

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Unit-III	**Sales Control and Evaluation** - Analysis of sales, costs and profitability; Management of sales expenses; evaluating sales force performance; Ethical issues in sales management. Sales Audit – Concept, Objectives, and Procedure.
Unit-IV	**Distribution Channel Management** - Role of Distribution Channels, Number of Channels, Factors Affecting Choice of Distribution Channel, Channel Behaviour and Organization, Channel Design Decision; Channel Management Decisions; Distribution Intensity; Partnering Channel Relationship.

Suggested Readings:

- Sales and Distribution Management by Still, Cundiff, Govoni and Sandeep Puri, Pearson Education.
- Professional Sales Management, Anderson R, Englewood Cliff, New Jersey, Prentice Hall, India.
- Management of a Sales Force by Spiro, Rosann L., Gregory A. Rich, and William J. Stanton, McGraw-Hill Irwin, Boston.
- Sales Management: Concepts and Cases by Dalrymple, Douglas J., and William L., New York, NY: Wiley

Useful Video Links:

Unit No	Topics	Links
Unit-I	Sales and Distribution Management	https://onlinecourses.nptel.ac.in/noc20_mg13
Unit-II	Strategic Sales Management	https://onlinecourses.nptel.ac.in/noc22_mg107
Unit-III	Management of field sales	https://onlinecourses.nptel.ac.in/noc21_mg29
Unit-IV	Innovations and Sales and Distribution	https://onlinecourses.nptel.ac.in/noc24_mg53

Course Code	DEC-MKT-MBA-218A				
Category	Discipline Elective Course-Marketing				
Course Title	**Customer Engagement Marketing**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To understand the customer relationship, experience, and engagement management to real-world marketing contexts. 2. To gain knowledge about customer engagement behavior and the main theories that explains customers engagement with brands. 3. To understand the role of technology, interactivity, and social media in enhancing customer engagement. 4. To understand how customer engagement happens in virtual brand communities and on social media platforms like Facebook.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Describe the core concepts and meaning of Customer Engagement, Customer Relationship Management, and Customer Experience Management.	Level-2 Understand
CO2	Apply customer relationship principles to enhance engagement.	Level-3 Apply
CO3	Apply the customer engagement value framework to address organizational challenges.	Level-3 Apply
CO4	Analyze the process and key metrics used to measure and enhance customer engagement.	Level-4 Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Concepts and Meaning of Customer Engagement:** Customer Relationship Management, Customer Experience Management and Customer Engagement – Customer Engagement Behaviour: Behavioral perspectives of customer engagement and Theoretical Foundations – The Process of Customer Engagement - Metrics for Engaging Customers
Unit-II	**Customer Engagement Brand Relationships:** Connective Brands with Customers - Assessing Customer Engagement and brand relationship - Customer Engagement in virtual brand community – Facebook and Other Social Network platforms - Customer Engagement in offline brand community, Customer Brand Value, Customer Lifetime Value, Customer Referral Value, Business Reference Value

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Unit-III	**Engagement, Interactivity, social media and Technology:** Customer Influence Value, Customer Knowledge Value - Managing the Customer Engagement Value Framework - Organizational Challenges
Unit-IV	**Emerging Customer Engagement:** Antecedents and outcomes of Customer Engagement - Developing a Spectrum of Positive to Negative Citizen Engagement - Negative Customer Brand Engagement in Blogs

Suggested Readings:

- Profitable Customer Engagement Concept, Metrics and Strategies by Kumar V, Sage Publications Pvt. Limited, New Delhi, India
- Customer Engagement Marketing by Palmatier, Robert W., Kumar, V., Harmeling, Colleen M., Palgrave Macmillan, India
- The Everything Guide to Customer Engagement: Connect with Customers to Build Trust, Foster Loyalty, and Grow a Successful Business by Linda Pophal, Adams Media, Massachusetts, USA.
- Customer Engagement, Contemporary Issues and Challenges by Roderick J. Brodie, Linda D. Hollebeek and Jodie Conduit, Routledge

Useful Video Links:

Unit No	Topics	Links
Unit-I	Customer Experience Management	https://elearn.nptel.ac.in/shop/completed-courses/masterclass-series-closed/managing-the-customer-experience-to-ensure-profitability/?v=13b5bfe96f3e
Unit-II	Customer Lifetime Value	https://www.youtube.com/watch?v=EI9cPd7nRhY
Unit-II	Customer Engagement	https://www.youtube.com/watch?v=DdQQVsFgWVg

Course Code	DEC-MKT-MBA-220A				
Category	Discipline Elective Course-Marketing				
Course Title	**Advanced Selling and Negotiation Skills**				
Scheme and Credits	L	T	P	Credits	**Semester-IV**
	3	1	0	4	
Course Objectives	The objectives of this course are 1. To understand the purpose, types, and structures of sales organizations and their relationships with other departments and distribution networks. 2. To gain knowledge about the processes of prospecting, pre-approach, post-approach, and organizing sales displays, showrooms, and exhibitions. 3. To understand negotiation strategies, including distributive and integrative negotiations, and reasons for negotiation breakdowns. 4. To understand sales analysis techniques, including sales quotas, budgets, territories, averages, and audits.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Describe** the concept, objectives, and key functions of sales management and negotiations.	Level-2 Understand
CO2	Apply various personal selling theories in sales.	Level-3 Apply
CO3	Apply various negotiations strategies in sales.	Level-3 Apply
CO4	Analyze all negotiation stages in sales	Level-4 Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Concepts of Selling, Sales Organization:** Sales Management: Evolution of sales function - Objectives of sales management positions - Functions of Sales executives - Relation with other executives Sales Organization and relationship: - Purpose of sales organization - Types of sales organization structures - Sales department external r elations - Distributive network relations.
Unit-II	**Theories of personal selling and Selling strategies:** Theories of personal selling - Types of Sales executives - Qualities of sales executives - Prospecting, pre-approach and post-approach- Organizing display, showroom & exhibition -Sales Presentations

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Unit-III	**Negotiation strategies and Stages:** Negotiation strategies – Distributive Negotiations- Integrative Negotiations - Conflict and Dispute Resolution- reasons for negotiations breakdowns - Legal aspects in Sales & Negotiation stages - The Preparation Stage - Preparing a range of objectives - Constants and variables - Researching the other party The Discussion Stage - Rapport building - Opening the negotiation -Questioning techniques -• Listening skills - Controlling emotions- Art of persuasion and emotions – ethics in sales
Unit-IV	**Negotiating Intelligence, Bargaining & Closing:** Negotiating Intelligence - Influencing and assertiveness skills- Spotting the signs - non-verbal communication and voice clues The Proposing Stage - Stating your opening position- Responding to offers – Adjournments - Administering Contracts and Role of Negotiations The Bargaining and Closing Stage - Making concessions - the techniques - Closing techniques - Confirming agreement; Sales Analysis - Sales quotas -sales budget - sales territory average and - sales audit

Suggested Readings:

- Sales Management by Charles Futrell, 6th Edition, Thomson South Western
- Selling: Building Partnerships, by Barton A Weitz, Stephen B Castleberry, and John F Tanner. McGraw, 7th Edition. Hill,
- Negotiation and Dispute Resolution by Beverly DeMarr and Suzanne De Janasz. Prentice Hall.
- Essentials of Negotiation by Roy J Lewicki, Bruce Barry, and David M Saunders, McGraw Hill.
- Mastering the ISDA Master Agreements: A Practical Guide for Negotiation by Paul Harding, Pearson/FT Press.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Sales Organization	https://www.youtube.com/watch?v=0Wj2WLi83v4
Unit-II	Theories of personal selling	https://www.youtube.com/watch?v=WxAb4Wqv0xA
Unit-III	Negotiation strategies	https://www.youtube.com/watch?v=rlgdYHnxnAY
Unit-IV	Sales Analysis	http://digimat.in/nptel/courses/video/110107163/L36.html

Course Code	DEC-FIN-MBA-222A				
Category	Discipline Elective Course-Finance				
Course Title	**Financial and Commodity Derivatives**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To understand the concepts, types, and participants of derivative markets. 2. To learn the trading mechanics, pricing, and uses of forwards, futures, options, and swaps. 3. To apply derivatives for hedging, speculation, and risk management. 4. To analyze the growth, trends, and future prospects of financial and commodity derivatives in India.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Describe** the conceptual framework of derivative markets and current trends in India.	Level2: Understand
CO2	**Apply** the fundamental principles and pricing techniques of derivative instruments for investment decisions.	Level3: Apply
CO3	**Apply** derivative instruments for hedging and risk management.	Level3: Apply
CO4	**Analyze** trends and future prospects of financial and commodity derivatives in India.	Level4: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	Concept and type of derivatives; Participants - hedgers, speculators, arbitragers and scalpers; uses of derivatives; types of orders; derivative markets in India- current trends and future prospects, Crypto Derivatives.
Unit-II	Fundamentals of futures and forwards - concept of futures; trading mechanics; basics of stock index future; interest rate futures; currency futures (basics); use of futures for hedging; difference between forward and future contracts; clearing process, Digital Asset Futures.
Unit-III	Types of options, trading strategies involving options; option pricing - black scholes option pricing model; Fundamental of swaps - introduction to swaps; interest rate swaps; currency swaps; mechanics of swap interest rate swap and currency swaps; swap pricing.

Unit-IV	Introduction to Commodity Derivatives: Cereals, metals and energy products; History and Contemporary issues of Indian derivative markets; Future of Commodity Derivatives in India.

Suggested Readings:

- Options, Futures, and Other Derivatives by John C. Hull, Pearson Education.
- An Introduction to Derivatives and Risk Management by Don M. Chance, Harcourt College Publishing.
- Derivatives: An Introduction by Robert A. Strong, Thomson Learning, Bombay.
- Financial Derivatives: An Introduction to Future/Forward, Options and Swaps by Redhead, Prentice Hall of India, New Delhi.
- Financial Derivatives by S. L. Gupta, PHI.
- Financial Derivatives by Aman Chugh and Divik Maheshwari, Pearson Education.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Financial Derivatives & Risk Management	https://nptel.ac.in/courses/110107128
Unit-II	Fundamentals of futures and forwards	https://youtu.be/ZimJwj_Llrw
Unit-III	Options & Swap	https://youtu.be/rGMc3_YrC_8
Unit-IV	Commodity Derivatives	https://onlinecourses.nptel.ac.in/noc25_mg128/preview

Course Code	**DEC-FIN-MBA-224A**				
Category	Discipline Elective Course-Finance				
Course Title	**International Financial Management**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To provide foundational knowledge of international financial management, global financial systems, and the functioning of multinational financial institutions. 2. To develop an understanding of international working capital management, global money markets, and financial instruments used in cross-border financing. 3. To enhance analytical skills in evaluating multinational capital budgeting, capital structure, cost of capital, and dividend decisions. 4. To equip learners with the ability to analyse foreign exchange markets, exchange rate behaviour, international risk exposure, and regulatory frameworks affecting multinational operations.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Describe** the concepts, components, and functioning of international financial management and global financial systems.	Level-2:Understand
CO2	**Apply** the techniques of international financial management and global financial instruments in cross-border business decisions.	Level-3:Apply
CO3	**Analyze** international financial management decisions related to fund flows, capital structures, dividend policies, foreign exchange markets, and country risk assessments.	Level-3:Analyze
CO4	**Evaluate** the effectiveness of multinational firms' decisions on liquidity, investments, exchange rate exposure, and compliance frameworks.	Level-5:Evaluate

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**International financial management**: Concept, International monetary and financial systems, IBRD and development banks; finance function in a multinational firm; International flow of funds

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Unit-II	**International working capital management:** International cash management; international receivable management, managing short-term assets and liabilities; international capital money markets; euro dollar and currency market; financial market instruments - GDRs, ADRs, Euro issues, CP and ECB.
Unit-III	**Financial Management Decisions:** International and Multinational capital budgeting, cost of capital, and capital structure decisions; dividend policy of multinational firm.
Unit-IV	**Foreign Exchange Markets and Regulations:** Developments in foreign exchange markets; exchange rate determination; measuring and managing various risks and exposure; country risk analysis; taxation in multinational firms; nature functions and participants of foreign exchange market; foreign exchange regulation in India.

Suggested Readings:

- International Financial Management by T. Siddaiah, Pearson Education
- International Financial Management by Madura Jeff, Thomson Learning
- International Financial Management by V. Sharan, PHI, New Delhi
- Multinational Financial Management by Allen Shapiro, PHI, New Delhi
- International Finance by Maurice D. Levi, McGraw Hill
- International Financial Management by P.G. Apte, Tata McGraw Hill

Useful Video Links:

Unit No	Topics	Links
Unit-I	International Financial and Global Economy	https://ugcmoocs.inflibnet.ac.in/index.php/courses/view_pg/733
Unit-II	International Equity Market and Indian ADRs and GDRs	https://archive.nptel.ac.in/content/storage2/courses/110105031/m34l34.html
Unit-III	Multinational Capital Budgeting	https://ugcmoocs.inflibnet.ac.in/index.php/courses/view_pg/733
Unit-III	International Financial Structure	https://ugcmoocs.inflibnet.ac.in/index.php/courses/view_pg/733
Unit-IV	Floating and Fixed Exchange Rate Regimes	http://www.digimat.in/nptel/courses/video/110105057/L05.html
Unit-IV	Foreign Exchange Market	http://www.digimat.in/nptel/courses/video/110105057/L07.html
Unit-IV	Exchange Rate Determination	http://www.digimat.in/nptel/courses/video/110105057/L13.html

Course Code	DEC-FIN-MBA-226A				
Category	Discipline Elective Course-Finance				
Course Title	**Investment Management**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To understand the concepts, objectives, and process of investment management. 2. To analyze risk, return, and valuation of debt and equity instruments. 3. To apply fundamental and technical analysis in investment decisions. 4. To learn portfolio theory, construction, evaluation, and revision strategies.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Describe** the conceptual framework of investment management and the regulatory environment governing investment decisions.	Level 2: Understand
CO2	**Apply** risk–return analysis and appropriate valuation techniques for debt and equity instruments to make effective investment decisions.	Level3: Apply
CO3	**Apply** fundamental and technical analysis tools to evaluate industries, companies, and market trends for informed investment choices.	Level3: Apply
CO4	**Analyze** portfolio theories, measure performance, and apply portfolio revision strategies to address real-world investment and financial challenges.	Level4: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	Investment- Concept, objectives and process of investment management, financial and non-financial forms of investment, various investment avenues, sources of investment information, financial market and Investment Instruments, services of intermediaries in investment management, regulatory framework in financial market, EmbeddedInvestment, Sustainable and Ethical Investing.
Unit-II	Analysis of risk & return, concept of total risk, factors contributing to total risk, systematic and unsystematic risk, default risk, interest rate risk, market risk, management risk, purchasing power risk. Valuation of debt instruments- methods of valuation, risk management in debt market. Valuation of equity- methods of valuation including CAPM and their relevance.

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Unit-III	Fundamental analysis: concept & significance of economic analysis, industry analysis: introduction, need for industry analysis, alternative classification of industry, industry life cycle analysis, economic factors & industry analysis, Company analysis - nature and style of management, key role of financial analysis, ratio analysis. Technical Analysis: line chart, bar chart, points and figures chart, candlestick chart, reversal patterns, continuation patterns, Dow Theory, Elliott wave theory.
Unit-IV	Portfolio theory- Efficient Market hypothesis (EMH), Random walk theory, Markowitz diversification model, Sharpe single index model, Arbitrage pricing theory. Portfolio building process, tools used by value investors, Portfolio performance evaluation- Sharpe's and Treynor's portfolio performance evaluation, Portfolio revision- Active and passive strategies & formula plans in portfolio revision, Advanced Portfolio Strategies.

Suggested Readings:

- Investment Analysis and Portfolio Management by Prasanna Chandra, McGraw Hill.
- Fundamentals of Investment by Alexander, Sharpe &Bailley, PHI, New Delhi.
- Investment Management: Security Analysis and Portfolio Management by V. K. Bhalla, Sultan Chand, New Delhi.
- Investment Analysis & Portfolio Management by Reilley & Brown, Thomson Learning.
- Modern Investment & Security Analysis by Russell J. Fuller & James L. Farrell, McGraw Hill, New York.
- Investment Analysis & Portfolio Management by Jordan J. Alexander & Jeffrey V. Bailey, Dryden Press, Thomson Learning, Bombay.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Investment Management	https://nptel.ac.in/courses/110105166
Unit-II	Analysis of risk & return	https://archive.nptel.ac.in/content/storage2/courses/110105036/m213.pdf
Unit-III	Technical Analysis	https://archive.nptel.ac.in/content/storage2/courses/110105036/m10l19.pdf
Unit-IV	Portfolio theories	https://nptel.ac.in/courses/110107154

Course Code	DEC-FIN-MBA-228A				
Category	Discipline Elective Course-Finance				
Course Title	**FinTech for Business Innovation**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To understand digital transformation in finance and insurance. 2. To apply AI, data, and automation in financial services. 3. To design and manage innovative FinTech products. 4. To explore emerging trends, technologies, and regulations in FinTech.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Describe** the fundamental concepts of Fintech, InsurTech, and digital transformation in financial services.	Level 2: Understand
CO2	**Apply** AI, data analytics, and automation techniques to enhance financial operations and decision-making.	Level3: Apply
CO3	**Apply** and manage innovative digital financial products using agile and user-centric approaches.	Level3: Apply
CO4	**Analyze** emerging trends, technologies, and regulatory aspects to address real-world challenges in the FinTech ecosystem.	Level4: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	InsurTech and Insurance Business Innovation:- InsurTech overview, digital disruption in insurance, insurance value chain innovation, usage-based and on-demand insurance, digital underwriting and claims automation, AI-driven risk assessment and fraud detection, customer experience and personalization, embedded insurance models, select InsurTech case studies.
Unit-II	Digital Banking and Payment Innovation:- Evolution of digital banking and neo-banks, open banking and API ecosystems, banking-as-a-service (BaaS), digital onboarding and e-KYC, UPI and real-time payments, QR/NFC payments and digital wallets, payment gateways, fraud prevention and security, regulatory frameworks (RBI, PSD2), emerging payment trends (CBDCs, biometric payments).
Unit-III	AI and Data-Driven Financial Innovation:- Role of AI/ML in financial services, credit risk and fraud analytics, customer segmentation and personalization, NLP and chatbots in banking, recommendation systems and robo-advisory, model explain ability and compliance, ethical issues, select AI-FinTech case studies.

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Unit-IV	FinTech Product Management and Strategy:- FinTech product management fundamentals, customer-centric design and UX, product lifecycle and MVP development, agile and lean methods, API-based platforms, regulatory considerations in product design, KPIs and performance metrics, go-to-market strategies, partnerships and scaling FinTech products, case studies of successful FinTech innovations.

Suggested Readings:

- The FINTECH Book by Susanne Chishti and Janos Barberis, Wiley Publications
- Artificial Intelligence in Practice by Bernard Marr and Matt Ward, Wiley Publications
- Digital Bank: Strategies to Launch or Become a Digital Bank by Chris Skinner, Marshall Cavendish International
- InsurTech: A Legal and Regulatory Guide by PierpaoloMarano and KyriakiNoussia, Springer International Publishing
- FinTech Innovation: From Robo-Advisors to Goal-Based Investing and Gamification by Paolo Sironi, Wiley Publications
- Product Management in Practice by Matt LeMay, O'Reilly Media

Useful Video Links:

Unit No	Topics	Links
Unit-I	Embedded System	https://nptel.ac.in/courses/106103182
Unit-II	Digital Payment System	http://www.digimat.in/nptel/courses/video/110105083/L33.html
Unit-III	Artifical Intelligence (AI) for Investments	https://onlinecourses.nptel.ac.in/noc23_mg63/preview
Unit-III	Advanced Algorithmic Trading and Portifolio Management	https://onlinecourses.nptel.ac.in/noc23_mg119/preview
Unit-IV	AI in Product Management	https://www.youtube.com/watch?v=771ee08QPy0

Course Code	**DEC-FIN-MBA-230A**				
Category	Discipline Elective Course-Finance				
Course Title	**Management of Financial Services**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To gain foundational knowledge of financial services, their features, scope, challenges, and role in the financial system. 2. To understand the key financial services such as leasing, merchant banking, credit rating, factoring, forfeiting, housing finance, securitisation, venture capital, private equity, and mutual funds. 3. To equip students with knowledge for evaluating financial decisions, including leasing, credit rating, securitisation, and venture capital investments. 4. To familiarize students with regulatory and institutional frameworks and enable the application of financial service tools in real-world investment and financing decisions.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Describe** the concepts, features, and mechanisms of major financial services.	Level-2:Understand
CO2	**Apply** financial service mechanisms in practical business scenarios.	Level-3:Apply
CO3	**Demonstrate** the application of major financial services in real-world financial decisions.	Level-3:Apply
CO4	**Analyze** the effectiveness of financial service mechanisms and institutional frameworks.	Level-4:Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Financial Services:** Silent features, scope, and problems, Digital Financial Services & FinTech Innovations. **Leasing:** Equipment leasing, Concept, evolution and classification, Green Leasing, Leasing in India: legal aspects, tax considerations, risks in leasing business, lease evaluation from lessee's and lessor's perspective. **Merchant Banking:** Meaning, types, functions, registration, and Code of Conduct, Sustainable Merchant Banking.
Unit-II	**Credit Rating Agencies**: Objectives, functions, importance, ESG Credit Ratings and Sustainability Benchmarks, rating methodologies, and benchmarks. **Factoring and Forfeiting**: Meaning, Types, and Mechanisms.
Unit-III	**Housing Finance**: Evolution and Role; Housing Finance Institutions and types of loans; issues and future outlook; role of NHB in housing finance, Green Housing Finance. **Investor Protection Fund**: Objectives and grievance redressal mechanism under the Investor Protection Fund, Fraud Detection & AI Tools in Investor Protection Mechanisms. **Securitisation**: Concept, modes, mechanisms, and securitisation in India, Role of RBI in Securitisation (New Securitisation Framework 2021).
Unit-IV	**Venture capital**: Meaning and role, venture capital investment process, stages of venture capital, financial and exit routes for venture capitalists, Venture capital financing in India with respect to investment process and evaluation criteria. Private Equity: Meaning, working, and types, ESG & Impact Investing as Emerging VC/PE Trends. **Mutual Funds**: Concepts, evolution, regulation, types of mutual fund schemes, and assets under management (AUM) in mutual funds in India.

Suggested Readings:

- Management of Financial Services by Khan, M.Y., Tata McGraw-Hill.
- Financial Institutions and Markets by Kohn, M., Tata McGraw-Hill.
- Management of Banking and Financial Services by Padmalatha, S., Sultan Chand and Sons.
- Management of Banking and Financial Services by Suresh, P. and Paul, J., Pearson.
- Emerging Scenario of Financial Services by Gordan, E. and Natrajan, K., Himalaya Publishing House.
- Indian Financial System by B.V. Pathak, Pearson Education.
- Financial Institutions and Markets by Bhole, L.M., Tata McGraw-Hill, New Delhi.
- Indian Financial System by Machiraju, H.R., Vikas Publishing House.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Introduction to Financial System	https://www.youtube.com/watch?v=p1KD-Y1e2Hg
Unit-II	Merchant Banking	http://digimat.in/nptel/courses/video/110105121/L33.html
Unit-II	Credit Rating	http://digimat.in/nptel/courses/video/110105121/L34.html
Unit-III	Securitisation	https://www.youtube.com/watch?v=HqJrOmlOD-o
Unit-IV	Mutual Funds	http://digimat.in/nptel/courses/video/110105121/L28.html
Unit-IV	Venture Capital	http://digimat.in/nptel/courses/video/110105121/L32.html

CourseCode	**DEC-HR-MBA-232A**				
Category	Discipline Elective Course-HR				
CourseTitle	**Training and Development**				
Schemeand Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
CourseObjectives	Theobjectivesofthiscourseare 1. To gain knowledge of training concepts, processes, strategic alignment, and stakeholder roles. 2. To develop awareness of learning theories, adult learning principles, and training design considerations. 3. To become familiar with training methods, evaluation techniques, and assessment of training effectiveness. 4. To understand employee development, career management strategies, and emerging trends in training and development.				
Assessment	40 Marks				
EndSemesterExamination	60 Marks				
Total	100 Marks				
DurationofExam	03 Hours				

CourseOutcomes: Aftersuccessfulcompletionofthiscourse,thestudentswillbeableto

COs	SkillsDemonstrated	RBT Level
CO1	**Describe** the concepts of training, learning, evaluation, and employee development processes.	Level2: Understand
CO2	**Apply** learning, training, and development strategies & methods to enhance workforce performance.	Level3:Apply
CO3	**Analyze** training needs, methods, learning processes, and employee development to improve performance outcomes.	Level4: Analyze
CO4	**Evaluate** organizational training, learning, employee development, performance, and career growth outcomes.	Level5: Evaluate

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set bytaking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. Atleastfourcaseswillbediscussed,onefromeachunit.

UnitNo.	Contents
Unit-I	**Introduction to Training**: concept and rationale, training system and processes, KSA'S- Types; Aligning training with strategy; Role of stakeholders in training programme; Difference between education, training and development. **Training needs assessment**: Importance, process of TNA, Organizational analysis, operational analysis, person analysis.
Unit-II	**Learning Theories:** Reinforcement theory, Social learning theory, Goal theory, Need theory, Expectancy theory, Adult learning theory and Information processing theory. Learning process, Factors influencing the learning process, Participants learning styles; Considerations in designing effective training programs - Selecting and preparing the training site, choosing trainers.

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Unit-III	**Training Methods**: Presentation methods - Lecture and Audio-visual techniques; Hands on methods- OJT, simulations, case studies, business games, role plays, Behaviour modelling; Group building methods: Adventure learning, team building, action learning. **Evaluation of training**: need for evaluation, criteria and approaches; return on investment in training.
Unit-IV	**Employee Development, Career Management and Future of T & D:** Approaches to Employee Development, The Development Planning Process, Companies Strategies used, Types of MDP's, EDP's/Seminars and Conferences, Symposia. **Career Management**: Traditional Career vs. Protean Career, Models of Career Development, Career Succession Planning, Challenges in Career Management: On boarding, Dual Career Paths, Plateauing, and Managing Career Breaks, Future Aspects of T& D.

SuggestedReadings:

- Employee Training and DevelopmentbyNoe, A Raymond, and Kodwani, D Amitabh,McGraw Hill Education
- Effective Training - Systems, Strategies, and Practices byBlanchard, P Nick, and James W. Thacker,Pearson Education.
- Every Trainer's Handbook byAgochia, Devendra,New Delhi; Sage Publications
- Training for Development byR.K. Sahu, Excel Books, New Delhi.
- Training in Organization byGoldstein,Thomson Learning, Bombay.
- Training for Life and Leadership in Industry by McGrath, Prentice Hall of India, New Delhi.

UsefulVideoLinks:

Unit No	Topics	Links
Unit-I	Concept and importance of Training Need Assessment	http://www.digimat.in/nptel/courses/video/109105192/L11.html
Unit-II	Learning Theories	http://www.digimat.in/nptel/courses/video/109105192/L17.html
Unit-III	Training Methods	http://www.digimat.in/nptel/courses/video/109105192/L31.html
Unit-IV	Future on Training and Development	http://www.digimat.in/nptel/courses/video/109105192/L51.html

CourseCode	**DEC-HR-MBA-234A**				
Category	Discipline Elective Course-HR				
CourseTitle	**Performance Management Systems**				
Schemeand Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
CourseObjectives	Theobjectivesofthiscourseare 1. To understand performance management concepts, objectives, principles, characteristics, benefits, and determinants of job performance. 2. To understand performance planning, competency mapping, processes, methodologies, and barriers in effective management. 3. To understand performance appraisal systems, approaches, methods, common errors, advantages, and limitations. 4. To understand employee development, 360-degree feedback, rewards, career planning, counseling, and ethical considerations.				
Assessment	40 Marks				
EndSemesterExamination	60 Marks				
Total	100 Marks				
DurationofExam	03 Hours				

CourseOutcomes: Aftersuccessfulcompletionofthiscourse,thestudentswillbeableto

COs	SkillsDemonstrated	RBT Level
CO1	**Explain** thefundamental concepts of performance management to improve employee performance and organizational effectiveness.	Level2: Understand
CO2	**Apply** performance management concepts and techniques to enhance employee effectiveness, career growth, and organizational outcomes.	Level3:Apply
CO3	**Analyze** systems and practices to identify improvements for employee effectiveness.	Level4: Analyze
CO4	**Evaluate**performance systems and practices to improve organizational effectiveness, fairness.	Level5: Evaluate

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set bytaking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. Atleastfourcaseswillbediscussed,onefromeachunit.

UnitNo.	Contents
Unit-I	**Introduction to Performance Management**: Performance Appraisal to Performance Management, Concept and Perspectives of Performance Management, Definitions of Performance Management, Characteristics of Performance Management, Objectives of Performance Management, Principles of Performance Management, Importance of Performance Management, Benefits of Performance Management Determinants of Job Performance.
Unit-II	**Performance Management Process:** Performance Management Process, **Performance Planning**: Meaning of Performance Planning, Characteristics of Performance Planning, Objectives of Performance Planning, Importance of Performance Planning, Methodologies of Performance Planning, Process of Performance Planning, Barriers to Performance Planning. **Overview of Competency Mapping**: Competency Defined, Competency Mapping Defined, Methods of Competency Mapping.

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Unit-III	**Performance Appraisal**: Meaning of Performance Appraisal, Performance Appraisal Defined, Characteristics of Performance Appraisal, Objectives of Performance Appraisal, Importance of Performance Appraisal, Principles of Appraising Performance, Process of Performance Appraisal, Approaches to Performance Appraisal, Methods of Performance Appraisal, Common Rating Errors, Advantages and Disadvantages of Performance Appraisal Elements of Good Performance Appraisal System.
Unit-IV	**Performance management and employee development**: Personal Development plans, 360 degree feedback as a developmental tool. **performance management and reward systems**: performance linked remuneration system, performance linked career planning and promotion policy, Performance Counselling. **Ethics in Performance Management**: Ethics Defined Principles of Ethical Performance Management, Ethical Issues and Dilemmas in Performance Management. **Role of AI in Performance Management**

SuggestedReadings:

- Performance Management and Appraisal Systems byT.V. Rao, Response Bank, New Delhi.
- Performance Management: System and Strategies byDipak Bhattacharya,Pearson Education.
- Performance Management byKandula, Srinivas,PHI, New Delhi.
- Performance Management: Concepts, Skills and ExercisebyL.Cardy, Robert, PHI, New Delhi.
- Performance Management byAguinis, Herman,Pearson Education.
- Performance Management by Kohli,Oxford University Press.

UsefulVideoLinks:

Unit No	Topics	Links
Unit-I	Introduction to Performance Management	http://kcl.digimat.in/nptel/courses/video/109105127/L01.html
Unit-II	Performance Planning	http://kcl.digimat.in/nptel/courses/video/109105127/L06.html
Unit-III	Performance Appraisal	http://kcl.digimat.in/nptel/courses/video/110105146/L34.html
Unit-IV	Role of AI in Performance Management	http://kcl.digimat.in/nptel/courses/video/110103626/L07.html

CourseCode	DEC-HR-MBA-236A				
Category	Discipline Elective Course-HR				
CourseTitle	**Organizational Change and Intervention Strategies**				
Schemeand Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	4	
CourseObjectives	Theobjectivesofthiscourseare 1. To understand the meaning, nature, forces, and strategic approaches of organizational change. 2. To focus on change management, resistance, intervention strategies, and development of learning organizations. 3. To understand organizational development processes, competencies, interventions, and evaluation methods. 4. To examine organizational culture, leadership influence, ethical practices, and emerging organizational trends.				
Assessment	40 Marks				
EndSemesterExamination	60 Marks				
Total	100 Marks				
DurationofExam	03 Hours				

CourseOutcomes: Aftersuccessfulcompletionofthiscourse,thestudentswillbeableto

COs	SkillsDemonstrated	RBT Level
CO1	**Describe**the fundamental concepts, processes, and strategic perspectives that drive organizational transformation and development.	Level2: Understand
CO2	**Apply** models, processes and interventions to facilitate organizational change and development.	Level3:Apply
CO3	**Analyze** organizational processes, structures, behaviors, and models to determine challenges, opportunities, and potential strategies for improvement.	Level4: Analyze
CO4	**Evaluate** organizational practices, strategies, and interventions to make informed and sustainable recommendations.	Level5: Evaluate

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set bytaking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. Atleastfourcaseswillbediscussed,onefromeachunit.

UnitNo.	Contents
Unit-I	**Organizational Change**: meaning, concept and nature of Organization Change. Forces of change, the domain of change,change agents, strategic management of change; Managerial approaches for implementing change. **Models of organizational change**: Kurt Lewin's models of change, Huse's 7 stages model of change.
Unit-II	**Change Management**: Change process, facilitating change, dealing with individual and group resistances, Intervention strategies and developing learning organization. **Organizational Diagnosis**: Meaning and importance, Weisbord's model of organizational diagnosis and Methods of obtaining diagnostic information.

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Unit-III	**Organizational Development**: An overview, Steps in OD process, General OD Competencies, OD Skills, Values, Assumption and Beliefs in OD; Designing OD Interventions- Interpersonal, Team, Intergroup, Structural and Comprehensive Interventions; Evaluation of Organizational Development Interventions.
Unit-IV	**Organizational Culture and Change**: Corporate Culture, Types of Culture, Importance, Nature, Formal and Informal Components of Organizational Culture, Designing Cultural Change; Organizational Culture and Leadership; Emerging Trends in Organizational Culture;Ethics of OD Professionals and Future of OD.

SuggestedReadings:

- Organization Development byFrench, W. H. and Bell, Pearson Education.
- Organization Change and Development byKSingh,Excel Books.
- Organization Development and Change byT.G. Cummings & C. G. WorleyCengage Learning.
- Alternative Designs of Human OrganizationsbyDe Nitish, Sage.

UsefulVideoLinks:

Unit No	Topics	Links
Unit-I	Models of organizational change	http://acl.digimat.in/nptel/courses/video/110107169/L22.html
Unit-II	Change Management	http://acl.digimat.in/nptel/courses/video/122105020/L15.html
Unit-III	Organizational Development	http://acl.digimat.in/nptel/courses/video/122108038/L28.html
Unit-IV	Organizational Culture	http://acl.digimat.in/nptel/courses/video/110105164/L31.html

CourseCode	**DEC-HR-MBA-238A**				
Category	Discipline Elective Course-HR				
CourseTitle	**Leadership and Teamwork in Organizations**				
Schemeand Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
CourseObjectives	Theobjectivesofthiscourseare 1. To provide a comprehensive overview of Human Resource Information Systems and their role in enhancing organizational efficiency and decision-making. 2. To develop an understanding of data management principles, system design, and integration for effective HR information handling. 3. To explore various modules and functional components of HRIS that support key HR activities such as planning, development, performance, and compensation. 4. To understand the implementation strategies, evaluation methods, software applications, and emerging ethical, legal, and security issues in HRIS.				
Assessment	40 Marks				
EndSemesterExamination	60 Marks				
Total	100 Marks				
DurationofExam	03 Hours				

CourseOutcomes: Aftersuccessfulcompletionofthiscourse,thestudentswillbeableto

COs	**SkillsDemonstrated**	**RBT Level**
CO1	**Describe** theconcepts and organizational significance of Human Resource Information Systems.	Level2: Understand
CO2	**Apply** HRIS principles and data management techniques for effective decision-making processes.	Level3:Apply
CO3	**Apply** HRIS modules and technologies to support diverse human resource functions.	Level3: Apply
CO4	**Analyze** implementation strategies, evaluation methods, and ethical issues in HRIS operations.	Level4: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set bytaking two questions from each unit. The students have to attempt five questions in tota., first being compulsory and selecting one from each unit.
2. Atleastfourcaseswillbediscussed,onefromeachunit.

UnitNo.	**Contents**
Unit-I	**Introduction to HRIS:** Introduction-Objective and Importance- Data and information for HR manager-Information System – Organizational benefits - Components of Information Systems-Types of IS-HRIS: Function, Usage and Application- benefits of a fully integrated Human Resource Information System.
Unit-II	**HRIS-Data Management:** Data Management for HRIS - Data Formats - Principles of HRIS data creation, storage and retrieval - Design of HRIS - Relevance of Decision-Making Concepts for Information System Design - HRM Needs Analysis – Concept & Mechanism.

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Unit-III	**HRIS Modules:** HRIS modules and sub modules and points of integration - Modules on HR Planning, Recruitment, Selection, Placement - Module on Performance Appraisal System - Training & Development Module - Module on Pay & other Related Dimensions - HRIS module on medical information, time and attendance, safety management.
Unit-IV	**HRIS Implementation and Evaluation:** Implementation of HRIS performance monitoring plan - Evaluating the transfer of training - Evaluating the results of the training – HRIS Evaluation Strategy model. Policies and procedures for HRIS. Ethical and legal considerations for HRIS. **HRIS – Software packages:** Software supporting Human Resource Information System- Enterprise Resource planning. SAP and Oracle Financials. **Key issues in HRIS:** Information Security and privacy in HRIS, The future of HRIS.

SuggestedReadings:

- Human Resource Information Systems: Basics, Applications, and Future Directions byMichael J Kavanagh and Dr. Mohan Thite, Sage Publications.
- Human Resource Information System byKelvin Molly, GRIN Publishing, London.
- Human Resource Information Systems byP.K.Gupta and Sushil Chaabra,Himalaya Publishing House.
- Practical Human Resource Information Systems bySatish K. Bagdi,PHI Learning.

UsefulVideoLinks:

Unit No	Topics	Links
Unit-I to IV	Models of organizational change	https://www.udemy.com/course/human-resource-information-system/?couponCode=PMNVD2025

Course Code	DEC-HR-MBA-240A				
Category	Discipline Elective Courses - HR				
Course Title	**Managing Workforce Stress**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To understand the concept, types, causes, and effects of stress on physical and mental health. 2. To understand stress symptoms, related illnesses, and occupational stress factors affecting performance and satisfaction. 3. To understand stress management techniques, including coping strategies, cognitive methods, and positive thinking approaches. 4. To understand therapeutic interventions and organizational roles in effectively controlling and managing workplace stress.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** the fundamental concepts related to stress and their effects on human functioning.	Level 2: Understand
CO2	**Apply** strategies to manage stress effectively across different personal and professional situations.	Level 3: Apply
CO3	**Analyze** various stressors and responses to determine their impact on performance and behavior.	Level 4: Analyze
CO4	**Evaluate** intervention methods that strengthen resilience and support healthier daily life outcomes.	Level 5: Evaluate

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Introduction to Stress:** Concept, Definitions and types of stress. Basic condition of stress, GAS, Stress reaction, Consequences of stress. Causes of stress. Impact of stress in human physical and mental health.
Unit-II	**Stress and Illness:** Symptoms of stress. Possible sign of stress in young people. Associated illnesses related to stress. **Occupational Stress:** Meaning, and concept of work stress. Sources of job stress: Organizational, Individual and environmental. Effect of stress on job performance and job satisfaction.

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Unit-III	**Stress Management Technique:** Aims of stress management. Coping strategies of stress in the organization: Individual, and organizational strategies. Techniques to combat stress: Cognitive behavioural techniques to change thought, Problem solving approach, Positive thinking.

Unit-IV	**Therapies and Remedial action to control stress:** Behaviour therapies, Relaxation training, Visualization, Expressive therapies, Storytelling and Counseling Methods, Meditation, Yoga and exercise. **Roles and responsibilities for managing workplace stress:** Leadership influence and responsibility, Senior leadership, Line management, Human Resources (HR).

Suggested Readings:

- Stress Management for Wellness by Walt Schafer, Cengage Learning.
- Stress in Life and work by Rita Agarwal, Response Books.
- Stress and Coping: the Indian Experience by D. M. Pestonjee , Sage Publications.
- Simple Ways To Manage Stress. by P. Batra , Think Inc. New Delhi.
- Stress Management by T. Heena Bhagtani, Himlaya Publishing House.
- Stress management by P.K. Dutta, Himalaya Publishing House

Useful Video Links:

Unit No	Topics	Links
Unit-I	Introduction to Stress Management	http://kcl.digimat.in/nptel/courses/video/122108038/L39.html
Unit-IV	Strategies for Managing Stress	http://kcl.digimat.in/nptel/courses/video/109104666/L03.html

Course Code	DEC-IT-MBA-242A				
Category	Discipline Elective Course-IT				
Course Title	Information Security and Cyber Laws				
Scheme and Credits	L	T	P	Credits	Semester-IV
	3	1	0	4	
Course Objectives	The objectives of this course are 1. To understand core principles of information security confidentiality, integrity, and availability and analyze various security threats. 2. To study mechanisms ensuring secure systems, including authentication, access control, cryptography, firewalls, and intrusion detection. 3. To evaluate organizational, operational, and human factors in maintaining secure environments and mitigating vulnerabilities. 4. To explore legal, ethical, and regulatory aspects of ICT, including cyber laws, IPR, e-commerce, and digital consumer protection.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Describe** security concepts, mechanisms, and cyber laws for information protection.	Level-2: Understand
CO2	**Apply** security principles and mechanisms to protect information systems.	Level-3: Apply
CO3	**Apply** cyber laws to analyze and handle cybercrime and legal issues.	Level-3: Apply
CO4	**Analyze** security risks, evaluate protective mechanisms, and assess the effectiveness of cyber laws in preventing cybercrimes and safeguarding digital assets.	Level-4: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Overview of basic concepts of security:** Confidentiality, Integrity and Availability; Security threats, Information security principles, operational and human issues in information and network security. **Security Policies:** types, development and management.

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Unit-II	**Authentication**: Access control mechanism, Physical security control, Operations security, **Cryptography:** basic concepts, symmetric and asymmetric cryptography; Key management, Firewalls, Intrusion detection, malware detection, Hash Functions and Message Authentication Codes (MAC).
Unit-III	**Legal Issues in information and communication technology**: cyber-crime and IT Act 2000, Legal resources against Hacking, Cyber fraud, defamation, abuse and pornography. **IT offences:** Contracts in cyber world and Jurisdiction.
Unit-IV	**Cyber squatting**: legal and other innovative moves against cyber squatting. **Copyright and protection of contents:** Software piracy, Digital Signatures and Certificates, E-Commerce Taxation, Protection of Cyber consumers in India.

Suggested Readings:

- Information Security: Principles and Practices by Mark Merkow and James Breithaupt, Pearson Education.
- Cyber Law Simplified by Vivek Sood, Tata McGraw Hill, New Delhi.
- Introduction to Computer Security by Matt Bishop, 1/e, Pearson Education.
- Security in Computing by *Charles P. Pfleeger* and *Shari Lawrence Pfleeger*, 5/e, Pearson Education.
- Information Systems Security: Security Management, Metrics, Frameworks and Best Practices by Nina Godbole, Wiley.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Overview of basic concepts of security	https://youtu.be/OYsY5B9pqYU?si=CG1nyLwgM_DPfPkq
Unit-II	Cryptography	https://youtu.be/-Oza6jm56eE?si=WmpqzokgcDNLLYJ6
Unit-III	IT Act 2000	https://youtu.be/AXk5IkyFFcU?si=GZz3_movD6m6D8oz
Unit-IV	Copyright in India	https://youtu.be/c98gSg5lZwg?si=bp5AgYbXc2ohiary

Course Code	**DEC-IT-MBA-244A**				
Category	Discipline Elective Course-IT				
Course Title	**Systems Analysis and Design**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To gain a thorough understanding of business information systems by exploring their concepts, types, and development methodologies, emphasizing the role and skills of a systems analyst. 2. To examine system development life cycle (SDLC) phases, focusing on feasibility studies, preliminary investigations, system analysis, and documentation techniques. 3. To grasp the principles of system and data design, including user interface, input/output, data dictionary, and structured application development with quality assurance. 4. To understand the design and implementation of distributed and internet-based systems, highlighting client/server architecture, LAN design, and site management considerations.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Describe** business information systems, development methodologies, and the role of a systems analyst.	Level-2: Understand
CO2	**Apply** feasibility and fact-finding techniques for system analysis and documentation.	Level-3: Apply
CO3	**Apply** design principles to develop system components such as interfaces, inputs, outputs, and data models.	Level-3: Apply
CO4	**Analyze** distributed and internet-based system designs for effective implementation.	Level-4: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents

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Unit-I	**Concept of System**: Business Information System, types of business information systems, overview of system development methodologies, role of systems analyst. **CASE Tools for Systems Analyst:** feasibility study-economic, organizational and cultural, technological, schedule and resource.
Unit-II	**System Development Life Cycle:** Preliminary investigation, Information System Projects, evaluation of system requests. **Major steps in preliminary investigation:** Systems Analysis, fact finding techniques, documentation, data flow diagrams, data dictionary; cost benefit analysis, (COCOMO) Constructive Cost Model.
Unit-III	**Systems Design:** User interface design, input and output design. **Data Design:** Systems Implementation: Application development, quality assurance, structured application development, structure charts, cohesion, coupling, testing, program, system, operations. **User Documentation:** Installation - Training, system changeover, Backup and Recovery procedures, System Configuration Guidelines.
Unit-IV	**Designing Distributed and Internet Systems:** designing distributed systems, designing systems for LANs, for client/ server architecture. **Designing internet Systems**: internet design fundamentals, design issues related to site management, managing online data.

Suggested Readings:

- System Analysis and Design by Kendall and Kendall, Pearson Education.
- System Analysis and Design by Shelly, Cashman, Rosenblatt, Cengage Learning.
- Introduction to Systems Analysis and Design by Hawryszkiewyez,, PHI.
- Systems Analysis and Design by Awad, Elias M.,Prentice Hall of India.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Concept of System	https://youtu.be/69PIhEvYmm8?si=5LnqvKEVZYYvXRQj
Unit-II	System Development Life Cycle	https://youtu.be/OT2O7uNldQk?si=tjaI0pc5lwP9QQrV
Unit-III	Cohesion	https://youtu.be/40Du7ear5v8?si=koU2FzarUU8i000y
Unit-IV	Distributed System	https://youtu.be/AWryELkUwow?si=bE7kcpmAl_BQrv5B

Course Code	**DEC-IT-MBA-246A**				
Category	Discipline Elective Course-IT				
Course Title	**Programming in Visual Basic**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To understand client–server computing architectures, deployment models, and differences between file server and client–server databases. 2. To learn Visual Basic fundamentals forms, controls, events, and methods for designing user-friendly interfaces. 3. To develop Visual Basic programming skills using variables, arrays, control structures, and functions for efficient applications. 4. To apply database connectivity, COM, and ActiveX technologies for data integration, reporting, and software deployment.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Describe** client–server concepts and Visual Basic fundamentals including forms, controls, and events.	Level-2: Understand
CO2	**Apply** VB programming constructs to design interactive GUI applications.	Level-3: Apply
CO3	**Implement** database connectivity using DAO, ADO, and ActiveX Data Objects.	Level-3: Apply
CO4	**Analyze** and integrate COM, ActiveX, and reporting tools for client–server application development.	Level-4: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Client Server Basics:** Discover Client-Server and Other Computing Architectures, understand File Server versus Client -Server Database Deployment, Learn about the Two Tier Versus Three Tire Client-Server Model. **Visual Basic Building Blocks and Default Controls:** Forms, Using Controls, Exploring Properties, Methods and Events, Introduction to Intrinsic Controls, Working With Text, Working With Choices, Special Purpose Controls. **VB Advance Controls:** Events, Menu bar, Popup Menus, Tool bar, Message Box, Input Box, Built-in Dialog Boxes, Creating MDI, Working with Menus.

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Unit-II	**VB Programming Fundamentals and Variables:** Introduction to Variables, Variable Declaration. Arrays, Introduction to Constants and Option Explicit Statement, Assignment Statements, Working with Math Operations, Strings, Formatting Functions. **Controlling And Managing Program:** All Control Statement, Loops, Error Trapping, Working with Procedures, Functions, Windows Common controls, control arrays.
Unit-III	**Visual Basic and databases:** understanding the Data Controls, Introduction to DAO, Working with Record sets, Record Pointer, Filter, Sorts and Manipulation of Records. **Remote And ActiveX data Objects:** Working with ODBC, Remote Data Objects and Remote data Control, Introducing ADO, ADO Data Control, Using Data Grid Control and ActiveX Data Objects.
Unit-IV	**COM and ActiveX Components:** COM, Creating, Testing, Compiling, Enhancing and User Drawn ActiveX Controls, Building Class Modules, ActiveX DLL. **Client-Server Development Tools:** Data Reports and Crystal Reports, Packaging a Standard EXE Project.

Suggested Readings:

- Programming in Visual Basic by McBride, P.K., BPB Publication.
- Visual Basic .NET Core Reference by Perry, S. , Microsoft Press, Pearson Education.
- Teach Yourself Visual Basic .NET in 21 Days by Schmuller, J., Sams Publishing, Pearson Education.
- Beginning Visual Basic 2015 by Reed, J., Wrox Publications, John Wiley & Sons.
- Visual Basic Programming by Holzner Steven: , IDG Books India Ltd.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Visual Basic Building Blocks and Default Controls	https://youtu.be/HFWQdGn5DaU?si=zt9bOxJdzRSPI0Hw
Unit-II	Windows Common controls	https://youtu.be/qjPfqke2pJQ?si=IzIfTMSn8plq28Iz
Unit-III	Working with ODBC	https://youtu.be/2L14ra49wwE?si=0dfiJc3V6wJdsRBF
Unit-IV	Data Reports and Crystal Reports	https://youtu.be/i7sg6O7bQRY?si=7REa6j7TjC3RNz01

Course Code	**DEC-IT-MBA-248A**				
Category	Discipline Elective Course-IT				
Course Title	**Enterprise Resource Planning**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To understand the fundamentals, evolution, advantages, and limitations of ERP and its related technologies. 2. To study the development of ERP through BPR, MIS, DSS, EIS, and SCM concepts. 3. To analyze ERP implementation issues and challenges in manufacturing environments. 4. To gain knowledge of key ERP modules such as Finance, Plant Maintenance, Quality, Materials, and Warehouse Management. 5. To understand the ERP lifecycle, implementation process, market trends, and future developments.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	**Skills Demonstrated**	**RBT Level**
CO1	**Describe** basic concepts of ERP systems for manufacturing or service companies.	Level-2: Understand
CO2	**Apply** ERP principles and tools in manufacturing processes, including MRP, MRP II, DRP, BOM, CAD/CAM, and JIT techniques.	Level-3: Apply
CO3	**Apply** knowledge of ERP modules to manage finance, materials, quality, maintenance, and warehouse operations effectively.	Level-3: Apply
CO4	**Analyze** ERP implementation strategies, lifecycle phases, and emerging trends to solve real organizational challenges.	Level-4: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Introduction:** Basic issues, evolution of ERP, advantages and limitations, Overview of an enterprise; ERP and related technologies. **Evolution of ERP:** Business process reengineering, management information system, decision support system, executive information system, supply chain management.
Unit-II	**ERP implementation in the manufacturing:** Issues and challenges viz., CAD/CAM, material requirement planning, bill of material, manufacturing resource planning, distribution requirement planning, JIT approach.
Unit-III	**ERP Modules:** Introduction to ERP modules in the Finance, Plant maintenance, quality management, materials management, store and warehouses. ERP Implementation: ERP lifecycle, vendors, consultants and users, ERP market, future directions and developments in ERP.
Unit-IV	**ERP Implementation:** ERP lifecycle, vendors, consultants and users, ERP market, future directions and developments in ERP(AI, IoT, Industry 4.0).

Suggested Readings:

- Enterprise Resource Planning by Alexis Leon, Tata McGraw Hill, Latest Edition.
- Enterprise Resource Planning: Concepts and Practice by Vinod Kumar Garg and N.K. Venkitakrishnan, PHI Learning Pvt. Ltd., Latest Edition.
- Concepts in Enterprise Resource Planning by Joseph A. Brady, Ellen F. Monk, and Bret J. Wagner, Cengage Learning, Latest Edition.
- ERP: A Managerial perspective by Sadagopan, S., Tata McGraw Hill.
- ERP: Making it Happen – The Implementers' Guide to Success with Enterprise Resource Planning by Wallace and Kremzar, John Wiley & Sons, Inc.
- ERP Concepts and Practice by Garg, V. K. and Venket Krishna N. K., PHI Publication.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Logistics and Supply Chain Management	https://youtu.be/V4kFWioPhZc
Unit-II	JIT approach	https://www.youtube.com/watch?v=l8cNSr9W6Mc
Unit-III	ERP modules	https://www.youtube.com/watch?v=NzyhYxUCjlg
Unit-IV	Industry 4.0	http://www.digimat.in/nptel/courses/video/110101436/L58.html

Course Code	**DEC-IT-MBA-250A**				
Category	Discipline Elective Course-IT				
Course Title	**Data Mining for Business Decisions**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. Understand core concepts, functionalities, and issues of data mining, data warehouses, and business intelligence. 2. Learn data preprocessing techniques, including cleaning, integration, transformation, and reduction. 3. Explore data mining primitives, query languages, and system architectures for business intelligence. 4. To gain an understanding of how managers use business analytics to formulate and solve business problems and to support managerial decision making. 5. To understand and translate business challenges into data mining problems.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	**Skills Demonstrated**	**RBT Level**
CO1	**Describe** the key concepts of data mining, data warehouses, and business intelligence.	Level-2: Understand
CO2	**Apply** multidimensional models, OLAP, and data pre-processing, Visualization Tools for business analysis.	Level-3: Apply
CO3	**Apply** data pre-processing methods to improve data quality for mining.	Level-3: Apply
CO4	**Analyze** DM architectures, query languages, pre-processing methods, applications in finance, retail, and telecom for business decisions.	Level-4: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Introduction to data mining (DM):** Kind of data, DM Functionalities, Classification of DM Systems, Issues in DM. Business Analytics at Data Warehouse Level, designing physical database, Deploying and supporting DW/BI system.
Unit-II	**Multidimensional data model:** Data cubes, Stars, snowflakes and fact constellations, Defining schemas, concept hierarchies, OLAP. **Types of OLAP servers:** ROLAP versus MOLAP versus HOLAP, Steps for design and construction, Three-tier Data.
Unit-III	**Data Preprocessing:** Data cleaning, transformation, and integration, Handling missing data and outliers, Data reduction and feature selection. **Data Reduction:** Data cube aggregation, Dimensionality reduction, Data Compression, Numerosity, Reduction Discretization and concept hierarchy Generation.
Unit-IV	**Data Mining Primitives:** Languages and System Architectures: Task relevant data, Kind of Knowledge to be mined. **DM Query languages:** Syntax, Designing GUI, Architectures of DM Systems, Concept of Cluster Analysis. , Application and trends in Data mining, Data Mining for Financial data analysis, Data Mining for retail industry, Data mining for telecommunication industry.

Suggested Readings:

- Data Ware House: From Architecture to Implementation by Barry Devlin , Addission Weslay Management by Hellreigel, Thomson Learning, Bombay.
- Building Data Mining Applications for CRM by Alex Berson, Stephen Smith, Kurt Threarling Tata McGraw.
- Data Warehousing, Data Mining and OLAP by Alex Berson, Stephen Smith , Tata McGraw Hill.
- Data Mining Techniques for marketing sales and Customer Support by Michael J.A.Berry , Gordon Linoff.
- Datamining: Concepts and techniques by Han, Jiawei , Harcourt.
- Data, Mining Techniques by Pujari,ArunK , Hyderabad University Press.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Introduction to Data Warehouse	https://youtu.be/m-aKj5ovDfg?si=srTwWdej2y3M4vO0
Unit-II	Snowflakes	https://youtu.be/3LcjuLb3Vy8?si=i5LZOvI8EQNhxmoY
Unit-III	Data Preprocessing	https://youtu.be/NSxEiohAH5o?si=q2bl-PTD8uwwqmzr
Unit-IV	Cluster Analysis	https://youtu.be/aMfzqHNsLug?si=0WkJlFGw5gM10Rzo

Course Code	DEC-IB-MBA-252A				
Category	Discipline Elective Course-IB				
Course Title	**Cross Cultural and Global Management**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To understand cultural influences and human variables affecting management in global organizations. 2. To learn key cross-cultural theories, frameworks, and leadership approaches in multinational contexts. 3. To develop skills for effective cross-cultural communication, negotiation, and global HR practices. 4. To promote ethical awareness, social responsibility, and management of cultural diversity in global business.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** cultural factors, global HR practices, communication, ethics, and global management trends influence multinational organizations.	Level 2: Understand
CO2	**Apply** communication, negotiation, and HRM strategies to manage multicultural teams effectively.	Level 3:Apply
CO3	**Apply** global leadership, decision-making, and staffing challenges in multinational organizations.	Level 3:Apply
CO4	**Analyze** ethical, social, and philosophical perspectives to develop inclusive and sustainable global management approaches.	Level 4: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set bytaking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Human and cultural variables in global organizations:** Cross-cultural differences and their managerial implications; Complexities and challenges in managing international firms; Global staffing policies: ethnocentric, polycentric, regiocentric, and geocentric approaches; Process of international recruitment, selection, and training for expatriates and global teams
Unit-II	**Learning Theories:** Reinforcement theory, Social learning theory, Goal theory, Need theory, Expectancy theory, Adult learning theory and Information processing theory. Learning process, Factors influencing the learning process, Participants learning styles; Considerations in designing effective training programs - Selecting and preparing the training site, choosing trainers.

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Unit-III	**Training Methods: Presentation methods - Lecture and Audio-visual techniques;** Hands on methods- OJT, simulations, case studies, business games, role plays, Behaviour modelling; Group building methods: Adventure learning, team building, action learning.
Unit-IV	**Ethics and corporate social responsibility (CSR) in international business;** Western and Eastern management philosophies and their relevance in the Indian context; Managing cultural diversity and inclusion in multinational organizations; Emerging trends in global management and sustainable international practices.

Suggested Readings:

- International Dimensions of Organizational Behaviour by Adler, N J., Kent Publishing.
- Understanding Cross-Culture Management by Marie- Joelle Browaeys, Pearson Education.
- Cultures Consequence: International Differences in Work Related Values by Hofstede, G Sage.
- Management International: Cases, Exercises and Readings by Marcie, D and Puffer, M., West Publishing.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Globalization and Culture	https://nptel.ac.in/courses/109105113
Unit-II	Globalization: Theoretical Perspectives	https://nptel.ac.in/courses/109105113

Course Code	**DEC-IB-MBA-254A**				
Category	Discipline Elective Course-IB				
Course Title	**Management Of Multinational Corporations**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are: 1. To understand the concepts, characteristics, and theories of Multinational Corporations (MNCs) and comparative management practices. 2. To learn strategic approaches, organizational structures, and coordination mechanisms used by MNCs. 3. To apply marketing, operations, human resource, and financial management practices in multinational contexts. 4. To analyze ethical, social, and emerging global issues and assess strategies of Indian MNCs.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course,the students will be able to

COs	**Skills Demonstrated**	**RBT Level**
CO1	**Explain** the conceptual framework, characteristics, and theoretical perspectives of Multinational Corporations (MNCs) along with comparative management approaches across major economies.	Level 2: Understand
CO2	**Apply** strategic management concepts to analyze how MNCs formulate global, international, and transnational strategies, design organizational structures, and manage entry modes and strategic alliances.	Level 3:Apply
CO3	**Demonstrate** the application of marketing, operations, human resource, and financial management practices in multinational contexts, including knowledge transfer, staffing, and taxation issues.	Level 3:Apply
CO4	**Analyze** ethical, social, and emerging issues faced by MNCs in the global environment and evaluate strategic challenges and opportunities for Indian multinational companies in the global arena.	Level 4: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Trends in world trade growth**: nature, significance and components of international logistics; creating an export organization; registration and licensing; selecting export products and markets and channels; export costing and pricing procedures incoterms; deciding payment terms; export contracts; deciding currency of payment; export order processing; international logistics infrastructure.
Unit-II	**Strategy and MNC's**: The role of strategy, Transferring core competencies, Realizing location economies, Realising experience curve economies, Pressures for cost reductions. Local responsiveness, Multinational strategy, International strategy and Global strategy. Modes of entry and strategic alliances. Organizational structure: Vertical and horizontal differentiation. Control and co-ordination in MNC's.
Unit-III	**Marketing management in MNC's**: Product, price, distribution and communication strategy. Operations management in MNC's: Where to manufacture: Country factors, technology factors, customization and cost efficiency, locating manufacturing facilities. Transfer of knowledge from home country to host country: parent subsidiary relationship, new product development. Human resource management in MNC's: HR policies in MNC's, types of staffing policy, employing expatriates in MNC's, Labour relations in MNC's. Financial management in MNC's: Double taxation relief, provisions of Indian Income Tax Act for double taxation, Transfer pricing.
Unit-IV	**Ethics and social responsibility in MNC's**: Stakeholders expectations, Environmental management in MNC's, dealing with corruption and bribery, Marketing issues, Human rights violation by MNC's. Emerging issues in MNC's: Challenges of globalization towards transnational companies, Enterprise risk management in MNC's. Indian MNC's: Strategic issues for Indian MNC's- Evolution of Indian companies, moving up the value curve, overcoming the liabilities of Indianness, Role of Government

Suggested Readings:

- Stress Management for Wellness by Walt Schafer, Cengage Learning.
- International Management" by Hodgetts, Tata McGraw Hill, New Delhi.
- International Management" by Nagandhi, Anant.R, Prentice Hall of India Ltd., New Delhi.
- Management: The Global Perspective by Koontz and Whelrich, Tata McGraw Hill, New Delhi.
- Global Business Management by Adhikary, Manab. Macmillan, New Delhi.
- International Management: Concepts and Cases by Thakur, Manab, Gene E. Burton, and B.N. Srivastava, Tata McGraw Hill, New Delhi.
- Transnational Management: Text and Cases by Christopher Bartlett and Sumantra Ghoshal, Tata McGraw Hill, New Delhi.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Logistics and Supply Chain Management	https://www.digimat.in/nptel/courses/video/109105494/L01.html?utm_source
Unit-II	International Logistics	https://auece.digimat.in/nptel/courses/video/109105494/L08.html?utm_source
Unit–III	Global Marketing Management	https://www.digimat.in/nptel/courses/video/110107112/L31.html?utm_source
Unit-IV	Advances in Strategic Human Resource Management	https://www.digimat.in/nptel/courses/video/110101164/L01.html?utm_source

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Course Code	DEC-IB-MBA-256A				
Category	Discipline Elective Course-IB				
Course Title	**International Logistics**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are: 1. To understand the concept, types, and theories of multinational corporations. 2. To analyze comparative management practices across different countries. 3. To learn procedures and documentation for pre-shipment export activities. 4. To understand post-shipment finance, foreign exchange management, and export risk coverage 5. To study export promotion schemes and institutional support for exporters in India.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** the concept, characteristics, and theories of multinational corporations and comparative management practices across countries.	Level2: Understand
CO2	**Apply** knowledge of export procedures to arrange pre-shipment finance, documentation, and logistics for international trade	Level3:Apply
CO3	**Analyze** post-shipment finance mechanisms, foreign exchange management, and risk coverage tools in export operations.	Level4: Analyze
CO4	**Apply** various export promotion schemes and institutional supports available for exporters in India to enhance global competitiveness.	Level3:Apply

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set bytaking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**A conceptual background of MNC's**: Defining MNC's, characteristics, types, growth and evolution of MNC's. A theoretical perspective: Internalisation theory, Oligopoly theory, Tariff jumping hypothesis, Obsolescing bargain theory. The three models of internalisation strategy. Comparative Management: Importance and scope; Approaches of comparative management; management styles and practices in US, Japan, China, Korea, India.

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Unit-II	**Arranging pre-shipment finance**: export procurement; quality control and pre -shipment inspection; packing and labeling of export consignments; basic procedure and documentation for excise and custom clearance; ADS; Cargo insurance; shipping modes procedures and documentation; role of forwarding agents
Unit-III	**Arranging post-shipment finance**: documentary collection of export bills; UCPDC guidelines; negotiating documents under L/C; managing exchange earners" foreign currency accounts; availing foreign exchange facilities; protecting against adverse movements in exchange rates; role of EXIM Bank; major provisions of FEMA relating to exporters; export credit risk insurance and the role of ECGC.
Unit-IV	**Major export promotion schemes in India:** export assistance to export houses; SEZ units, EOUs, EHTP, STP and BTP units; facilities for deemed exports; marketing development assistance; trade information support; role of commodity boards and export promotion councils in trade promotion; facilities for service exports.

Suggested Readings:

- Export: What, When, How by Paras Ram, Anupam Publications, New Delhi
- Export Management by Khurana, P.K., Galgotia Publishing, New Delhi
- Export Marketing – A Practical Guide for Exporters by Shavaramu,, Wheeler Publishing, New Delhi
- Contemporary Logistics by Paul R. Murphy, Pearson Education
- Ministry of Commerce and Industry – Handbook of Procedure by Govt. of India, New Delhi

Useful Video Links:

Unit No	Topics	Links
Unit-I	Trade promotion, foreign trade regulations, export procedures, etc.	https://nptel.ac.in/courses/110107145
Unit-II	Pre-shipment finance; export procurement; documentation; packing / labeling; shipping modes / agents	https://nptel.ac.in/courses/110107145
Unit-III	Post-shipment finance; L/Cs; foreign exchange; role of EXIM Bank; FEMA; ECGC	https://nptel.ac.in/courses/110105157
Unit-IV	Export promotion schemes in India; SEZ/EOU units; marketing development assistance; role of export promotion councils	https://nptel.ac.in/courses/110107145

Course Code	DEC-IB-MBA-258A				
Category	Discipline Elective Course-IB				
Course Title	**International Marketing**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. Understand the concept, nature, scope, and importance of international marketing in a globalized business environment. 2. Examine the process of market selection, segmentation, and international marketing planning strategies for competitive advantage. 3. Apply knowledge of international marketing mix (product, price, place, promotion) in global business decision-making. 4. Analyze the challenges and opportunities in international distribution, promotion, and digital marketing strategies.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** the fundamental concepts, scope, and significance of international marketing and global trade environment.	Level 2: Understand
CO2	**Apply** appropriate market segmentation, targeting, and positioning strategies to international markets using analytical models.	Level 3:Apply
CO3	**Apply** international marketing mix decisions relating to product, branding, pricing, and logistics for diverse markets.	Level 3:Apply
CO4	**Analyze** international distribution, communication, and digital marketing practices to build global brand presence and customer relationships.	Level 4: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**International Marketing:** Definitions, nature, scope, and benefits ;Domestic Marketing versus International Marketing; International marketing orientation – EPRG framework, Trade Barriers – Protectionism, Tariff, and Non-tariff barriers, Basic modes for entry, Process of International Marketing; International Institutions and Trade Agreements (WTO, IMF, World Bank, regional blocs)

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Unit-II	**International market selection and planning**: Market segmentation – Basis, macro and micro segmentation, Target market strategies, Positioning decisions, International Marketing Planning – Process and framework of market planning, Selection process and strategies; Process of marketing control, Competitive Advantage in Global Markets (Porter's Diamond Model)
Unit-III	**International Marketing Mix – Product, Branding, and Pricing Decisions:** International product policy and planning: International product mix, Product life cycle, Product standardization and adaptation, Organization of product warranties and services, Building brands for foreign markets, Labeling and packaging decisions, International pricing decisions – pricing policies, the process of price setting, pricing decisions, Terms of payment in international transactions, Dumping, counter trade, transfer pricing, and grey marketing
Unit-IV	**International Distribution, Promotion, and Digital Marketing:** International Distribution Decisions: International Distribution Channels, International distribution policy, Selecting distribution channels: Communicating with the global world: Global advertising and culture, Setting global advertising budget, Advertising standardization vs. adaptation, Global media decisions, Global marketing and internet; Digital and Social Media Strategies in International Marketing

Suggested Readings:

- International Marketing by Philip R. Cateora, Mary C. Gilly, John L. Graham,McGraw Hill Education
- Global Marketing Management by Warren J. Keegan, Mark C. Green, Pearson Education
- International Marketing by Sak Onkvisit, John J. Shaw, Routledge / PHI Learning (India Edition)
- International Marketing and Export Management by Gerald Albaum, Edwin Duerr, Pearson Education
- International Marketing by Michael R. Czinkota, Ilkka A. Ronkainen, Cengage Learning
- International Marketing: Analysis and Strategy by Sak Onkvisit & John Shaw, PHI Learning

Useful Video Links:

Unit No	Topics	Links
Unit-I to IV	International Marketing	https://nptel.ac.in/courses/110107112

Course Code	DEC-IB-MBA-260A				
Category	Discipline Elective Course-IB				
Course Title	**International Financial Market**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are: 1. Understand the conceptual framework of international financial system. 2. Understand the main instruments of regulation of currency and credit relations. 3. Know the role, functions, issues and challenges of international financial institutions. 4. Understand the currency market for lending and investment and to understand the global market for hedging, arbitrage and speculations.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** the evolution of the international financial system and the role of global financial institutions in international monetary stability.	Level2: Understand
CO2	**Apply** the concepts of international capital and money market instruments to evaluate global financing and investment decisions	Level3:Apply
CO3	**Analyze** the regulatory challenges, risks, and sustainability trends affecting international financial markets.	Level4: Analyze
CO4	**Apply** currency risk management, hedging, arbitrage, and portfolio strategies in global banking and foreign exchange operations.	Level3:Apply

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**International Financial System** – Evolution, Institutions & Global Architecture: Introduction to International Financial System: Bretton Woods Conference and Developments Afterwards; Creation of the European Monetary System (EMS), Euro-Dollar Market; Euro-Banking & Euro-Currency Centres; Syndicated Euro-Credits; Role of Financial Institutions:IMF, IBRD, IFC, BIS, ICSID, Regional Development Banks.

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Unit-II	**International Capital Markets** –Instruments, Institutions & Innovations; Introduction to International Financial Markets, International Capital Market Instruments: International Equities, Euro-Bonds, Euro-Loans, GDRs / ADRs / IDRs, Institutions in International Capital Markets, Green Bonds, Sustainability Bonds & ESG-linked Capital Markets
Unit-III	**International Money Markets** – Short-Term Instruments, Regulation & Challenges: Introduction to International Money Markets , Money Market Instruments: Euro-Notes, Euro-Commercial Papers, Participatory Notes (P-Notes), Issues and Challenges in Global Money Markets; Regulatory Oversight & Transparency Issues.
Unit-IV	**Currency Market for lending and Investment:** Currency Risk and Exposure, International Banking and Portfolio. Use of Global Markets for Hedging, Arbitrage and Speculations.

Suggested Readings:

- International Financial Management by Jeff Madura, Cengage (or West) — Multiple editions; 14th Edition, Cengage
- Financial Markets and Institutions by Frederic S. Mishkin & Stanley G. Eakins, Pearson publication
- Corporate Foreign Exchange Risk Management by Lars Oxelheim, Alf Alviniussen, Håkan Jankensgård, John Wiley & Sons

Useful Video Links:

Unit No	Topics	Links
Unit-I	Concept and importance of Training Need Assessment	http://www.digimat.in/nptel/courses/video/109105192/L11.html
Unit-II	Learning Theories	http://www.digimat.in/nptel/courses/video/109105192/L17.html
Unit-III	Training Methods	http://www.digimat.in/nptel/courses/video/109105192/L31.html
Unit-IV	Future on Training and Development	http://www.digimat.in/nptel/courses/video/109105192/L51.html

Course Code	DEC-AGB-MBA-262A				
Category	Discipline Elective Course-AGB				
Course Title	**Agricultural Input Marketing And Post- Harvest Management**				
Scheme and Credits	L	T	P	Credits	**Semester-IV**
	3	1	0	4	
Course Objectives	The objectives of this course are 1. To understand the concepts, scope, and importance of agricultural input marketing. 2. To analyze the production, supply, pricing, and policy framework related to fertilizers and plant protection chemicals. 3. To explore the development, marketing, and mechanization of farm machinery and equipment. 4. To gain comprehensive knowledge of post-harvest management, value addition, and processing of major agricultural commodities.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** the significance of agricultural input marketing systems.	Level 2:Understand
CO2	**Illustrate** the production, supply, demand, pricing, distribution channels, and regulatory frameworks related to seeds, fertilizers, pesticides, farm machinery, and processed agricultural products.	Level 3: Apply
CO3	**Demonstrate** knowledge of emerging trends, technological innovations, sustainability practices, digital platforms, and quality standards that influence modern agribusiness and agri-input marketing.	Level 3 : Apply
:CO4	**Classify** the problems faced in management techniques for cereals, pulses, oilseeds, fruits, and vegetables.	Level 4 :Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Agricultural input marketing** – meaning and importance; Management of distribution channels for agricultural input marketing; Agricultural Inputs and their types – farm and nonfarm, role of cooperative, public and private sectors in Agri- input marketing, **Organic Farming**, Seed-Importance of seed input; **Types of seeds-** hybrid, high yielding and quality seeds; Demand and supply of seeds; Seed marketing channels, pricing, export import of seeds; Role of National Seed Corporation and State Seed Corporation. **Regulatory Framework and Policies for Agricultural Inputs in India, Emerging Trends in Agri-Input Marketing and Digital Platforms.**

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Unit-II	**Chemical Fertilizers-** Production, export-import, supply of chemical fertilizers, Demand/consumption, Prices and pricing policy; subsidy on fertilizers, **Nutrient-Based Subsidy (NBS) Policy and Its Impact on Fertilizer Use, Emerging Alternatives and Sustainable Fertilizer Practices; marketing system** – marketing channels, problems in distribution, Role of IFFCO and KRIBCO in fertilizer marketing.
Unit-III	**Plant Protection Chemicals-** Production, export/import, consumption, marketing system – marketing channels; **Farm Machinery-** Production, supply, demand, Marketing and distribution channels of farm machines, Agro industries Corporation and marketing of farm machines / implements/Equipment. **Integrated Pest Management (IPM) and Safe Pesticide Usage, Technological Innovations in Farm Machinery.**
Unit-IV	Importance and scope of **post-harvest management** of major cereals, pulses, oilseeds, fruits and vegetables in Indian Economy; Production and utilization of major cereals, pulses, oilseeds, fruits and vegetables; Present status of food industry in India and emerging scenario; Factors affecting post-harvest losses, Problems in marketing of processed foods, Government Policy, BIS standards for various processed products, Quality standards for domestic and international trade**. Cold Chain Management and Storage Infrastructure in India. Value Addition and Agri-Food Processing Industries.**

Suggested Readings:

- Pradeep Kashya, Rural Marketing, Pearson Education.
- Acharya, S. S. and Agarwal, N. L., 2011. Agricultural Marketing in India. 4th Ed. Oxford and IBH.
- Broadway A. C. and Broadway, A. A., 2003, A Text Book of Agri-Business Management. Kalyani.
- Singh, A. K. and Pandey, S., 2005. Rural Marketing. New Age.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Post Harvest Operations and Processing	https://onlinecourses.nptel.ac.in/noc25_ag18/preview?utm
Unit-II	Fundamentals of Food Process Engineering	https://onlinecourses.nptel.ac.in/noc20_ag01/preview?utm
Unit-III	Food Processing And Shelf Life Extension	https://onlinecourses.nptel.ac.in/noc24_ag03/preview?utm
Unit-IV	Food Science and Technology	https://onlinecourses.nptel.ac.in/noc25_ag04/preview?utm

Course Code	DEC-AGB-MBA-264A				
Category	Discipline Elective Course-AGB				
Course Title	**Life Stock Business Management**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To understand the concepts, nature, and scope of livestock business. 2. To gain knowledge about livestock products, their characteristics, and marketing of perishable and non-perishable commodities. 3. To analyze market opportunities, marketing channels, and institutional structures. 4. To understand the global trade scenario and quality standards governing livestock marketing.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** the significance of the livestock sector.	Level 2:Understand
CO2	**Demonstrate** and classify various livestock products.	Level 3: Apply
CO3	**Illustrate** market structures for livestock.	Level 3 : Apply
CO4	**Infer** the global markets of livestock.	Level 4 :Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Livestock business-** concepts, nature and scope; production, consumption, trade in livestock in India, **Role of Animal Husbandry in Sustainable Rural Development**, Livestock contributions to national economy.
Unit-II	**Livestock produce and products**. Components, characteristic of small business. Marketable livestock commodities. **Marketing of livestock** and perishable and non-perishable livestock products. **Cold Chain Logistics and Packaging Innovations for Livestock Products**
Unit-III	**Market opportunities** - marketing channels of livestock and livestock products, organized/unorganized markets and cattle fairs. Overview of Livestock Programme. **E-Marketing and Digital Platforms in Livestock Trade.**

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Unit-IV	**Import and export of animal and animal products**. International Agreements/Regulations (WTO and General Agreement on Trade and Tariff-GATT) for marketing/trade of live animals and products, MFPO, BIS Standards for meat products, National and international specifications and standards. Visit to livestock farms. **Export Potential of Indian Livestock Products**

Suggested Readings:

- Acharya, S. S. and Agarwal, N. L., 2011. Agricultural Marketing in India. 4th Ed. Oxford and IBH.
- Safiullah, M. A., Selvam, S. and Prema, N., 2000, Livestock Economics, Business Management and
- Marketing, Tamil Nadu Veterinary and Animal Sciences University, Chennai.
- Swatland, H. and Compbell, T., 2004, Meat Cuts and Muscle Foods, Nottingham Univ. Press.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Dairy And Food Process And Products Technology.	https://onlinecourses.nptel.ac.in/noc23_ag18
Unit-II	Machine Learning For Soil And Crop Management	https://onlinecourses.nptel.ac.in/noc24_ag02
Unit-III	Marketing Management	https://onlinecourses.nptel.ac.in/noc22_mg05
Unit-IV	Basics of Crop Breeding and Plant Biotechnology	https://onlinecourses.nptel.ac.in/noc24_ag08

Course Code	DEC-AGB-MBA-266A				
Category	Discipline Elective Course-AGB				
Course Title	Agricultural Marketing Management				
Scheme and Credits	L	T	P	Credits	Semester-IV
	3	1	0	4	
Course Objectives	The objectives of this course are 1. To understand the concepts, structure, and significance of agricultural marketing and its role in agricultural and economic development. 2. To develop knowledge of product management, pricing strategies and new product development processes in agribusiness. 3. To examine the logistics and supply chain functions involved in the efficient movement and storage of agricultural commodities. 4. To analyze the promotional, distributional, and intermediary functions essential for marketing agricultural products effectively.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** the structure, functions, and dynamics of agricultural markets and their contribution to economic development.	Level 2:Understand
CO2	**Demonstrate** effective strategies suited to agribusiness environments.	Level 3: Apply
CO3	**Examine** and apply principles for efficient agricultural marketing operations.	Level 3 : Apply
CO4	**Outline** the role of marketing agencies in agricultural trade.	Level 4 :Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Agricultural marketing**, agricultural marketing and economic development. Agricultural market structure, Components and dynamics of market structure. Marketing strategy, formulation of marketing strategy. Agribusiness marketing environment, design of marketing mix, market segmentation and targeting. Determinants of consumer's behavior.; **Role of ICT and digital platforms in agricultural marketing; Government policies and institutions in agricultural marketing**

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Unit-II	**Product management**, product management process and decisions. New product development-significance and classification of new product. Stages and estimation of demand of new product, product life cycle. **Pricing policies** and practices for agribusiness - determinants of price, objectives of pricing policies and pricing methods. **Branding and packaging strategies for agricultural products; Value addition and product differentiation in agribusiness.**
Unit-III	**Logistics-** concepts, factors affecting logistics, objectives of logistics management, activities of logistics function order, processing, packaging, transport management inventory, warehousing etc.; Cold chain logistics and post-harvest management; **Supply chain integration and traceability systems in agribusiness**
Unit-IV	**Promotional management**, advertising, planning and execution. Sales promotion, grading and standardization. **Distribution management-** storage and warehousing, transportation. Management for agricultural products. Marketing agencies/ intermediaries, roles and functions of marketing agencies.; **Rural retailing and direct marketing models; Export marketing of agricultural commodities**

Suggested Readings:

- Kotler, P and Keller, Marketing Management, Pearson Education.
- Acharya, S. S. and Agarwal, N.L. 2004. Agricultural Marketing in India. 4th Ed. Oxford and IBH.
- Kohls, R. L and Uhl, J. N. 2005. Marketing of Agricultural Products. 9th Ed. Prentice Hall.
- Krishnamacharyulu, C and Ramakrishan, L. 2002. Rural Marketing. Pearson Edu.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Rural Marketing: Principles, Strategies, and Practices	https://onlinecourses.swayam2.ac.in/ini25_mg06/preview
Unit-II	Commodity Derivatives & Risk Management (NPTEL)	https://onlinecourses.nptel.ac.in/noc25_mg128/preview
Unit-III	Indian Agricultural Development (Swayam)	https://onlinecourses.swayam2.ac.in/nou25_ag09/preview
Unit-IV	Post- Harvest Operations and Processing of Fruits, Vegetables, Spices and Plantation Crop Products (NPTEL)	https://onlinecourses.nptel.ac.in/noc23_ag16/preview

Course Code	DEC-AGB-MBA-268A				
Category	Discipline Elective Course-AGB				
Course Title	Agri Supply Chain and Logistics Management				
Scheme and Credits	L	T	P	Credits	Semester-IV
	3	1	0	4	
Course Objectives	The objectives of this course are 1. To understand the concept, evolution, and significance of supply chain management in the agribusiness sector. 2. To develop knowledge of demand forecasting, operations, procurement, performance control, and logistics (including IT, transportation, warehousing, and distribution) in the agri supply chain. 3. To understand the role of information technology in enhancing visibility, coordination, and decision-making in agri logistics and supply chain management. 4. To gain knowledge about the performance metrics and control systems for continuous improvement in agri supply chain management.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Describe** the concept, evolution, and significance of supply chain & logistics management in agri business.	Level-2:Understand
CO2	**Apply** supply chain and logistics models in the agribusiness sector.	Level-3: Apply
CO3	**Apply** basic supply chain concepts to solve real-world problems in agribusiness.	Level-3: Apply
CO4	**Analyze** logistics elements such as transportation, warehousing, packaging, and IT in agribusiness.	Level-4:Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Supply Chain-** Concept, Evolution and Significance. Role and Models of Supply Chain as Applicable to Agribusiness. Traditional v/s Modern Agri Supply Chain Management.
Unit-II	**Demand Planning and Forecasting in Agri Supply Chain**: Operations and Manufacturing Management in Agri Supply Chain. Inventory Management in Agribusiness: Techniques for controlling stock, reducing spoilage, and maintaining optimal inventory levels.

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Unit-III	**Procurement Management in Agri Supply Chain:** Purchasing Cycle, Type of Purchases and Contract/Corporate Farming. Performance Measurement and Controls in Agri Supply Chain Management.
Unit-IV	**Logistics Management in Agribusiness:** Elements of Logistics as Applicable to Agribusiness. Distribution Strategies and Pool Distribution in Agribusiness. Transportation Management in Agribusiness. Warehousing, Packaging and Third-Party logistics in Agribusiness. Role of Information Technology in Logistics Management.

Suggested Readings:

- Supply Chain Management: Concepts and Cases by Altekar R V, Prentice Hall of India
- Logistics Management by Satish C. Ailawadi, Rakesh Singh, Prentice Hall of India, 1st Edition, 2005.
- Supply Chain Management-Text and Cases by Janat Shah, Pearson Education India. 2009 1st edition.
- Sales and Distribution Management by Tapan K. Panda, Sunil Sahadev, Oxford University Press, 2008.
- Sales and Distribution Management by S. A. Chu Nawala, Himalaya Publishing House, 2nd Edition, 2008.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Logistics & Supply Chain Management	https://onlinecourses.nptel.ac.in/noc25_hs205/preview?utm
Unit-II	Supply Chain Management In Agriculture	https://www.youtube.com/watch?v=s9KQyRsyZy8
Unit-III	Contract farming	https://www.youtube.com/watch?v=z2uE9uYgXXM
Unit-IV	Transportation Management in Agribusiness	https://www.youtube.com/watch?v=iSxBolqFCN0

Course Code	DEC-AGB-MBA-270A				
Category	Discipline Elective Course-AGB				
Course Title	**International Trade in Agri-Business**				
Scheme and Credits	L	T	P	**Credits**	**Semester- IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To gain knowledge about the fundamental concepts and importance of international trade. 2. To Examine the significance of agriculture in economic development. 3. To Study the main provisions of the WTO Agreement on Agriculture, including market access, domestic support, and export subsidies. 4. To Understand the interrelationship between agriculture, trade, and economic development.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Describe** the fundamental concepts, importance, and instruments of international trade.	Level-2: Understand
CO2	**Apply** knowledge of trade policy instruments in agri-business.	Level-3: Apply
CO3	**Apply** trade theories to explain economic benefits.	Level-3: Apply
CO4	**Analyze** the inter linkages between agriculture, trade, and development.	Level-4: Analyze

Note:

1. The examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**International Trade:** Basic concepts and importance of international trade, gains from trade, trade policies instruments of trade policy- tariffs, subsidies, quotas, Case for protectionism and for free trade; Importance of Agriculture in development, trade and agriculture, globalization and agriculture, emerging scenario of international trade in agricultural commodities.
Unit-II	**WTO-Agreement on agriculture:** main provisions - market access, domestic support, export subsidies and other provisions, issues for further negotiations, implications of WTO provisions on Indian Agriculture-reduction commitments for India,

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Unit-III	**Foreign Trade of India:** trade policy, Indian agricultural trade, trends in exports and imports, changing structure and pattern of agricultural trade, export potential of various agro-commodities, export and import procedures and documentation.
Unit-IV	**Competitiveness of Indian Agriculture:** measures of competitiveness, competitiveness of various crops, measures for improvement, Digital Trade and E-commerce in Agriculture, Impact of Climate Change on Agricultural Trade.

Suggested Readings:

- Implications of WTO Agreements for Indian Agriculture by Datta Samar K. and Satish Y. Deodhar, Oxford and IBH Pub Co., New Delhi.
- WTO and Indian Economy by Chadha G. K., Deep and Deep Publications
- WTO Negotiations on Agriculture and Developing Countries by Hooda and Gulati, Oxford University Press, New Delhi.
- Trade liberalization and Indian Agriculture: Cropping Pattern Changes and Efficiency Gains in Semi-Arid Tropics by Gulati, Ashok and Tim Kelley, Oxford University Press in New Delhi, New York
- WTO and New International Trade Regime- Implication for Indian Agriculture by Vashisht A. K. and Singh Alka, Advance Publishing Concept.

Useful Video Links:

Unit No	Topics	Links
Unit-I	International Trade - Theory	https://onlinecourses.nptel.ac.in/noc22_hs98/preview?utm
Unit-II	International Trade Law	https://onlinecourses.nptel.ac.in/noc25_lw06/preview?utm
Unit-III	Introduction to International Business	https://nptel.ac.in/courses/110107145
Unit-IV	Economic Viability of Indian Agriculture	https://onlinecourses.swayam2.ac.in/aic21_ge22/preview

Course Code	**DEC-OM-MBA-272A**					
Category	Discipline Elective Course-OM					
Course Title	**Transportation Management**					
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**	
	3	1	0	**4**		
Course Objectives	The objectives of this course are 1. To understand the key activities and functions of transportation systems, emphasizing accessibility, connectivity, mobility, and their interrelationships with economic cost, trade, geography, technology, and social development. 2. To develop the ability to apply transportation planning, operation, and management principles through models such as trip generation, distribution, mode selection, and traffic flow theories for efficient transport system design. 3. To analyze the historical evolution and structural components of transportation systems—including sea, rail, road, and air transport—and to understand multimodalism, intermodalism, and infrastructure in supply chain contexts. 4. To evaluate travel demand forecasting models, transportation policies, and legal frameworks such as the Motor Vehicle Act of 1988 and emission norms, and their implications for sustainable urban transport development.					
Assessment	40 Marks					
End Semester Examination	60 Marks					
Total	100 Marks					
Duration of Exam	03 Hours					

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** fundamental concepts, relationships, and influencing factors within complex systems and their broader social, economic, and technological contexts.	Level-2 Understand
CO2	**Apply** analytical methods, decision-making approaches, and quantitative or qualitative techniques to address practical situations and structured problem scenarios.	Level-3 Apply
CO3	**Demonstrate** system components, interactions, and performance patterns to identify causes, implications, and potential areas for improvement.	Level-3 Apply
CO4	**Illustrate** alternative strategies, policies, and solutions using logical reasoning and evidence-based criteria to recommend effective improvements.	Level-4 Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

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Unit No.	Contents
Unit-I	**Growth of Urbanization and Problems of Transportation**: Transport- Challenges and Limitations; Government Activities in Transportation; Functions of Transport Accessibility/Connectivity, Mobility Inter relations of Transport Economic cost and trade, Geography and technology, Social, cultural and recreational development of Information and Communication Technology
Unit-II	**Transportation Systems - Planning, Operation and Management** Trip Generation and Distribution: Load Planning: Transportation Modes and their Selection; Land Use theory; Physical Theories, Economic Theories Utility Maximization; Choice Theory, Logit Model, Gravity Model, Generalized Cost; Elements of Traffic Flow, Generalized Car Following Theory, Green shields Theory
Unit-III	**Early transport and trade, Development of Sea ports**, canal transport and the railways, Road building and motorization, Development of airports and air transport; Transport Networks, Features of networks – nodes and links, Multimodalism and choice in transport, Supply chain, Inter modalism, Transport Infrastructure
Unit-IV	**Sequential Travel Demand Forecasting Models**: Future Developments in Transportation; Motor Vehicle Act 1988 and its Impact on Urban Transport System: Emission Norms.

Suggested Readings:

- Transportation and Traffic Engineering Handbook. Englewood Cliffs by Baerwal, J E., Prentice Hall Inc.
- Transportation: An Introduction by Khisty and lall Tata McGraw Hill
- The Business of Transport. Plymouth by Bell, G. et al., Pearson Education.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Growth of Urbanization and Problems of Transportation	http://amrita.digimat.in/nptel/courses/video/105105204/L42.html
Unit-II	Transportation Systems - Planning, Operation and Management	http://www.digimat.in/nptel/courses/video/105107210/L31.html
Unit-III	Early transport and trade, Development of Sea ports,	http://www.digimat.in/nptel/courses/video/114106032/L29.html
Unit-IV	Sequential Travel Demand Forecasting Models	http://digimat.in/nptel/courses/video/105106050/L32.html

Course Code	**DEC-OM-MBA-274A**				
Category	Discipline Elective Course-OM				
Course Title	**Warehouse Management and Inventory Control**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To provide a comprehensive understanding of warehouse management principles, processes, and organization. 2. To introduce the role of computerization, safety, and performance evaluation in warehouse operations. 3. To enable students to apply various inventory control models, stock management techniques, and replenishment systems for effective inventory planning 4. To develop analytical skills for evaluating warehouse and inventory performance through quantitative tools and ratios.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	**Skills Demonstrated**	**RBT Level**
CO1	**Explain** the fundamental concepts, functions, and significance of warehouse management and inventory control.	Level 2: Understand
CO2	**Apply** suitable methods and procedures to manage warehouse operations efficiently.	Level 3: Apply
CO3	**Apply** inventory control techniques and warehouse management tools to improve material handling and stock management.	Level 4: Apply
CO4	**Analyze** warehouse and inventory performance, operational issues, and material flow to support effective decision-making.	Level 5: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Warehouse management:** meaning and significance; warehouse organization: requisitions and replenishment of materials, receipt and inspection of materials, issue of materials, stocktaking, discrepancies and their resolution, control of tools, surplus, and scrap materials, storage and handling practices of materials
Unit-II	**Computerization of warehouse activities,** performance evaluation of stores activities, ISO standards and warehouse activities, warehouse location, layout, and facilities planning, warehouse security, safety, and maintenance.
Unit-III	**Inventory Management:** inventory concepts, pressures for low inventory, pressures for high inventory, types of inventory – seasonal, decoupling, cyclic, pipeline, safety stock; inventory costs; inventory control systems :issues in the P and Q systems of inventory control; The Basic Economic Order Quantity Model, Production Quantity Model, Quantity Discounts, Reorder Point, Safety Stocks, Service Level, Order quantity for periodic inventory system, Order quantity with variable demand
Unit-IV	**Just-In-Time:** Principles of just-in-time, Core logic of JIT, Main features for stocks, Achieving just-in-time operations, and other effects of JIT, Benefits and disadvantages of JIT, Comparison with other methods Of inventory management. KANBAN as a control tool. Vendor managed inventory; Make or Buy Decisions : Factors influencing Make or Buy Decisions-cost, quality, capacity core v/s noncore, management strategy. **Evaluation of performance of Materials** function,cost, delivery, quality, inventory turnover ratio methodology of evaluation, Use of ratios and analysis like FSN: Fast slow, Nonmoving, HML-High Medium, Low, XYZ. Materials Management in JIT Environment

Suggested Readings:

- Employee Training and Development by Noe, A Raymond, and Kodwani, D Amitabh, McGraw Hill Education
- Every Trainer's Handbook by Agochia, Devendra, New Delhi; Sage Publications
- Training for Development by R.K. Sahu, Excel Books, New Delhi
- Training in Organization by Goldstein, Thomson Learning, Bombay
- Training for Life and Leadership in Industry by McGrath, Prentice Hall of India, New Delhi

Useful Video Links:

Unit No	Topics	Links
Unit-I	Introduction to Data Warehousing	https://www.youtube.com/watch?v=m-aKj5ovDfg
Unit-II	Computerised Layout Planning	https://www.youtube.com/watch?v=q8xxKVtRbws
Unit-III	Introduction to Inventory and Materials Management	https://nptel.ac.in/courses/110105095
Unit-IV	JIT-based Approaches for Materials Management	https://nptel.ac.in/courses/110105095

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Course Code	DEC-OM-MBA-276A				
Category	Discipline Elective Course-OM				
Course Title	**Supply Chain Analytics**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To understand the fundamental concepts and quantitative techniques for warehousing decisions, including mathematical programming models, heuristic approaches, and warehouse layout planning. 2. To develop the ability to apply various inventory management models such as dynamic lot sizing, multi-echelon, and aggregate inventory systems for optimizing inventory control in supply chains. 3. To analyze and model transportation and network optimization problems using graph theory, shortest path algorithms, vehicle routing heuristics, and scheduling techniques for efficient logistics operations. 4. To evaluate and integrate decision-support and risk analysis tools such as Analytic Hierarchy Process (AHP), Data Envelopment Analysis (DEA), and Fuzzy Logic for addressing uncertainties and improving supply chain performance.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** key concepts, principles, and methodological foundations used in decision-making within complex logistic systems.	Level-2 Understand
CO2	**Apply** quantitative and qualitative techniques to formulate, compute, and interpret solutions for a variety of real-world and simulated logistic problem.	Level-3 Apply
CO3	**Illustrate** multi-step processes, interrelated components, and performance outcomes to identify patterns, constraints, and areas requiring improvement.	Level-3 Apply
CO4	**Categorize** alternative approaches and solution methods using logical reasoning, comparative criteria, and evidence-driven insights to innovative logistics solutions.	Level-4 Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

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Unit No.	Contents
Unit-I	**Warehousing Decisions:** Mathematical Programming Models, P-Median Methods, Guided LP Approach, Balmer- Wolfe Method, Greedy Drop Heuristics, Dynamic Location Models, Space Determination and Layout Methods
Unit-II	**Inventory Management**: Inventory aggregation Models, Dynamic Lot sizing Methods, Multi-Echelon Inventory models, Aggregate Inventory system and LIMIT
Unit-III	**Transportation Network Models**, Notion of Graphs, Minimal Spanning Tree, Shortest Path Algorithms, Maximal Flow Problems, Multistage Trans-shipment and Transportation Problems, Set covering and Set Partitioning Problems, Traveling Salesman Algorithms, Advanced Vehicle Routing Problem Heuristics, Scheduling Algorithms-Deficit Function Approach and Linking Algorithms
Unit-IV	**Analytic Hierarchy Process, Data** Envelopment Analysis, Risk Analysis in Supply Chain, measuring transit risks, supply risks, delivering risks, Risk pooling strategies, Fuzzy Logic and Techniques-Application in SCM

Suggested Readings:

- Managing the supply chain: the definitive guide for the business professional by D. Simchi-Levi, P. Kaminsky, E. Simchi-Levi Pearson Education.
- Supply Chain Management by Janat Shah Tata McGraw Hill.
- Supply Chain Management: Strategy, Planning, and Operation, by Sunil Chopra Thomson Learning, Bombay.
- Designing and Managing the Supply Chain concepts by D. Simchi-Levi, P. Kaminsky, E. Simchi-Levi, and Ravi Shankar Pearson Education.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Warehousing Decisions	http://www.digimat.in/nptel/courses/video/109105494/L51.html
Unit-II	Inventory Management: Inventory aggregation Models	https://onlinecourses.nptel.ac.in/noc23_mg50/preview
Unit-III	Transportation Network Models	https://onlinecourses.nptel.ac.in/noc25_ce102/preview
Unit-IV	Risk Analysis in Supply Chain	https://nptel.ac.in/courses/110105141

Course Code	DEC-OM-MBA-278A				
Category	Discipline Elective Course - OM				
Course Title	**Service Operations Management**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To understand the fundamental concepts, nature, and significance of services and their role in the modern economy. 2. To develop the ability to design, analyze, and manage efficient service processes that enhance customer satisfaction. 3. To apply tools and techniques for improving service quality, productivity, and performance in various service sectors. 4. To explore emerging trends, technologies, and strategic issues influencing service operations in a global business environment.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Discuss** an understanding of the terminology and responsibilities that relate to Service Operations Management.	Level 2: Understand
CO2	**Illustrate** the functions of the Service Operations Management discipline in various sectors of the economy through case study.	Level 3: Apply
CO3	**Demonstrate** basic tools and skills used in solving problems traditionally associated with operating the service operations system.	Level 4: Apply
CO4	**Infer** solutions with which a service organization can improve its operations and achieve sustainable competitive advantage.	Level 5: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit

Unit No.	Contents
Unit-I	**Nature and characteristics of services**, Role and importance of service sector in the economy, Difference between goods and services operations, The service concept: dimensions and design, Service strategy and competitive priorities, Service classification and service process matrix, Service quality: concepts, determinants, and measurement, Service encounters and moments of truth, The service-profit chain and customer experience management

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Unit-II	**Service process design and analysis**, Service blueprints and process flowcharts, Facility location and layout for service organizations, Capacity planning and demand management in services, Managing variability in service operations, Technology in service design: self-service technologies (SSTs) Role of information systems in service delivery
Unit-III	**Service supply chain management**, Human resource strategies in service delivery, Scheduling and workforce management, Service productivity and efficiency, Total Quality Management (TQM) in services, Service quality measurement models: SERVQUAL, GAP model, Service recovery and complaint management, Managing customer expectations and satisfaction
Unit-IV	**Globalization of services and outsourcing/off shoring**, E-services and digital transformation in service industries, Innovation in services and new service development, Sustainability and green service operations, Managing knowledge-intensive and professional services, Service performance measurement and analytics

Suggested Readings:

- Service Management Effectiveness: Balancing Strategy, Organization and Human Resources by Bowmen David E. etc Parsons Publications.
- Service Management Operating Decisions by Collier and David Prentice Hall Publication.
- Service Operations Management by James A. and Sullivan, McGraw Hill.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Nature and characteristics of services	https://vit.digimat.in/nptel/courses/video/110105078/L04.html
Unit-II	Service process design and analysis	https://nptel.ac.in/courses/103106148
Unit-III	Service supply chain management	http://www.digimat.in/nptel/courses/video/110108056/L05.html
Unit-IV	Globalization of services and outsourcing/off shoring	https://www.youtube.com/watch?v=Yw8E1KooQ9g

Course Code	**DEC-OM-MBA-280A**				
Category	Discipline Elective Course-OM				
Course Title	**Project Management**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. Provide a comprehensive understanding of project management concepts, phases, and capital budgeting decisions. 2. Develop the ability to apply financial, technical, and market analysis tools for evaluating project feasibility. 3. Enable students to apply investment appraisal techniques, risk assessment methods, and project scheduling tools in real project contexts. 4. Equip students with analytical skills to examine project risks, environmental and social impacts, resource constraints, and implementation challenges for effective project decision-making.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	**Skills Demonstrated**	**RBT Level**
CO1	**Explain** the key concepts, processes, and objectives involved in project management and capital budgeting.	Level 2: Understand
CO2	**Apply** suitable techniques to assess project feasibility, financial projections, and investment decisions.	Level 3: Apply
CO3	**Apply** project appraisal tools, risk assessment methods, and scheduling techniques for effective project planning.	Level 3: Apply
CO4	**Analyze** project risks, environmental and social implications, resource requirements, and implementation issues to support informed project decisions.	Level 4: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Phases and objectives of project management and capital budgeting**, theoretical foundations for capital expenditure decisions, strategy and resource allocation, generation and screening of project ideas, **feasibility study** – market and demand analysis, and technical analysis.
Unit-II	**Financial estimation and projections, investment appraisal criteria** – Payback, NPV, IRR, PI, ARR; term financing and consortium lending; venture capital; PPP models, BOT and TOT frameworks.
Unit-III	**Risk analysis** – types of risk: business, financial, environmental, and market; measurement and techniques of project risk analysis – sensitivity, scenario, and simulation; project selection under risk and uncertainty legal, tax, and regulatory considerations. **Social Cost Benefit Analysis** – rationale and UNIDO approach Environmental Impact Assessment.
Unit-IV	**Network techniques** – PERT and CPM: concepts, construction, and analysis; critical path determination, time–cost trade-offs, and resource leveling; time and cost overruns and corrective measures. **Project implementation** – forms of organization, planning, control, and human aspects. **Project review** – post-audit and abandonment analysis evaluation of the capital budgeting system.

Suggested Readings:

- Prasanna Chandra– Projects: Planning, Analysis, Selection, Financing, Implementation and Review, McGraw Hill Education.
- K. Nagarajan – Project Management, New Age International Publishers
- Gopalakrishnan, P., & Ramamoorthy, V.E.– Textbook of Project Management, Macmillan
- Chandra, P. – Financial Management: Theory and Practice, McGraw Hill Education
- Cleland, D.I., & Gareis, R. – Global Project Management Handbook, McGraw Hill.
- S. Choudhury–Project Management, Tata McGraw Hill.
- Gray, C. F., & Larson, E. W. – Project Management: The Managerial Process, McGraw Hill.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Introduction to Project Management	https://nptel.ac.in/courses/110107430
Unit-II	Project Feasibility Analysis	https://nptel.ac.in/courses/110107430
Unit-III	Project Risk analysis	https://nptel.ac.in/courses/110107430
Unit-IV	Project Audit	https://nptel.ac.in/courses/110107430

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Course Code	DEC-BA-MBA-282A				
Category	Discipline Elective Course-BA				
Course Title	**Economics for Business Strategy**				
Scheme and Credits	L	T	P	Credits	**Semester-IV**
	3	1	0	4	
Course Objectives	The objectives of this course are 1. To understand the economic principles underlying business strategy formation, including demand-supply dynamics, market efficiency, and market failure. 2. To analyze how firms compete and cooperate through mergers, acquisitions, advertising, differentiation, and integration in diverse market structures. 3. To evaluate diversification, globalization, privatization, and disinvestment as strategic tools for business and economic development. 4. To explore the interconnections between innovation, sustainability, and strategic decision-making in the context of global business economics.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** key economic concepts and innovation-based strategies within the context of business decision-making.	Level-2:Understand
CO2	**Apply** economic tools and strategic frameworks to analyze real-world business situations.	Level-3:Apply
CO3	**Apply** the economic rationale behind strategic business decisions.	Level-3:Apply
CO4	**Analyze** alternative business strategies using economic reasoning to recommend optimal decisions for competitive advantage, growth, and sustainability.	Level-4:Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Market Dynamics and Strategic Analysis** –Demand and Supply Analysis, Bridging the gaps in the demand and supply for circular economy, Efficiency of the Market Mechanism, Understanding Market Failure, Market Research and Competitive Analysis,Market Dynamics and Strategic Analysis

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Unit-II	**Strategic Integration, Advertising, and Business Excellence**– Rationale behind Mergers and Acquisitions (M&A), Socio-economic and political consequences of M&A; Economics of advertising, differentiation, and integration; Product differentiation and advertising, Marketing Success through Differentiation; Business Excellence through Horizontal and Vertical Integration
Unit-III	**Diversification, Globalization, and Strategic Expansion**–Economic complexity of diversification and economic development, Economic Diversification in Developing Countries; Business Diversification: When, Why and How it's done, Diversification Strategy and Firm Performance; Rationale behind of privatization and disinvestment; Trade and Globalization; Global Expansion Strategies
Unit-IV	**Cost, Pricing, and Innovation Strategies for Sustainable Growth**–Cost and Price Analysis, Cost Leadership Strategy: Pros, Cons and Implementation, Understanding the Psychology of Consumption and Pricing, Formulating Optimal Pricing Strategy; Economics of Innovation and its association with business strategy for sustainability

Suggested Readings:

- Marginal Economics in a Global Economy by Salvatore, D. McGraw Hill Publication Co. Ltd
- Business Strategy: Managing Uncertainty, Opportunity, and Enterprise by Spender, J. C. OUP Oxford.
- Business Strategy by Stonehouse, G., & Houston, B.Routledge.
- Developing Business Strategies by Aaker, D. A. John Wiley & Sons.
- Managerial economics by Petersen, H. C., & Lewis, W. C. Macmillan Publishing Company.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Demand and Supply Analysis	https://youtu.be/Ht7W2ghvLXc
Unit-II	Product differentiation and advertising	https://youtu.be/7p1y_nxmSt4
Unit-III	Global Expansion Strategies	https://youtu.be/0oiN_dgExxc
Unit-IV	Cost and Price Analysis	https://youtu.be/svespJwNQNo

Course Code	DEC-BA-MBA-284A				
Category	Discipline Elective Course-BA				
Course Title	**Econometrics for Business Analytics**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To understand the nature, scope, and methodology of econometrics and apply basic estimation techniques such as OLS and Maximum Likelihood in simple and multiple regression models. 2. To identify and address econometric problems like Multicollinearity, autocorrelation, and heteroscedasticity, and apply dummy variables and limited dependent variable models (LPM, Probit, Logit). 3. To analyze and estimate simultaneous equation models using identification tests and methods such as ILS, 2SLS, and SUR. 4. To apply advanced time series techniques including unit root tests, ARIMA, VAR, co integration, ECM, Granger causality, and volatility models (ARCH/GARCH) for economic forecasting.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** the theoretical concepts, assumptions, and fundamental principles underlying econometric techniques.	Level-2:Understand
CO2	**Apply** appropriate econometric methods to estimate economic relationships across different types of data.	Level-3:Apply
CO3	**Apply** econometric diagnostic tests and model evaluation tools.	Level-3:Apply
CO4	**Analyze** the results of estimated econometric models to derive meaningful economic insights, forecast outcomes, and support policy or decision-making.	Level-4:Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Introduction to Econometrics-**Nature, scope and methodology of econometrics; Simple Linear Regression Model: Assumptions, Procedures and properties of OLS estimator, Co-efficient of determination, Tests of significance, Maximum Likelihood Estimation, Gauss–Markov Theorem and BLUE Properties of OLS.

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Unit-II	**Multiple Linear Regression Analysis-** Method of least squares, Econometric Problems: Multicollinearity, Autocorrelation and Heteroscedasticity, Dummy Variables-Nature and uses, Dummy Variables in Regression Models, Regression on Dummy Dependent Variable, Linear Probability Model (LPM), Probit and Logit Models, Dynamic Econometric Models.
Unit-III	**Simultaneous Equation Models-** Structural, Reduced and final forms, Identification-Order and rank conditions, Methods for estimating the simultaneous models-Basic idea of Indirect Least Square (ILS) and Two Stage Least Square (2SLS) methods, Seemingly Unrelated Regressions (SUR)
Unit-IV	**Modern Time Series Techniques** -Stochastic process, Stationarity, Unit Roots, Testing Unit Roots – Dickey and Fuller, Phillips and Perron tests, Autoregressive (AR) models, Moving Average (MA) models, autoregressive integrated moving average (ARIMA) model, VAR analysis, Co integration – Eagle-Granger Methodology, Johanson approach, Error Correction Models, Granger Causality, Modelling Volatility: ARCH, GARCH

Suggested Readings:

- Basic Econometrics 4th ed.by Gujarati, D. N., McGraw-Hill.
- Introduction to Econometrics by Stock, J. H., & Watson, M. W., Pearson.
- Econometric Analysis of Cross Section and Panel Data by Wooldridge, J. M., MIT press.
- Econometric Analysis by Greene, W. H., Pretence Hall.
- Econometric Methods By, Johnston, J., & Di Nardo, J., Ed. New York: McGraw-Hill.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Simple Linear Regression Model	https://youtu.be/_exbieKYgJY
Unit-II	Method of least squares	https://youtu.be/QnQR30oG1ac
Unit-III	Two Stage Least Square	https://youtu.be/kTwRwq60pIw
Unit-IV	Testing Unit Roots	https://youtu.be/GW89kSkeqKU

Course Code	DEC-BA-MBA-286A				
Category	Discipline Elective Course-BA				
Course Title	**Predictive Business Analytics**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	4	
Course Objectives	The objectives of this course are 1. To develop an understanding of the foundational concepts of predictive analytics, its relationship with business intelligence, and the role of big data in data-driven decision-making. 2. To familiarize students with major prediction techniques and enable them to understand how these models function and are applied in business scenarios. 3. To equip students with knowledge of classification techniques for solving categorical prediction problems in business analytics. 4. To enable students to understand and apply unsupervised learning methods and ensemble approaches for pattern discovery, segmentation, and improved predictive accuracy.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** the fundamental concepts, methodologies, and techniques of predictive analytics.	Level-2:Understand
CO2	**Apply** predictive modelling techniques to real business problems for generating actionable insights.	Level-3:Apply
CO3	**Apply** business datasets to select optimal predictive solutions.	Level-3:Apply
CO4	**Analyze** predictive modeling approaches to justify the best methodological choice for solving specific business decision-making problems.	Level-4:Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Introduction to Predictive Analytics-** overview, business intelligence, predictive analytics in relation to business intelligence, statistics, data mining; Big data, importance in decision making; Setting up problem-CRISP-DM, business understanding, Defining data, target variable and measures of success for predictive modelling; Methodology of predictive modeling, Time series forecasting in predictive analytics.

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Unit-II	**Prediction Methods-**Linear Regression- best subset selection, forward selection, backward selection, step-wise regression, Cp mallows and adjusted R-square criteria; k-Nearest Neighbours (k-NN); Regression Trees- CART, CHAID; Neural Nets- architecture of neural nets, neurons, input layer, hidden layers, output layer.
Unit-III	**Classification Methods–**the naïve rule, Naïve-Bayes classifier, K-Nearest neighbours, Classification Trees, Neural Nets, Logistisc Regression.
Unit-IV	**Non-supervised Learning–** Association Rules- support and confidence, the apriori algorithm, the selection of strong rules; Cluster Analysis- hierarchical methods, optimization and the k-means algorithm, similarity measures, other distance measures. Ensemble Methods: Nelson and Granger-Ramanathan methods for continuous targets, Majority voting for categorical targets, Bagging, Boosting.

Suggested Readings:

- Predictive Analytics for Human Resources by Fitz-Enz, J., & John Mattox, I. I. John Wiley & Sons.
- Predictive Modeling Techniques in Predictive Analytics: Business Problems and Solutions by Miller, T. W., R. Pearson Education.
- Predictive Business Analytics: Forward Looking Capabilities to Improve Business Performance by Maisel, L., & Cokins, G., John Wiley & Sons.
- Modeling Techniques in Predictive Analytics with Python and R: A Guide to Data Science by Miller, T. W., FT Press.
- Predictive Analytics Analytics: The Power to Predict Who Will Click, Buy, Lie, Or Die. Siegel, E., John Wiley & Sons.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Data mining and business intelligence	https://youtu.be/hozC5pMajYk
Unit-II	Regression Trees	https://youtu.be/G0LiiX1cick
Unit-III	The naïve rule	https://youtu.be/QEYzi5r0iX4
Unit-IV	Cluster Analysis	https://youtu.be/J07gAN5WdRI

Course Code	**DEC-BA-MBA-288A**				
Category	Discipline Elective Course-BA				
Course Title	**Time Series Data Analysis**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To enable students to understand the fundamental principles and characteristics of data evolving over time. 2. To develop the ability to apply appropriate analytical techniques for identifying and estimating models for time-based data. 3. To build skills in analyzing the structure, behavior, and patterns of sequential datasets using diagnostic and evaluation tools. 4. To equip learners with the competence to generate reliable forecasts and assess model performance for informed decision-making.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** the underlying principles, assumptions, and characteristics of analytical methods used in the study of dynamic data patterns.	Level-2:Understand
CO2	**Apply** appropriate analytical and statistical procedures to identify, specify, and estimate models relevant to the behavior of sequential data.	Level-3:Apply
CO3	**Apply** the behavior and structure of sequential datasets using diagnostic evaluations and interpret the implications of model outputs for data behavior.	Level-3:Apply
CO4	**Analyze** forecasts using suitable modelling frameworks, and examine the accuracy and relevance of predictive results for decision-making.	Level-4:Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Foundations of Stochastic Processes and Stationarity-**Stochastic process and its main characteristics. Time series as a discrete stochastic process. Stationarity. Main characteristics of stochastic processes (means, auto co variation and autocorrelation functions). Stationary stochastic processes. Stationarity as the main characteristic of stochastic component of time series. Wold decomposition. Lag operator.

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Unit-II	**Autoregressive and Moving Average Modelling Framework-**Autoregressive-moving average models ARMA (p,q) Moving average models MA(q). Condition of invertibility. Autoregressive models AR (p). Yull-Worker equations. Stationarity conditions. Autoregressive-moving average models ARMA (p, q). Coefficient estimation in ARMA (p,q) processes. Box-Jenkins' approach.
Unit-III	**Model Estimation, Diagnostic Evaluation, and Selection Criteria-**Coefficients estimation in autoregressive models. Coefficient estimation in ARMA (p) processes. Quality of adjustment of time series models. AIC information criterion. BIC information criterion. "Portmonto"-statistics. Box-Jenkins methodology to identification of stationary time series models.
Unit-IV	**Forecasting and Non-Stationary Time Series Modelling-** Forecasting in the framework of Box-Jenkins model Forecasting, trend and seasonality in Box-Jenkins model. Non-stationary time series. Time series with non-stationary variance. Non-stationary mean. ARIMA (p, d, q) models. The use of Box-Jenkins methodology to determination of order of integration.

Suggested Readings:

- Econometric Methods by J. Johnston, J. DiNardo. McGraw Hill Publication Co. Ltd
- Introduction to Time Series and Forecasting by P. J. Brockwell, R. A. Davis, Springer.
- The Econometric Analysis of Time Series by Andrew C. Harvey. Philip Allan.
- Applied Econometric Time Series by Enders W. John Wiley & Sons.
- Time Series Model by Andrew C. Harvey. Harvester wheatsheaf.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Stochastic process and its main characteristics	https://youtu.be/-9bRRXsCx-U
Unit-II	Moving average models	https://youtu.be/WxZ0i340CGM
Unit-III	ARMA Model	https://youtu.be/GBj_eaBdw-w
Unit-IV	Non-stationary mean	https://youtu.be/VvjO0Tn2VxU

Course Code	**DEC-BA-MBA-290A**				
Category	Discipline Elective Course-BA				
Course Title	**Market Microstructure**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To develop an understanding of the concept of economic organization and analyze organizational objectives, efficiency, and transaction cost economics 2. To examine the role of prices, markets, and managerial coordination as mechanisms for motivation and efficient resource allocation. 3. To analyze organizational behavior under conditions of bounded rationality, private information, and market failure 4. To study incentive systems, contracts, and control mechanisms, with special emphasis on moral hazard and performance-based incentives. 5. To understand employment policies, internal labor markets, job design, performance evaluation, and compensation strategies in organizations.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** the concepts of economic organization, efficiency, transaction costs, price coordination, bounded rationality, incentives, and employment relationships in markets and organizations.	Level-2:Understand
CO2	**Apply** price mechanisms, decentralization principles, and transaction cost analysis to explain coordination, motivation, and organizational choices in market and firm settings.	Level-3:Apply
CO3	**Apply** contract and incentive frameworks to address moral hazard, design performance incentives, evaluate employment policies, and structure compensation systems.	Level-3:Apply
CO4	**Analyze** organizational structures, internal labour markets, and incentive systems using information economics to assess efficiency, coordination, and motivation outcomes.	Level-4:Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

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Unit No.	Contents
Unit-I	Economic Organization and Efficiency: Concept and rationale of organization, Organization and Efficiency, The problem of Economic Organization, Organizational Objectives, and Transaction cost analysis.
Unit-II	Use of Price for coordination and Motivation, Neoclassical Model and theories of Organization, Market failure and Organization; Coordination: Market and Management, Price and coordination, management, Decentralization and the means of coordination
Unit-III	Bounded Rationality and Private Information, Motivation: Contracts, Information, and Incentives, Moral Hazard and Performance Incentives, Moral hazard in Organization, Controlling Moral Hazard.
Unit-IV	Employment Policy and Human Resource Management, Internal Labour Market, Critique of Classical Theories of Employment, Job Assignments and Promotions, Compensation and Motivation: Implicit Incentive Pay, Performance Evaluation, Job Design, Incentive Pay for Groups

Suggested Readings:

- Paul Milgrom and John Roberts, Economics, Organization and Management, Prentice Hall.
- Luis M.B. Cabral, Industrial Organization, Jaico Publishing House.
- Sengupta,D.N. and Anadiya Sen, Economics of Business Policy, Oxford University Press.
- Luis M.B. Cabral, Introduction to Industrial Organization, Cambridge Mass: The MIT Press.
- Carlton, D. W. and J.M. Perloff, Modern Industrial Organization, Warper Collins.
- Caves, R.E., Multinational Enterprise and Economic Analysis, Cambridge University Press.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Organizational Objectives	https://digimat.in/nptel/courses/video/110102016/L12.html
Unit-II	Coordination	https://youtu.be/RYnUDLey-g4
Unit-III	Motivation	https://youtu.be/uSjOrNF17aU
Unit-IV	Employment Policy and Human Resource Management	https://youtu.be/bhPGFtikJX0

Course Code	DEC-PP-MBA-292A				
Category	Discipline Elective Course-PP				
CourseTitle	**Public Finance Administration**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are: 1. To develop an understanding of the concepts, scope, and importance of public finance in economic management and policy formulation 2. To explain the mechanisms of revenue generation, public expenditure, public debt, and fiscal policy within a developing economy. 3. To apply fiscal principles to analyze and evaluate government financial operations and their impact on business and society. 4. To promote analytical and managerial insights into fiscal responsibility, budgetary management, and intergovernmental financial relations.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

CourseOutcomes: Aftersuccessfulcompletionofthiscourse,thestudentswillbeableto

COs	Skills Demonstrated	RBT Level
CO1	**Explain** the scope, functions, and significance of public finance and its role in promoting economic stability and development.	Level 2: Understand
CO2	**Apply** the concepts and principles of taxation, expenditure, and fiscal policy to assess their impact on economic performance and governance..	Level 3:Apply
CO3	**Apply** fiscal management techniques to analyze government budgets, public debt, and revenue systems for effective decision-making.	Level 3:Apply
CO4	**Analyze** the structure of public finance, intergovernmental fiscal relations, and policy frameworks to evaluate their effectiveness in resource allocation and economic growth.	Level 4: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set bytaking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Public Finance:** Nature, Definition, Scope of Public Finance, Role of Public Finance in Economic Development and Principles of Maximum Social Advantage; Impact, shifting, incidence and effects of taxation. Public finance vs. private finance – managerial implications Fiscal transparency and accountability in governance Standing Committee for scrutiny of demands for grants.

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Unit-II	**Sources of Revenue:** taxes, loans, grants and aid - meaning and types, canons of taxation, problem of justice in taxes, incidence of taxation, taxable capacity, Impact of taxation and tax evasion characteristics of Indian tax system, defects and steps of reform; Public Expenditure: Meaning, Classification and Cannons of Public Expenditure, Effects of Public expenditure on- Production, Distribution and Economic Growth
Unit-III	**Public Debt:** Meaning, Need, Sources and repayment, Effects of Public debt on - Money Supply, Economic Growth and Economic Stability; Federal Finance: Financial Issues in a Federal set up, Finance Commission, Principles of efficient division of financial resources between Central and States, Problems of financial imbalances and measures for adjustments.
Unit-IV	**Fiscal Policy:** Meaning, Objectives of Fiscal Policy, role of fiscal policy in controlling inflation and stagnation, Fiscal Responsibility and Budget Management Act; Budgets: Meaning, Classification of Budgets, Fiscal Deficit, Deficit financing and deficit budget

Suggested Readings:

- Public Finance by H.L. Bhatia, Vikas Publishing House
- Public Finance in Theory and Practice by R.A. Musgrave and P.B. Musgrave, McGraw-Hill
- Public Finance and Public Policy by J. Gruber, Macmillan Learning
- Principles of Public Finance by Hugh Dalton, Allied Publishers
- Public Finance in Theory and Practice by S.K. Singh, S. Chand Publishing
- Financial Federalism in India by M. Govinda Rao and Tapas Sen, Macmillan, Delhi
- Public Finance in Theory and Practice by Hollwy Ulbrich, Thomson–South Western
- Managing Government Expenditure by Salvatore Schiavo-Campo and Danial Tomasi, Asian Development Bank
- Fiscal Policy in India: Trends and Issues by M. Govinda Rao (Ed.), Oxford University Press
- The Constitution of India, Central Government Budget, Economic Survey, Reports of the Finance Commission and Expenditure Reforms Commission, Government of India

Useful Video Links:

Unit No	Topics	Links
Unit-I	A Brief Introduction to Public Finance: Definition, Role, Objectives	https://www.youtube.com/watch?v=ZF8Hujxt2Hk
Unit-II	Classification of Public Expenditure	https://www.youtube.com/watch?v=gvFbbSh8Iq0
Unit-III	Aspects of Public Expenditure	https://www.youtube.com/watch?v=NnEnlJ_9nHw&list=PLP0yMcMjdG7Wdd6sYeKWs2_7pubZPMBYw&index=5
Unit-IV	Fiscal Policy	https://www.youtube.com/watch?v=ow3L6TUq6sg&list=PLP0yMcMjdG7Wdd6sYeKWs2_7pubZPMBYw&index=3

Course Code	DEC-PP-MBA-294A				
Category	Discipline Elective Course-PP				
Course Title	**Risk and Disaster Management**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To familiarize students with the institutional framework and legal mechanisms for disaster management in India. 2. To develop awareness about community-based disaster management and the importance of local participation in disaster preparedness and response. 3. To equip students with knowledge and skills for disaster risk assessment, prevention, mitigation, and rehabilitation. 4. To enhance managerial competencies in planning, coordination, and decision-making during disaster situations.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** the fundamental concepts, processes, and frameworks of disaster management and their impact on society, economy, and communities.	Level 2: Understand
CO2	**Apply** disaster management principles to assess risks, design strategies, and propose solutions for effective preparedness, mitigation, and response.	Level 3:Apply
CO3	**Analyze** the roles of institutions, communities, and organizations in disaster management to evaluate their effectiveness and identify areas for improvement.	Level 4: Analyze
CO4	**Demonstrate** the ability to plan, coordinate, and make informed decisions for sustainable disaster management and risk reduction in real-world contexts.	Level 3:Apply

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Disaster Contexts:** Meaning, Characteristics and Types of Disasters - Indian Society and its Vulnerability to Disasters- Hazards and Vulnerability factors - Risk assessment: Seismic Zones, Richter Scale and other measures- Impact of disasters on socio-economic development: Social, Economic, Political and Psychological -Food, Water, Shelter, Hygiene, Health, Education, Agriculture, Cattle wealth, Employment, Financial distress, Electricity, Infrastructure facilities, Transportation, Industry, Environment, Disorganising in the family, Governmental process, system and services - Impact of Disasters on population: Gender, Children, Aged, Poor, Differently abled, Shelter less, Coastal population, Tribal population.

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Unit-II	**Disaster Management** - Process and Institutions: Evolution of Disaster Management in India – Disaster Management Act, 2005 - Organization for Disaster Management at various levels - National Disaster Management Authority at National, State, District and Local Level - Role of National Institute of Disaster Management, State level institutions - Process: Disaster Preparedness, Prevention, Mitigation, and Rehabilitation - Capacity Building of the stakeholders- Institutional and Legal Mechanisms - Advocacy and Public awareness - Preparation of Prevention and Mitigation Strategies, Role of Media in Disaster Management.
Unit-III	**Community-based Disaster Management:** Community Based Disaster Management: Scope and Significance - Disaster Management Planning at Village Level - Mapping of the Area and Resources - Preparatory Exercises at the local level - Capacity building sessions: Mock Drills; Emergency Response and recovery; First Aid - Emergency Reconstruction; Temporary Relief and Rehabilitation.
Unit-IV	**Disaster Preparedness and Risk Reduction:** Disaster Preparedness and Risk Reduction: Scope and Significance- Corporate Social Responsibility in Disaster Risk Reduction Analysis of functions by the Local Governments - Empowering Local Governments in Disaster Preparedness and Risk Reduction- Community Based Approach - Disaster Preparedness Measures: Constitution of Core team/ Task force- Village Disaster Management Plan - Capacity building of elected members, officials and community- Use of GIS data for disaster-specific information.

Suggested Readings:

- Disaster Administration – Theory and Practice by S. L. Goel, Deep and Deep, New Delhi, 2009
- Management of Natural Disasters by S. L. Goel, Deep and Deep, New Delhi, 2010
- Disaster Management – Approaches and Strategies edited by Tej Singh, Akansha Publishing House, New Delhi, 2006
- Disasters in India – Studies of Grim Reality edited by Anu Kaur et al., Rawat Publications, Jaipur, 2005
- Disaster Management and Panchayati Raj Institutions, PRIA, New Delhi, 2007
- Community-Based Disaster Risk Management for Local Authorities by Shesh Kanta Kafle & Zubair Murshed, Asian Disaster Preparedness Center, Bangkok, Thailand, 2006
- Best Practices in Panchayats on Livelihoods and Natural Resource Management, Government of India, Ministry of Panchayati Raj, New Delhi, 2015

Useful Video Links:

Unit No	Topics	Links
Unit-I	Introduction-Natural Hazards	https://youtu.be/v-NGndAd0T4?si=Lav84ivBBgsHENV1 https://youtu.be/TB97oX7ANGo?si=q6Ewf5ugoDFBtkE7
Unit-II	Disaster Management Act- 2005	https://youtu.be/quowKmVIJJ0?si=acmYPj1-AxYhnD4P
Unit-III	Community Based Disaster Management	https://www.youtube.com/live/UnjEqk8TtIY?si=S0DJPfAC4Jyl8SCR
Unit-IV	Culture, Climate Change Adaptation And Disaster Risk Reduction	https://youtu.be/IpSbQRl99Oo?si=kD0x8-Bfl1EAJ8DV

Course Code	**DEC-PP-MBA-296A**				
Category	Discipline Elective Course-PP				
Course Title	**Developmental Economics**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To develop an understanding of the key concepts and factors influencing economic growth and development. 2. To examine measurement methods for development, including income-based, capability-based, and human development indices. 3. To analyze poverty, inequality, and policy interventions to promote inclusive development. 4. To explore major theories and models of economic growth, development, and structural change. 5. To understand environmental sustainability and its role in long-term economic development				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** the fundamental principles and concepts of economic development and growth.	Level 2: Understand
CO2	**Apply** analytical and evaluation techniques to assess economic performance and development outcomes.	Level 3:Apply
CO3	**Apply** economic reasoning to formulate strategies for inclusive and sustainable development.	Level 3:Apply
CO4	**Analyze** development policies, frameworks, and interventions to evaluate their effectiveness and implications.	Level 4: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Economic Development:** Meaning of economic growth and development, Factors determining economic growth and development; Measuring Development: Income Measures, Basic Needs Approach, PQLI and HDI and Capabilities Approach; Importance of agriculture and industry in economic development.

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Unit-II	**Poverty and Inequality:** Measurement, Impact and Policy options, relationship between poverty/inequality and economic development; Development Gap: concepts and measurement; land reform and its effects on productivity and development. Microfinance and financial inclusion.
Unit-III	**Theories of Development:** classical theory of development, Karl Marx's theory of development - theory of social change, capitalist development; Growth Models: Harrod and Domar Model, Neo Classical Growth Models, Endogenous Growth Model, Lewis Model; Amartya Sen vs Bhagwati debate on growth, Poverty and Distribution, Mahalanobis Model.
Unit-IV	**Environment and Sustainable Development:** Defining sustainability for renewable resources; a brief history of environmental change; common-pool resources; environmental externalities and state regulation of the environment; economic activity and climate change

Suggested Readings:

- Economic Development by Michael P. Todaro and Stephen C. Smith, Pearson Education
- Development Economics: A Critical Perspective by A. Mukherjee and S. Chakrabarti, PHI India.
- Development Economics by Debraj Ray, Oxford University Press
- Development Economics by H.L. Ahuja, S. Chand Publication
- Alternative Approaches to the Theory of Economic Growth by S. Chakravarti, Oxford University Press, Delhi
- A Textbook of Economic Theory by Alfred W. Stonier and Douglas C. Hague, Pearson Education
- Handbook of Development Economics by S. Behrman and T.N. Srinivasan, Elsevier

Useful Video Links:

Unit No	Topics	Links
Unit-I	Concepts of Economic Growth and Development	https://www.youtube.com/watch?v=9Vy0In2fnE4&list=PLwdnzlV3ogoXxAT0AGHAQ3iMswK39C6gS&index=2
Unit-II	Growth and Inequality	https://www.youtube.com/watch?v=MsoHq91R3is&list=PLwdnzlV3ogoXxAT0AGHAQ3iMswK39C6gS&index=13
Unit-III	Strategies of economic development and growth	https://youtu.be/s842kckI6Ak?si=wnPX9nfujJJS81Xn
Unit-IV	Operational Principle of Sustainable Development	https://youtu.be/zPxZTTSqmzo?si=6Im8CUdf_8AXVmXW

Course Code	DEC-PP-MBA-298A				
Category	Discipline Elective Course-PP				
Course Title	Right To Information Act				
Scheme and Credits	L	T	P	Credits	Semester-IV
	3	1	0	4	
Course Objectives	The objectives of this course are 1. To develop understanding about the Right to Information Act 2005. 2. To understand the functioning of various authorities under the Act. 3. To defend their rights by meaningful use of RTI Act. 4. To know about the obligations of public authorities.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** the evolution, objectives, and constitutional basis of the Right to Information Act, 2005.	Level-2:Understand
CO2	**Apply** RTI procedures to obtain information and address non-compliance by public authorities.	Level-3:Apply
CO3	**Apply** the powers and procedures of Central and State Information Commissions in appeals and penalty.	Level-3:Apply
CO4	**Analyze** the role of RTI in transparency, e-governance, privacy, and governance through case studies.	Level-4:Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	Introduction of Right to Information Act 2005: History, Background, Objectives, Preamble of Right to Information Act 2005, Obligation of Public Authorities (Section 3 to 11), Right to Information as Constitutional rights: Protection of Article 19(1) (a), Right to privacy, Contempt of Court, Public Interest vis-à-vis Information; Right to Information Regime in India: a Tool in the hands of the Citizens.
Unit-II	The Central Information Commission: Constitutions, Eligibility criteria and Process of Appointment, Term of office and Condition of Service, Removal of Informational Commissioner; The State Information Commission: Constitutions, Eligibility criteria and Process of Appointment, Term of office and Condition of Service, Removal of Informational Commissioner.

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Unit-III	Power and Function: Information Commission, Appeal and Penalties under Right to Information Act 2005; Breach of Confidentiality and Privacy: The Indian perspective an „offence" under the Indian Information Technologies Act 2000; Using the RTI Act to get "Information"- The Filing of the Request for obtaining Information.
Unit-IV	Public Authority vis-à-vis Right to Information Act 2005: Origin, History, Public Authority, right to Information, Breach of Duty to disclose by Public Authority; Right to Information and E-Governance: Electronic Information Dissemination, need for regulation, Jurisdiction in Cyberspace: Problem and perspective; Success Stories and Case Studies.

Suggested Readings:

- The Right to Information Act Book, By Shruti Desai.
- Handbook on The Right to Information Act By P.K. Das
- Treaties on The Right to Information Act 2005 By Dr. Hiraj Kumar (2007)
- The Right to Information :Law-Policy-Practice By Rodney D Ryder
- The Right to Information Act,2005 By Dheera Khanawal and Krishna K. Khanawal

Useful Video Links:

Unit No	Topics	Links
Unit-I	History, Background & Evolution of RTI	https://youtu.be/F5xmpZ3DiYI?si=WxTIYrNvGb3PIjxD
Unit-II	Salient Features, Objectives & Preamble of RTI Act	https://youtu.be/tQ16_g17JiQ?si=KYy5jzaXpfzy7Nu0
Unit-III	Central Information Commission| State Information Commission |Appeals& Penalties| RTI Act 2005 & 2019	https://youtu.be/kFdUoKzpY-I?si=Py1X3h1H9IjJMc5n
Unit-IV	E-Governance	https://youtu.be/LFOm5Zc8GFk?si=l2T7NbPIqXshqDMs

Course Code	DEC-PP-MBA-300A				
Category	Discipline Elective Course-PP				
Course Title	**Legal Institutional Dynamics**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To familiarize students with the fundamental principles, features, and structure of the Indian Constitution. 2. To develop an understanding of the organization and functioning of the Union, State, and Local Governments in India. 3. To explain the rights, duties, and directive principles that form the foundation of the Indian democratic system. 4. To enable students to analyze the relationship between constitutional provisions and public administration, governance, and business ethics.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** the fundamental principles and structure of the Indian Constitution and its relevance to governance.	Level 2: Understand
CO2	**Apply** constitutional provisions to analyze real-world issues in governance and public administration.	Level 3:Apply
CO3	**Examine** the roles and responsibilities of various constitutional bodies in ensuring effective administration and democratic functioning.	Level 3:Apply
CO4	**Analyze** the significance of constitutional values in shaping ethical governance and responsible citizenship.	Level 4: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Features of Indian Constitution:** Salient Features and sources of Indian Constitution - The Preamble and its significance - Citizenship - Fundamental Rights and its limitations - Fundamental Duties and its implications - Directive Principles of State Policy and Welfare State.
Unit-II	**Union Government:** Parliament: The President; Vice President - Lok Sabha and the Speaker - Rajya Sabha and the Chairman - The Prime Minister, Cabinet and the Council of Ministers - Elections, Powers and Functions - Emergency Provisions.

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Unit-III	**State and Local Government:** Governor - Chief Minister and Council of Ministers - Legislative Assembly and Speaker; Legislative Council and Chairperson - Elections, Powers and Functions - Panchayati Raj Institutions (PRI) - 73rd Amendment Act – 11th Schedule - PESA Act - Urban Local Government Institutions (ULGI) - 74th Amendment Act - 12th Schedule.
Unit-IV	**The Judiciary:** Supreme Court, High Courts: Powers, Functions and Jurisdictions - Judicial Review - Judicial Activism - Public Interest Litigation (PIL) - Types of Writs

Suggested Readings:

- Employee Training and Development by Noe, A Raymond, and Kodwani, D Amitabh, McGraw Hill Education
- Effective Training - Systems, Strategies, and Practices by Blanchard, P Nick, and James W. Thacker, Pearson Education.
- Every Trainer's Handbook by Agochia, Devendra, New Delhi; Sage Publications
- Training for Development by R.K. Sahu, Excel Books, New Delhi.
- Training in Organization by Goldstein, Thomson Learning, Bombay.
- Training for Life and Leadership in Industry by McGrath, Prentice Hall of India, New Delhi.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Salient Features of the Constitution of India	https://youtu.be/cltb8idq7Y4?si=tJDYyEfr1ztZ9qnZ
Unit-II	Election Commission & Election Process | Constitutional Law & Public Administration in India	https://youtu.be/a0_FuX41GzU?si=eSauaxK264Cr_6pa
Unit-III	Local Self Governance | Constitutional Law & Public Administration in India	https://youtu.be/cPvgLneA2sY?si=eOLcT2GEXJEmcU7Y
Unit-IV	Introduction to the Indian Judiciary | Constitutional Law & Public Administration in India	https://youtu.be/vvp2TAPtk08?si=BL_F8RHd7-T0hIbg

Course Code	SEC-MBA-206A				
Category	Skill Enhancement Course				
Course Title	**Data Analysis using Excel**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	0	0	**3**	
Course Objectives	The objectives of this course are 1. To understand Excel interface, workbook structure, data types, and basic data management tools. 2. To apply logical, lookup, text, date/time, and statistical functions for data analysis. 3. To use Pivot Tables, What-If analysis, forecasting, and regression tools for decision-making. 4. To create clear charts, dashboards, and dynamic reports using Excel best practices.				
Assessment	25 Marks				
End Semester Examination	50 Marks				
Total	75 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Describe** the core components of the Excel interface, workbook structure, data types, cell referencing, and essential data management techniques.	Level 2: Understand
CO2	**Apply** logical, lookup, text, date/time, and statistical functions to organize, analyze, and interpret data effectively.	Level3: Apply
CO3	**Use** PivotTables, Pivot Charts, What-If analysis tools, forecasting methods, and regression techniques to support data-driven decision-making.	Level3: Apply
CO4	**Analyze** interactive charts, dashboards, and dynamic reporting elements to evaluate and improve the effectiveness of Excel-based data presentations.	Level4: Analyze

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	Introduction to Excel interface and workbook structure; Data types and cell referencing; Sorting, filtering, and conditional formatting; Data validation, removing duplicates, and flash fill; Named ranges, data import/export
Unit-II	Logical functions (IF, AND, OR, NOT); Lookup functions (VLOOKUP, HLOOKUP, XLOOKUP, INDEX, MATCH); Text functions, Date & Time functions; Statistical functions (AVERAGE, MEDIAN, STDEV, VAR, CORREL)

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Unit-III	Pivot Tables and Pivot Charts; Data tables and What-If analysis; Goal Seek, Scenario Manager, Solver; Trendlines and forecasting; Regression analysis using Excel's Data Analysis ToolPak
Unit-IV	Charts: Column, Line, Pie, Bar, Area, Combo; Sparklines and heat maps; Dashboards with interactive components (Slicers, Timelines); Dynamic reports using form controls; Best practices in Excel-based reporting

Suggested Readings:

- Microsoft Excel Data Analysis and Business Modelingby W. L. Winston, Microsoft Press.
- Excel 2021 Bible by John Walkenbach, Wiley.
- Basics of Excel Data Analysis by L. Uman, Sage.
- Statistics Using Excel by J. E. Freund, Pearson.
- Excel for Managers by Harvard Business Review, Harvard Business Review Press.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Basics of Excel	https://www.youtube.com/watch?v=uisSkBQGlUM
Unit-II	Use of EXCEL for regression analysis	https://archive.nptel.ac.in/content/storage2/courses/112106139/pdf/1_6.pdf
Unit-III	Pivot Tables and Pivot Charts	http://kcl.digimat.in/nptel/courses/video/110105089/lec10.pdf
Unit-IV	Excel Charts - Pie, Column, Bar & Line Chart	https://www.youtube.com/watch?v=dckWSXb5MXk

Course Code	LC-MBA-208A				
Category	Skill Enhancement Course				
Course Title	**Data Analysis using Excel Lab**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	0	0	2	**1**	
Course Objectives	The objectives of this course are 1. To develop basic spreadsheet skills for data entry, manipulation, and essential functions. 2. To Organize and manage data using multiple worksheets, protection tools, and advanced functions like nested IF, VLOOKUP, HLOOKUP, and text functions. 3. To analyze and summarize data using filtering, PivotTables, and Pivot Charts for informed decision-making. 4. To Create and format advanced charts, including line, bar, pie, histogram, and scatter plots for effective visualization.				
Assessment	10 Marks				
Practical/ Viva Voce	15 Marks				
Total	25 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** basic spreadsheet operations, functions, and formulas.	Level-2 Understand
CO2	**Apply** advanced spreadsheet functions to organize and analyze data across multiple sheets.	Level-3 Apply
CO3	**Apply** filtering tools and construct PivotTables for detailed data analysis.	Level-3 Apply
CO4	**Analyze** datasets by creating and customizing various charts for effective visual representation.	Level-4 Analyze
CO5	**Evaluate** business scenarios using Excel analytical tools such as What-If analysis, Goal Seek, Solver, and statistical techniques to support managerial decisions.	Level-4 Evaluate
CO6	**Design** and create dynamic Excel-based dashboards and reports integrating functions, PivotTables, and visualizations for executive-level reporting.	Level-4 Create

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts of 1.5 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.
2. At least four cases will be discussed, one from each unit.

S. No.	Description	COs
1	Apply data validation rules and remove duplicates from datasets.	CO-2
2	Apply filters and conditional formatting to identify high-performing products or employees	CO-3
3	Apply VLOOKUP and HLOOKUP to fetch sales and pricing data from excel sheet.	CO-1, CO-3
4	Apply XLOOKUP to fetch payroll data from excel sheet.	CO-1, CO-3

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5	Use AVERAGE and MEDIAN along with filters to analyze trends and variability.	CO-3
6	Create Pivot Tables from large datasets	CO-3, CO-6
7	Convert PivotTables into Pivot Charts and customize for trend comparison.	CO-3, CO-6
8	To study regression analysis using Data Analysis Tool Pak.	CO-5
9	Create Column, Line, Pie, Bar, and Area charts from a business dataset	CO-4, CO-6
10	Apply PivotTables with Slicers and Timelines for interactive analysis.	CO-3

Suggested Readings:

- Data Analysis Using Microsoft Excel by Ash Narayan Sah – Excel.
- Microsoft Excel Data Analysis and Business Modeling by W. L. Winston, Microsoft Press.
- Excel 2021 Bible by John Walk enbach, Wiley.
- Basics of Excel Data Analysis by L. Uman, Sage.
- Statistics Using Excel by J. E. Freund, Pearson.
- Excel for Managers by Harvard Business Review, Harvard Business Review Press.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Basics of Excel	https://www.youtube.com/watch?v=uisSkBOGIUM
Unit-II	LOOKUP Functions in Excel VLOOKUP, HLOOKUP, INDEX MATCH, XLOOKUP Tutorial	https://youtu.be/ndvZAnvja7k
Unit-III	Creating Pivot Tables	https://youtu.be/PdJzy956wo4
Unit-IV	Excel Charts - Pie, Column, Bar & Line Chart	https://www.youtube.com/watch?v=dckWSXb5MXk

Course Code	**INT-MBA-210A**				
Category	Internship				
Course Title	**Internship Report**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
				4	
Course Objectives	The objectives of this course are 1. Build ability to design, conduct, and evaluate research addressing academic or practical problems effectively. 2. Improve capacity to write clear, well-structured, and coherent academic reports aligned with thesis standards. 3. Promote critical analysis to evaluate sources, interpret data, and construct sound, evidence-based arguments. 4. Ensure correct application of citation styles to maintain academic integrity and prevent any form of plagiarism. 5. Develop skills to present, articulate, and defend thesis work clearly using effective verbal communication strategies.				
Assessment	50 Marks				
Viva-Voce	50 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	**Skills Demonstrated**	**RBT Level**
CO1	**Recall** key concepts of research methodology, academic writing formats, and ethical standards in thesis preparation.	Level 1: Remember
CO2	**Explain** the structure and components of a formal thesis and the purpose of each section clearly.	Level 2: Understand
CO3	**Apply** appropriate research methods, writing techniques, and citation styles in the development of a thesis report.	Level 3: Apply
CO4	**Analyze** research data, literature sources, and arguments to identify gaps, trends, and relationships relevant to the thesis topic.	Level 4: Analyze
CO5	**Assess** the quality, coherence, and originality of research findings and written content.	Level 5: Evaluate
CO6	**Design** a complete, well-structured, and academically sound thesis report, Culminating in a successful oral defense.	Level 6: Create

Note:

All candidates who have opted for Option 3 are required to submit a detailed project report/synopsis comprising a minimum of 50 pages by the end of the third semester. The report must include a comprehensive literature review, clearly defined research problem, proposed plan of work, detailed methodology, and any practical work or case studies conducted. The document should reflect originality, critical thinking, and adherence to academic standards. Proper formatting, structured writing, and accurate referencing (APA/MLA/Chicago style) are essential. Plagiarism must be strictly avoided, and the report will be subject to similarity checks prior to acceptance.

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The submitted report will undergo evaluation by a Board of Examiners comprising one internal faculty member (appointed by the Director) and two external experts from academia and industry, selected from a Panel approved by the Board of Studies (BOS) of the Department of Management. A viva voce will be conducted to assess the candidate's understanding, analytical skills, and ability to defend the research. Candidates are advised to maintain regular contact with their supervisors (if assigned), follow submission deadlines strictly, and

Course Code	PR-MBA-212A				
Category	Project Work				
Course Title	**Project Work**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
				4	
Course Objectives	The objectives of this course are 1. Apply MBA concepts to real-world business problems through practical project work. 2. Develop strategic thinking and analytical decision-making skills. 3. Strengthen managerial abilities in planning and execution. 4. Enhance professional communication and report-writing skills.				
Assessment	50 Marks				
Viva-Voce	50 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Explain** business theories and frameworks in the context of real-world project scenarios.	Level 2: Understand
CO2	**Apply** appropriate business tools, models, and techniques to analyze and solve organizational problems in the project.	Level 3: Apply
CO3	**Analyze** business data and processes to examine key issues, uncover trends, and diagnose performance gaps in the chosen project area.	Level 4: Analyze
CO4	**Evaluate** alternative strategies or solutions using data-driven insights and managerial judgment.	Level 5: Evaluate
CO5	**Develop** and present innovative recommendations or business models based on project findings and industry best practices.	Level 6: Create

Note: The evaluation will be based on two parts: 50 marks for the Viva-voce of the report and 50 marks for the Project report writing.

Guidelines:

1. Topic Selection and Approval

- Students must select a relevant and feasible research topic aligned with their area of specialization.
- The proposed topic must be finalized in consultation with the assigned Research Supervisor.
- A brief synopsis (1–2 pages) outlining the objectives, rationale, and proposed methodology must be submitted for approval within the **first month** of the third semester.

2. Role of the Research Supervisor

- Each student will be allotted a faculty member as Research Supervisor by the Head of the Department (HOD).
- The Supervisor will provide guidance on topic finalization, research design, data analysis, and report writing.
- Regular meetings with the Supervisor are mandatory to ensure timely progress.

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3. Submission and Evaluation

- The final project report must be submitted by the deadline specified by the department.
- Evaluation will be based on quality of research, originality, application of concepts, clarity of presentation, and adherence to academic standards.
- Students may be required to give a viva-voce or presentation before a panel of faculty members.

4. Academic Integrity

- The project must be the student's original work. Plagiarism will lead to rejection or disciplinary action.
- All sources must be properly cited using a recognized citation style (e.g., APA, MLA).

Course Code	RT-MBA-212A				
Category	Project Report				
Course Title	**Report Thesis-II**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
				20	
Course Objectives	The objectives of this course are 1. Build ability to design, conduct, and evaluate research addressing academic or practical problems effectively. 2. Improve capacity to write clear, well-structured, and coherent academic reports aligned with thesis standards. 3. Promote critical analysis to evaluate sources, interpret data, and construct sound, evidence-based arguments. 4. Ensure correct application of citation styles to maintain academic integrity and prevent any form of plagiarism. 5. Develop skills to present, articulate, and defend thesis work clearly using effective verbal communication strategies.				
Assessment	200 Marks				
End Semester Examination	200 Marks				
Viva-Voce	100 Marks				
Total	500 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Recall** key concepts of research methodology, academic writing formats, and ethical standards in thesis preparation.	Level 1: Remember
CO2	**Explain** the structure and components of a formal thesis and the purpose of each section clearly.	Level 2: Understand
CO3	**Apply** appropriate research methods, writing techniques, and citation styles in the development of a thesis report.	Level 3: Apply
CO4	**Analyze** research data, literature sources, and arguments to identify gaps, trends, and relationships relevant to the thesis topic.	Level 4: Analyze
CO5	**Assess** the quality, coherence, and originality of research findings and written content.	Level 5: Evaluate
CO6	**Design** a complete, well-structured, and academically sound thesis report, culminating in a successful oral defense.	Level 6: Create

Note:

All candidates who have opted for Option 3 are required to submit a detailed project report/synopsis comprising a minimum of 50 pages during the fourth semester. The report must include a comprehensive literature review, clearly defined research problem, proposed plan of work, detailed methodology, and any practical work or case studies conducted. The document should reflect originality, critical thinking, and adherence to academic standards. Proper formatting, structured writing, and accurate referencing (APA/MLA/Chicago style) are essential. Plagiarism must be strictly avoided, and the report will be subject to similarity checks prior to acceptance.

The submitted report will undergo evaluation by a Board of Examiners comprising one internal faculty member (appointed by the Director) and two experts from academia and industry, selected from a

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panel approved by the Board of Studies (BOS) of the Department of Management. A viva voce will be conducted to assess the candidate's understanding, analytical skills, and ability to defend the research. Candidates are advised to maintain regular contact with their supervisors.

Annexure 4.10 c

~~Annexure 3.4~~

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA (JHAJJAR)

An Autonomous Institute

Approved by AICTE, New Delhi and Affiliated to MDU, Rohtak

NAAC 'A' GRADE

GITAM

SCHEME OF EXAMINATION AND SYLLABI

OF

3-4 YEAR

BACHELOR OF BUSINESS ADMINISTRATION PROGRAM

(BBA)

WITH EFFECT FROM THE SESSION 2025-26

HOD MGMT

Scheme of Studies and Examination

BBA – 4th Semester

w.e.f. 2025-26

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)				Exam Duration in H
				L	T	P			Assessment	End Semester Examination	Practical / Viva-Voce	Total	
1	Discipline Specific Course- Major Course	DSC-BBA-202A	Basics of International Business	3	1	0	4	4	30	70	-	100	3
2	Discipline Specific Course- Major Course	DSC-BBA-204A	Indian Financial System	3	1	0	4	4	30	70	-	100	3
3	Discipline Specific Course- Major Course	DSC-BBA-206A	Indian Business Environment	3	1	0	4	4	30	70	-	100	3
4	Discipline Specific Course- Major Course	DSC-BBA-208A	Legal and Ethical Issues in Business	3	1	0	4	4	30	70	-	100	3
5	Major Discipline Relevant Course (Vocational)- Minor	Refer Table No.-XIV	----------	3	0	0	3	3	25	50	-	75	3
		Refer Table No.-XIV	----------	0	0	2	2	1	10	-	15	25	3
6	Ability Enhancement Course	Refer Table No.-XII	----------	2	0	0	2	2	15	35	-	50	3
7	Value Added Course	Refer Table No.- XIII	----------	2	0	0	2	2	15	35	-	50	3
Total Credits								**24**				**600**	

Note:

1. At the end of the Fourth Semester every student shall undergo Summer Training/ Internship/ Capstone Project for Eight Weeks in the Industry/ Research or Academic Institute. This component will be evaluated during the fifth semester. The candidates will submit the SIR in the manner specified in the Ordinance.
2. **Exit Criteria after Second Year of BBA Program**
   The students shall have an option to exit after 2nd year of BBA and will be awarded with a UG Diploma in Business Administration. Students on exit have to compulsorily complete additional 04 Credits either in a Skill based subject or work based Vocational Course offered during summer term or Internship/ Apprenticeship/ Social Responsibility & Community Engagement- encompassing community engagement with an NGO/ Capstone Project after the fourth semester of minimum 8 weeks of duration as decided by the GITAM (securing 96 credits). The exiting students will clear the subject/ submit the Internship Report as per the Institute schedule.
3. Students may opt for one course @ **four credits** from the pool of Minor and Minor (Vocational) Courses designed at the central level by the Institute.

Total Credits (22+22+24+24=92+4) for UG Diploma (Business Administration)	**96**

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Semester-IV

Table No. XII (Ability Enhancement Courses)

S. No.	Category	Course Code	Course Name
1	Ability Enhancement Course	AEC-202A	Hindi-II
2		AEC-204A	Sanskrit-II

Table No. XIII (Value Added Courses)

S. No.	Category	Course Code	Course Name
1	Value Added Courses	VAC-202A	Wellbeing Through Yoga
2		VAC-204A	Communication Skills

Table No. XIV (Major Discipline Relevant Course (Vocational)- Minor Courses)

S. No.	Category	Course Code	Course Name
1	Major Discipline Relevant Course (Vocational) – Minor	MICV-208A	Managerial Skills
2		MICV-210A	Database Management System
3		LC-MICV-212A	Database Management System Lab

Re-entry Criteria into Third Year (Fifth Semester)

The student who takes an exit after the second year with an award of Diploma may be allowed to re-enter the fifth Semester for completion of the BBA Program, as per the Institute's schedule, after earning the requisite credits in the Second year.

Scheme of Studies and Examination

BBA – 5th Semester

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)				Exam Duration in H
				L	T	P			Assessment	End-of-Semester Examination	Practical / VivaVoce	Total	
1	Discipline Specific Course-Major Course	DSC-BBA-301A	Entrepreneurship and MSME	3	1	0	4	4	30	70	-	100	3
2	Discipline Specific Course-Major Course	DSC-BBA-303A	Principles of Marketing	3	1	0	4	4	30	70	-	100	3
3	Discipline Specific Course-Major Course	DSC-BBA-305A	Introduction to Human Resource Management	3	1	0	4	4	30	70	-	100	3
4	Discipline Specific Course-Major Course	DSC-BBA-307A	Business Taxation	3	1	0	4	4	30	70	-	100	3
5	Major Discipline Relevant Course (Vocational)- Minor	Refer Table No. XV	.....	3	0	0	3	3	25	50	-	75	3
		Refer Table No. XV	.....	0	0	2	2	1	10	-	15	25	3
6	Internship	INT-BBA-301A	Internship Report	-	-	-	-	4	-	-	100	100	3
Total Credits								**24**				**600**	

Note:

1. Four credits of internship earned by a student during summer internship after the 2nd semester or 4th semester will be counted in the 5th semester of a student who pursues a 3-year UG Program without taking exit option.
2. After completion of the internship, students need to prepare a comprehensive report highlighting their learning and takeaways during the internship period. The internship duration is 8 weeks during the summer vacation. The Internship Report prepared after completion shall be assessed in the 5th Semester as a compulsory course. The candidates will submit the internship report in the prescribed format designed by the department. The report will be evaluated by an examiner appointed by the Controller of Examination (or a committee constituted by the Director of the Institute) from the approved panel of examiners.
3. Students may opt for one course @ **four credits** from the pool of Minor and Minor (Vocational) Courses designed at the central level by the Institute.

Table No. XV Major Discipline Relevant (Vocational) -Minor Courses

S. No.	Category	Course Code	Course Name
1	Major Discipline Relevant Course (Vocational) - Minor	MICV-307A	Business Policy and Strategy
2		MICV-309A	Computer Networks and Internet
3		LC-MICV-311A	Computer Networks and Internet Lab

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Scheme of Studies and Examination

BBA – 6th Semester

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)				Exam Duration in H
				L	T	P			Assessment	End Semester Examination	Practical / Viva-Voce	Total	
1	Discipline Specific Course-Major Course	DSC-BBA-302A	Research Methodology	3	1	0	4	4	30	70	-	100	3
2	Discipline Specific Course-Major Course	DSC-BBA-304A	Event Management	3	1	0	4	4	30	70	-	100	3
3	Discipline Specific Course-Major Course	DSC-BBA-306A	Financial Management	3	1	0	4	4	30	70	-	100	3
4	Discipline Specific Course-Major Course	DSC-BBA-308A	Operations and Supply Chain Management	3	1	0	4	4	30	70	-	100	3
5	Research Project	RP-BBA-306A	Research Report	-	-	-	4	4			100	100	3
6	Major Discipline Relevant Course (Vocational)-Minor	Refer Table No. XVI	.....	3	0	0	3	3	25	50	-	75	3
		Refer Table No. XVI	.....	0	0	2	2	1	10	-	15	25	3
Total Credits								**24**				**600**	

Note:
1. Students exiting the programme shall be awarded a 3-year UG Degree in Business Administration upon securing 140 credits.
2. In case of the Project reports/ Dissertation/ Research Project, the assessment shall be carried out by the examiners appointed by the Controller of Examination from the approved panel of examiners. The examiners shall be invited from amongst the panel of examiners.
3. Students may opt for one course @ **four credits** from the pool of Minor and Minor (Vocational) Courses designed at the central level by the Institute.

Total Credits (22+22+24+24+24+24) for 3-Years UG Degree in Business Administration	**140**

Re-entry Criteria into Fourth Year (Seventh Semester)

- The student who takes an exit after third year with an award of BBA may be allowed to re-enter into the seventh semester for completion of the BBA (Honors) or BBA (Honors with Research) Program as per the Institute schedule after earning requisite credits in the Third year.
- Minimum eligibility criteria for opting the course in the fourth year will be as follows:
  - For BBA (Honors): Completion of 3-Year BBA Degree.
  - BBA (Honors with Research): Minimum 75% marks or equivalent CGPA in BBA Degree up to Sixth Semester.

Table No. XVI Major Discipline Relevant (Vocational) -Minor Courses

S. No.	Category	Course Code	Course Name
1	Major Discipline Relevant Course (Vocational) - Minor	MICV-308A	Entrepreneurship Development
2		MICV-310A	Web Development
3		LC-MICV-312A	Web Development Lab

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Scheme of Studies and Examination

BBA – 7th Semester (Common for Honors and Honors with Research)

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)				Exam Duration in H
				L	T	P			Assessment	End Semester Examination	Practical / Viva-Voce	Total	
1	Discipline Specific Course-Major Course	DSC-BBAH-401A	Management Process and Organizational Behaviour	3	1	0	4	4	30	70	-	100	3
2	Discipline Specific Course-Major Course	DSC-BBAH-403A	Finance for Managers	3	1	0	4	4	30	70	-	100	3
3	Discipline Specific Course-Major Course	DSC-BBAH-405A	Managerial Economics	3	1	0	4	4	30	70	-	100	3
4	Discipline Specific Course-Major Course	DSC-BBAH-407A	Business Environment	3	1	0	4	4	30	70	-	100	3
5	Discipline Specific Course-Major Course	DSC-BBAH-409A	Business Research Methods	3	1	0	4	4	30	70	-	100	3
6	Skill Enhancement Course	SEC-401A	Business Ethics and Communication Skills	3	0	0	3	3	25	50	-	75	3
		LC-SEC-403A	Business Ethics and Communication Skills Lab	0	0	2	2	1	10	-	15	25	3
7	Major Discipline Relevant Course (Vocational)-Minor	MICV-401A	IT for Managers-I	3	0	0	3	3	25	50	-	75	3
		LC-MICV-403A	IT for Managers-I Lab	0	0	2	2	1	10	-	15	25	3
8	Internship	INT-BBA-401A	Internship Report	-	-	-	-	4	-	-	100	100	3
Total Credits								**24**				**600**	

Note:

1. The students are required to choose either SEC or MICV or Internship. In the 7th and 8th Semester, students shall be offered three optional papers (Skill-Enhancement Course/ Vocational Course/ Internship) in each semester. Each student must choose one subject in each semester. The subject opted in the 8th semester shall be the continuation of the subject opted in the 7th semester.
2. Those students opting for an internship in the 7th semester follow the guidelines.

After completion of the internship, students need to prepare a comprehensive report highlighting their learning and takeaways during the internship period. The internship duration is 8 weeks during the summer vacation. The Internship Report prepared after completion shall be assessed in the 5th Semester as a compulsory course. The candidates will submit the internship report in the prescribed format designed by the department. The report will be evaluated by an examiner appointed by the Controller of Examination (or a committee constituted by the Director of the Institute)from the approved panel of examiners.

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Scheme of Studies and Examination

BBA (Honors) – 8th Semester

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)				Exam Duration in H
				L	T	P			Assessment	End Semester	Practical / Viva-	Total	
1	Discipline Specific Course-Major Course	DSC-BBAH-402A	Strategic Marketing	3	1	0	4	4	30	70	-	100	3
2	Discipline Specific Course-Major Course	DSC-BBAH-404A	Strategic Human Resource Management	3	1	0	4	4	30	70	-	100	3
3	Discipline Specific Course-Major Course	DSC-BBAH-406A	Management Information System	3	1	0	4	4	30	70	-	100	3
4	Discipline Specific Course-Major Course	DSC-BBAH-408A	Total Quality Management	3	1	0	4	4	30	70	-	100	3
5	Discipline Specific Course-Major Course	DSC-BBAH-410A	Emotional Intelligence	3	1	0	4	4	30	70	-	100	3
6	Skill Enhancement Course	SEC-402A	Personality and Soft Skills Development	3	0	0	3	3	25	50	-	75	3
		LC-SEC-404A	Personality and Soft Skills Development Lab	0	0	2	2	1	10	-	15	25	3
7	Major Discipline Relevant Course (Vocational)-Minor	MICV-402A	IT for Managers-2	3	0	0	3	3	25	50	-	75	3
		LC-MICV-404A	IT for Managers-2 Lab	0	0	2	2	1	10	-	15	25	3
8	Internship	INT-BBA-402A	Internship Report	-	-	-	-	4	-	-	100	100	3
Total Credits								**24**				**600**	

Note:

1. The students are required to choose either SEC or MICV or Internship. In the 7th and 8th Semester, students shall be offered three optional papers (Skill-Enhancement Course/ Vocational Course/ Internship) in each semester. Each student must choose one subject in each semester. The subject opted in the 8th semester shall be the continuation of the subject opted in the 7th semester.

2. Those students opting for an internship in the 7th semester follow the guidelines.
After completion of the internship, students need to prepare a comprehensive report highlighting their learning and takeaways during the internship period. The internship duration is 8 weeks during the summer vacation. The Internship Report prepared after completion shall be assessed in the 5th Semester as a compulsory course. The candidates will submit the internship report in the prescribed format designed by the department. The report will be evaluated by an examiner appointed by the Controller of Examination (or a committee constituted by the Director of the Institute) from the approved panel of examiners.

Total Credits (22+22+24+24+24+24+24+24) for Four-Year BBA Honors — **188**

Scheme of Studies and Examination

BBA (Honors with Research) – 8th Semester

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)				Exam Duration in H
				L	T	P			Assessment	EndSemester Examination	Practical / viva-Voce	Total	
1	Discipline Specific Course-Major Course	DSC-BBAHR-402A	Management Information System	3	1	0	4	4	30	70	-	100	3
2	Discipline Specific Course-Major Course	DSC-BBAHR-404A	Total Quality Management	3	1	0	4	4	30	70	-	100	3
3	Research Report/Dissertation	RP-BBAHR-406A	Research Report	-	-	-	12	12			300	300	3
4	Skill Enhancement Course	SEC-402A	Personality and Soft Skills Development	3	0	0	3	3	25	50	-	75	3
		LC-SEC-404A	Personality and Soft Skills Development Lab	0	0	2	2	1	10	-	15	25	3
5	Major Discipline Relevant Course (Vocational)-Minor	MICV-402A	IT for Managers-2	3	0	0	3	3	25	50	-	75	3
		LC-MICV-404A	IT for Managers-2 Lab	0	0	2	2	1	10	-	15	25	3
6	Internship	INT-BBA-402A	Internship Report	-	-	-	-	4	-	-	100	100	3
Total Credits								**24**				**600**	

Note:

1. The students are required to choose either SEC or MICV, or Internship. In the 7th and 8th semesters, students shall be offered three optional papers (Skill-Enhancement Course/ Vocational Course/ Internship) in each semester. Each student must choose one subject in each semester. The subject opted in the 8th semester shall be the continuation of the subject opted in the 7th semester.
2. Those students opting for an internship in the 7th semester follow the guidelines. After completing the internship, students are required to prepare a comprehensive report that highlights their learning and key takeaways from the internship period. The internship duration is 8 weeks during the summer vacation. The Internship Report prepared after completion shall be assessed in the 5th Semester as a compulsory course. The candidates will submit the internship report in the prescribed format designed by the department. The report will be evaluated by an examiner appointed by the Controller of Examinations (or a committee constituted by the Director of the Institute) from the approved panel of examiners.
3. The topic of the Research Project to be submitted for evaluation in the eighth Semester shall be submitted by the student along with a brief synopsis after finalization in the 7th Semester, in consultation with the faculty member allotted as Research Supervisor by the HOD.
4. Any student opting for a dissertation has to submit a report to the department prepared in consultation with his/ her Research Supervisor and appear before a Department Research Committee (DRC) constituted by the HOD.
5. In case of the Project reports/ Dissertation/ Research Project, the assessment shall be carried out by the examiners appointed by the Controller of Examination from the approved panel of examiners. The examiners shall be invited from amongst the panel of examiners.
6. Students undertaking the research project/dissertation may have their research findings patentable or presented at conferences or seminars, or published in peer-reviewed journals.

Total Credits (22+22+24+24+24+24+24+24) for Four-Year BBA Honors	**188**

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GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA (JHAJJAR)

An Autonomous Institute

Approved by AICTE, New Delhi and Affiliated to MDU, Rohtak

NAAC 'A' GRADE

GITAM

SCHEME OF EXAMINATION AND SYLLABI

of

4th Semester

BACHELOR OF BUSINESS ADMINISTRATION PROGRAM (BBA)

WITH EFFECT FROM THE SESSION 2025-26

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Scheme of Studies and Examination

BBA – 4th Semester

w.e.f. 2025-26

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)				Exam Duration in H
				L	T	P			Assessment	End Semester Examination	Practical / Viva-Voce	Total	
1	Discipline Specific Course- Major Course	DSC-BBA-202A	Basics of International Business	3	1	0	4	4	30	70	-	100	3
2	Discipline Specific Course- Major Course	DSC-BBA-204A	Indian Financial System	3	1	0	4	4	30	70	-	100	3
3	Discipline Specific Course- Major Course	DSC-BBA-206A	Indian Business Environment	3	1	0	4	4	30	70	-	100	3
4	Discipline Specific Course- Major Course	DSC-BBA-208A	Legal and Ethical Issues in Business	3	1	0	4	4	30	70	-	100	3
5	Major Discipline Relevant Course (Vocational)- Minor	Refer Table No.-XIV	----------	3	0	0	3	3	25	50	-	75	3
		Refer Table No.-XIV	----------	0	0	2	2	1	10	-	15	25	3
6	Ability Enhancement Course	Refer Table No.-XII	----------	2	0	0	2	2	15	35	-	50	3
7	Value Added Course	Refer Table No.- XIII	----------	2	0	0	2	2	15	35	-	50	3
Total Credits								**24**				**600**	

Note:

1. At the end of the Fourth Semester every student shall undergo Summer Training/ Internship/ Capstone Project for Eight Weeks in the Industry/ Research or Academic Institute. This component will be evaluated during the fifth semester. The candidates will submit the SIR in the manner specified in the Ordinance.
2. **Exit Criteria after Second Year of BBA Program**
   The students shall have an option to exit after 2nd year of BBA and will be awarded with a UG Diploma in Business Administration. Students on exit have to compulsorily complete additional 04 Credits either in a Skill based subject or work based Vocational Course offered during summer term or Internship/ Apprenticeship/ Social Responsibility & Community Engagement- encompassing community engagement with an NGO/ Capstone Project after the fourth semester of minimum 8 weeks of duration as decided by the GITAM (securing 96 credits). The exiting students will clear the subject/ submit the Internship Report as per the Institute schedule.
3. Students may opt for one course @ **four credits** from the pool of Minor and Minor (Vocational) Courses designed at the central level by the Institute.

Total Credits (22+22+24+24=92+4) for UG Diploma (Business Administration)	**96**

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Semester-IV

Table No. XII (Ability Enhancement Courses)

S. No.	Category	Course Code	Course Name
1	Ability Enhancement Course	AEC-202A	Hindi-II
2		AEC-204A	Sanskrit-II

Table No. XIII (Value Added Courses)

S. No.	Category	Course Code	Course Name
1	Value Added Courses	VAC-202A	Wellbeing Through Yoga
2		VAC-204A	Communication Skills

Table No. XIV (Major Discipline Relevant Course (Vocational)- Minor Courses)

S. No.	Category	Course Code	Course Name
1	Major Discipline Relevant Course (Vocational) - Minor	MICV-208A	Managerial Skills
2		MICV-210A	Database Management System
3		LC-MICV-212A	Database Management System Lab

Course Code	DSC-BBA-202A				
Category	Discipline Specific Course - Major Course				
Course Title	Basics of International Business				
Scheme and Credits	L	T	P	Credits	Semester-IV
	3	1	0	4	
Course Objectives	The objectives of this course are 1. To understand the concepts, scope, significance, and challenges of international business, including globalization and major risks. 2. To explore the international business environment, its components, determinants, stages of internationalization, and approaches. 3. To understand international trade, foreign exchange mechanisms, foreign direct investment, and the role of government and international organizations in trade. 4. To learn about international marketing strategies, including product design, branding, pricing, promotion, logistics, and distribution in global markets.				
Assessment	30 Marks				
End Semester Examination	70 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Define** fundamental concepts of international business, globalization, and major risks.	Level-1 Remember
CO2	**Explain** the international business environment, modes of entry, and foreign trade policies.	Level-2 Understand
CO3	**Apply** international trade theories, foreign exchange, foreign direct investment and international marketing in business decision-making.	Level-3 Apply
CO4	**Analyze** international trade theories and marketing strategies, including product, pricing, promotion, and distribution, to solve global business problems.	Level-4 Analyze

Note:

1. Examiner will set nine questions in total. Question one will have 7 short questions of 2 marks (each) from all units. Remaining eight questions of 14 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first question being compulsory and selecting one from each Unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**International Business:-** An overview; Domestic versus International Business; Major risks and challenges of International Business; **International Business Environment:-** Components and determinants; stages of internationalization of business; international business approaches, concept of globalization.
Unit-II	**International Business and Foreign Exchange Environment:-** Modes of entering into international business; nature of multinational enterprise and international direct investment; motives and determinants of Foreign Direct Investment; Foreign Exchange Market; determination of exchange rate; Balance of Payments.
Unit-III	**Theories of International Trade:-** Absolute advantage theory; comparative advantage theory; factor proportions theory; Product Life Cycle theory of trade; governmental influence on trade, rationale for government intervention, instruments of trade control; role of WTO, IMF and World Bank in international trade.
Unit-IV	**International Marketing Strategies:-** Assessing international markets; designing products for foreign markets; branding decisions, international promotions policy; international pricing, international logistics and distribution.

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Suggested Readings:

- International Business: A Strategic Management Approach by Rugman Alen M and Hodgetts Richard D, McGraw Hill.
- The Globalisation of Business by Dunning John H, Rontledge London.
- International Marketing by Omkvisil and Shaw.
- International Business, Daniels John D and Radebangh Lee H, Pearson Education.
- International Business, Rao P Subba, Himalaya Publishing House.

Useful Video Links:

Unit No.	Topics	Links
Unit-I	International Business Environment	http://www.digimat.in/nptel/courses/video/110107145/L16.html
Unit-II	Foreign Direct Investment	http://digimat.in/nptel/courses/video/130106117/L22.html
Unit-III	International Trade Theory	http://www.digimat.in/nptel/courses/video/110105057/L31.html
Unit-IV	International Marketing	http://www.digimat.in/nptel/courses/video/110105157/L01.html

Course Code	**DSC-BBA-204A**				
Category	Discipline Specific Course - Major Course				
Course Title	Indian Financial System				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	4	
Course Objectives	The objectives of this course are: 1. To understand the structure, components, functions, and reforms of the Indian financial system, including money markets and their segments. 2. To explore the Indian capital market, its primary and secondary markets, stock exchanges (NSE, BSE), depositories, new financial instruments, and the role of SEBI. 3. To understand the functions of banking and financial institutions in India, including commercial banks, RRBs, NBFCs, merchant banking, and risk management in banks. 4. To learn about mutual funds and insurance as financial intermediaries, including their types, principles, and the role and functions of IRDA.				
Assessment	30 Marks				
End Semester Examination	70 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

Cos	Skills Demonstrated	RBT Level
CO1	**Define** the concepts, components, functions, and reforms of the Indian financial system.	Level-1 Remember
CO2	**Describe** the structure, operations, the regulatory framework and policies governing the Indian financial system.	Level-2 Understand
CO3	**Apply** Indian financial system concepts to real-world roles of institutions, markets, and regulators.	Level-3 Apply
CO4	**Analyze** the mechanisms & regulations of the Indian financial system and market in a real world scenario.	Level-4 Analyze

Note:

1. Examiner will set nine questions in total. Question one will have 7 short questions of 2 marks (each) from all units. Remaining eight questions of 14 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first question being compulsory and selecting one from each Unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Financial System: -** Meaning, components and functions; reforms in the Indian Financial System; money market and its segments. Digital Transformation in the Indian Financial System. Recent Money Market Reforms and Liquidity Management.
Unit-II	**Indian Capital Market: -** Primary market; stock exchange and its function, trading in stock exchange, NSE, BSE, depositories and custodian, new financial instruments, role and functions of SEBI. Rise of Retail Investors and Online Trading Platforms in India. SEBI's Recent Regulatory Measures for Investor Protection.
Unit-III	**Banking and Financial Institutions in India: -** Commercial banks, RRBs, risk management in banks, merchant banking and its services, NBFCs. Current Scenario of Risk Management and NPAs in Indian

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	Banks. Growth of NBFCs and FinTech Collaboration in India
Unit-IV	**Mutual funds:** - meaning, type and principle, Growth of SIPs and Retail Participation in Mutual Funds. **Insurance:** - IRDA, its role and functions. InsurTech and Digital Insurance Reforms in India.

Suggested Readings:

- The Indian Financial System, Second Edition, by Pathak, Bharati V (2008), Pearson Education.
- Indian Financial System, Fourth Edition, by Khan, M Y, Tata Mc Graw Hill.
- Indian Financial System, Third Edition, by Machi raju, HR, Vikas Publications.
- The Indian Financial System and Development, by Desai, Vasant, Himalaya Publishing House.

Useful Video Links:

Unit No.	Topics	Links
Unit-I	Indian Financial System	http://digimat.in/nptel/courses/video/110105121/L01.html
Unit-II	Structure and functions of SEBI	http://www.digimat.in/nptel/courses/video/110105121/L20.html
Unit-III	Importance and Forms of Commercial Banks	https://nptel.ac.in/courses/110105143
Unit-IV	Mutual Funds	http://www.digimat.in/nptel/courses/video/110105166/L22.html

Course Code	DSC-BBA-206A				
Category	Discipline Specific Course - Major Course				
Course Title	Indian Business Environment				
Scheme and Credits	L	T	P	Credits	Semester-IV
	3	1	0	4	
Course Objectives	The objectives of this course are: 1. To understand the nature and components of the business environment and the Indian economy. 2. To examine economic reforms in India such as Liberalization, Privatization and Globalization, along with monetary and fiscal policies, and key regulatory frameworks like Competition Act, Consumer Protection, and Corporate Governance. 3. To examine industrial reforms in India with special reference to Industrial Policy 1991, public sector reforms, public-private partnerships, SMEs, industrial sickness, and the role of SEBI in investor protection. 4. To understand India's external sector, including Balance of Payments, foreign trade policy, FDI environment, FEMA, and the role of global institutions such as WTO, IMF, and World Bank in business and trade.				
Assessment	30 Marks				
End Semester Examination	70 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Define** the fundamental concept of business environment.	Level-1 Remember
CO2	**Explain** the fundamental components of the business environment, the major economic reforms, and the key business regulations in India.	Level-2 Understand
CO3	**Apply** the concepts of the business environment, economic reforms, key business regulations in India and role of global institutions to business decision-making.	Level-3 Apply
CO4	**Analyze** the business environment, economic reforms, key business regulations in India, and the role of global institutions to infer their impact on real-world business decision-making.	Level-4 Analyze

Note:

1. Examiner will set nine questions in total. Question one will have 7 short questions of 2 marks (each) from all units. Remaining eight questions of 14 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first question being compulsory and selecting one from each Unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Business Environment:-** Nature, components of business environment: internal and external environment; country risk; political risk; international impact on business environment; nature of Indian economy.
Unit-II	**Economic Reforms and Governance in India:-** Liberalization, privatization and globalization, monetary and fiscal policy; Competition Act 2002; Consumer protection; corporate governance.
Unit-III	**Industrial Reforms:-** Industrial policy of 1991; public sector reforms; public private partnership; **SMEs:–** threats and challenges; industrial sickness; introduction to SEBI and investor protection.
Unit-IV	**India's External Sector and Global Institutions:-** Balance of Payments scenario; foreign trade pattern and policy; environment for international direct investment; Foreign Exchange Management Act; WTO, IMF, World Bank.

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Suggested Readings:

- Economic Environment of Business by Mishra S.K. and Puri V.K., Himalaya Publishing, New Delhi.
- Business Environment by Bedi, Suresh.
- Indian Economy Govt. of India, Economic Survey (latest year), by Datt Ruddar and Sundaram, Govt. of India, New Delhi.
- Government and Business by Sengupta N.K., Vikas Publication, New Delhi.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Business Environment	https://youtu.be/M6t71wG77sk?si=kmsM0wlnu71YuLJV
Unit-II	Monetary policy	http://www.digimat.in/nptel/courses/video/109104184/L29.html
Unit-III	Challenges of small and medium enterprises SME	https://www.youtube.com/watch?v=8gIHVhqJatA
Unit-IV	Monetary approach to Balance of Payments & Exchange Rates	http://digimat.in/nptel/courses/video/109107173/L46.html

Course Code	DSC-BBA-208A				
Category	Discipline Specific Course - Major Course				
Course Title	Legal and Ethical Issues in Business				
Scheme and Credits	L	T	P	Credits	Semester-IV
	3	1	0	4	
Course Objectives	The objectives of this course are: 1. To understand the key legal and ethical issues in the business context of India, including their significance and challenges. 2. To analyze ethical dilemmas in business decisions and the factors influencing ethical behavior. 3. To understand the legal and regulatory aspects of business ethics, including financial, competitive, and social responsibilities of organizations. 4. To learn how organizational and individual factors impact business ethics and ethical decision-making in practice.				
Assessment	30 Marks				
End Semester Examination	70 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Recall** major laws, regulations, ethical principles, and fundamental concepts of business organizations that guide business conduct.	Level-1 Remember
CO2	**Explain** various forms of business organizations, government policies, and legal–ethical aspects of business operations.	Level-2 Understand
CO3	**Apply** legal and ethical principles in managerial and organizational decision-making.	Level-3 Apply
CO4	**Analyze** ethical dilemmas, legal frameworks, and organizational challenges using ethical theories, CSR principles, and organizational principles to assess their impact on real-world business decision-making.	Level-4 Analyze

Note:

1. Examiner will set nine questions in total. Question one will have 7 short questions of 2 marks (each) from all units. Remaining eight questions of 14 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first question being compulsory and selecting one from each Unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Introduction to Business Law:-** Business law – definition, scope, importance of understanding the role of law in business; Elements of a contract – offer and acceptance, consideration, contractual capacity; Essentials of a valid contract; Types of contracts; Performance obligations; Types of contract breaches and remedies; Product liability and consumer protection laws; Business torts; Employment law.
Unit-II	**Sales and Leases:-** Formation of Sales Contract: Contracts for Leasing Goods, Title and Risk of loss, Performance and remedies, Warranties and Product liability; Introduction to Negotiable Instruments, Negotiability, Negotiation and Holders in due course; Liability and discharge, Bank customer Relations/Electronic Fund Transfers.
Unit-III	**Introduction to Business Ethics:-** The definition and importance of business ethics, business ethics in the Indian context; Institutionalization of Business Ethics in the organization, benefits of Ethical Conduct in Business, Ethical Issues and Stakeholder Concerns; Social Responsibility and Regulatory Framework: Corporate social responsibility; Environment & business; Issues related to Business Ethics in marketing,

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	finance & human resource functions. Ethical responsibilities of multinational corporations; Ethical dilemmas facing businesses globally including issues related to discrimination, human rights, environmental impact, and intellectual property.
Unit-IV	**The Ethical Decision-making process :-** Philosophical approaches to ethical decision making; Ethics & Religious approaches; Moral & Legal aspects of ethical decision making: Ethical aspects in Bhagvat Gita; Kautilya's Arthshastra; Swami Vivekanand on Ethics; Swami Vivekanand's message to the youth of India; Ethical Decision Making in Organizations: Individual and Organizational Factors Influencing Ethical Decisions; Karmyog, Indian philosophy of work ethics; Kautilya's Arthshastra; Introduction to Integral Humanism; Ethical Decision-Making Frameworks to Improve Decision-Making Outcomes; Corporate Governance and its Impact on Ethical Decision-Making; Whistleblowing; Conflict Resolution.

Suggested Readings:

- Business and Corporate Laws by Tulsian, P. C., S. Chand Publishing.
- Business Ethics and Corporate Governance by Fernando, A.C., Pearson.
- Business Law beyond Business, Bayern, S. J., Corp. L.
- To the Youth of India by Vivekanand, S., Advaita Ashrama.

Useful Video Links:

Unit No.	Topics	Links
Unit-I	Formation of Contract	http://www.digimat.in/nptel/courses/video/129106006/L12.html
Unit-II	Special Contracts: Sale of Goods	http://www.digimat.in/nptel/courses/video/129106006/L38.html
Unit-III	Business Ethics	http://www.digimat.in/nptel/courses/video/110105079/L01.html
Unit-IV	Moral aspects of ethical decision making	http://www.digimat.in/nptel/courses/video/109104206/L03.html

Course Code	MICV- 208A				
Category	Major Discipline Relevant Course (Vocational) – Minor				
Course Title	**Managerial Skills**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	4	
Course Objectives	The objectives of this course are 1. To understand and apply key managerial skills, with a focus on coordination, interpersonal roles, and effective management techniques. 2. To learn problem-solving strategies, foster creativity, and understand the importance of empowerment and delegation in management. 3. To understand team-building, group behavior, and leadership skills, using techniques like brainstorming and sensitivity training. 4. To improve communication skills, conduct meetings and interviews, and develop self-confidence and motivational skills for managerial effectiveness.				
Assessment	30 Marks				
End Semester Examination	70 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Define** key concepts of managerial skills, problem-solving, team dynamics, and communication.	Level-1 Remember
CO2	**Explain** the significance of managerial skills in fostering effective management.	Level-2 Understand
CO3	**Apply** managerial skills in the context of delegation and empowerment, group Dynamics and communication styles in organizational problem solving.	Level-3 Apply
CO4	**Analyze** managerial skills in the context of delegation and empowerment, group Dynamics and communication styles in organizational decision making.	Level-4 Analyze

Note:

1. Examiner will set nine questions in total. Question one will have 7 short questions of 2 marks (each) from all units. Remaining eight questions of 14 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first question being compulsory and selecting one from each Unit.

Unit No.	Contents
Unit-I	**Introduction to managerial skills:-** Meaning and concept of managerial skills, Need and its importance, Techniques of skill development for effective management, Application of management skills, Coordination and Interpersonal roles.
Unit-II	**Problem-solving:-** Problem-solving, creativity, innovation, steps of analytical problem solving, limitations of analytical problem solving, impediments of creativity, multiple approaches to creativity. **Empowering and delegating:-** Meaning of empowerment, dimensions of empowerment, how to Develop empowerment, inhibitors of empowerment, delegating works.
Unit-III	**Teams and Groups:-** Team Building, developing teams and teamwork, advantages of a team, leading a team, team membership, Group Dynamics, Group Behaviour, Cohesion, Importance of Brain Storming, Sensitivity Training, Nominal Group techniques, Leadership and competence development.

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Unit-IV	**Communication:-** Process of communication, Need and Importance of communication skills, Types of communication, conduct of meetings, Interviews, reporting of projects, reporting of case analysis, Building self confidence, Role of motivation skills in developing managers.

Suggested Readings:

- Essentials of Management by Herald Koontz, Weihrich and Cannice, Tata-Mc Graw Hill Publishing House.
- Management by A. E. James Stoner, Freeman, Gilberth, Pearson Publishing House.
- Management by Robbins, Coulter, Fernandez Pearson Publishing House.
- Principles of Management by L. Richard Daft:, Cengage Learning India.
- Managerial Skills by V.S.P. Rao Excel Books, New Delhi.
- Developing Management skills by David A Whetten, Cameron, PHI.
- Managerial Skills by Ramnik Kapoor Path Makers, Bangalore
- Skills development for Business and Management Students by Kevin Gallagher, Oxford.
- Business Communication Strategies by Monipally, Muttthukutty Tata Mc Graw Hill.
- Organisational Behaviour by P. Robbins Stephen, Pearson.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Introduction to managerial skills	https://www.youtube.com/watch?v=iYzpESZbuQQ
Unit-II	Problem-solving	https://www.youtube.com/watch?v=hiqoCvPs_Jc
Unit-III	Teams and Groups	https://www.youtube.com/watch?app=desktop&si=zavzAEqML949-6rt&v=uG-FLOi4OOU&feature=youtu.be
Unit-IV	Communication	http://kcl.digimat.in/nptel/courses/video/109104031/L01.html

Course Code	MICV-210A				
Category	Major Discipline Relevant Course (Vocational)- Minor				
Course Title	Database Management System				
Scheme and Credits	L	T	P	Credits	Semester-IV
	3	0	0	3	
Course Objectives	1. To provide a strong foundation in database concepts and relational design, including ER Modelling, normalization, and integrity constraints using My SQL. 2. To develop practical skills in SQL, transaction management, optimization, and database security, enabling students to build, manage, and scale database-driven applications.				
Assessment	25 Marks				
End Semester Examination	50 Marks				
Total	75 Marks				
Duration of Exam	3 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Recall core database concepts including relational models, ER modelling, normalization, SQL, transactions, optimization, security, backup, and My SQL integration.	Level-1 Remember
CO2	Explain database concepts, relational ER design, normalization, SQL operations, transactions, optimization, security, My SQL integration with applications and cloud platforms.	Level-2 Understand
CO3	Apply database concepts to design schemas, implement SQL transactions, optimize queries, ensure security backup, integrate My SQL with applications and cloud platforms.	Level-3 Apply
CO4	Analyze database requirements to design, normalization, SQL queries, transactions, optimization, security, scalability in My SQL and cloud databases.	Level-4 Analyze

Note:

1. Examiner will set nine questions in total. Question one will have 5 short questions of 2 marks (each) from all units. Remaining eight questions of 10 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first question being compulsory and selecting one from each Unit.

Unit No.	Contents
Unit-I	**Database Fundamentals:** Definition, purpose, and types of databases (flat-file vs. relational). Components of a **DBMS:** Storage engine, query processor, transaction manager. Applications of databases in industries (e.g., healthcare, e-commerce etc). **Relational Model Basics:** Tables, rows, columns, keys (primary, foreign, candidate). Integrity constraints: Entity, referential, domain. Introduction to MySQL: Overview of MySQL as an RDBMS. MySQL architecture and installation.
Unit-II	**Entity-Relationship (ER) Modelling:** Entities, attributes, relationships (1:1, 1:N , M:N). ER diagram notation(Chen/UML) and case studies. Relational Schema Design: Converting ER diagrams to relational tables. **Normalization:** Functional dependencies, anomalies (insertion, deletion, update). 1NF, 2NF, 3NF, and BCNF with practical examples.
Unit-III	**Structured Query Language (SQL):** DDL: CREATE, ALTER, DROP tables. DML: INSERT, UPDATE, DELETE. DQL: SELECT with clauses (WHERE, GROUP BY, JOIN, sub queries). **Transactions and Concurrency**: ACID properties, COMMIT, ROLLBACK, isolation levels.

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Unit-IV	**Database Optimization:** Query optimization using EXPLAIN, indexing strategies. Normalization vs. Denormalization tradeoffs. Security and Backup: User management, roles, and privileges in My SQL. Data encryption, backups (mysqldump), and recovery. **Integration and Scalability:** Connecting MySQL with applications. Introduction to cloud databases (e.g., AWSRDS, MySQL on Azure etc).

Suggested Readings:

- Elmasri and Navathe, Fundamentals of Database Systems, Pearson Education.
- C.J.Date, Longman, Introduction to Database Systems, Pearson Education.
- Peter Rob and Coronel, Database Systems, Design, Implementation and Management, Thomson Learning.
- Korth, Silberchatz, Sudarshan, Database System Concepts, McGraw-Hill.
- Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems, McGraw-Hill.
- Database Management System by R.P. Mahapatra and Govind Verma.
- Database Management Systems: A Practical Approach by Rajiv Chopra.
- Database System Concepts by Abraham Silberschatz, Henry F. Korth, and S. Sudarshan.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Database Fundamentals	https://youtu.be/sEaYXwmsLw0?si=9qVJw3l1cjL23RsK
Unit-II	Entity-Relationship (ER) Modelling	https://youtu.be/5TU7zH0Z8ps?si=7qosQo9cH0lGMXYf
Unit-III	Structured Query Language (SQL)	https://youtu.be/TB5T2O8Hwm8?si=G2DffC9qXWqNTaGc
Unit-IV	Database Optimization	https://youtu.be/_jou55svo1k?si=2kv6pRgc0fzcQMGQ

Course Code	LC-MICV-212A				
Category	Major Discipline Relevant Course (Vocational)- Minor				
Course Title	Database Management System Lab				
Scheme and Credits	L	T	P	Credits	Semester-IV
	0	0	2	1	
Course Objectives	The objectives of this course are to 1. To design and implement relational databases using ER diagrams, normalization, table creation, keys, and relationships in MySQL. 2. To apply SQL and database management techniques including queries, joins, sub queries, transactions, optimization, stored procedures, and backup and recovery.				
Assessment	10 Marks				
End Semester Examination	15 Marks				
Total Marks	25 Marks				
Duration of Exam	3 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated
CO1	Apply database design techniques to create relational schemas using ER diagrams, keys, relationships, and normalization in My SQL.
CO2	Analyze database requirements to evaluate ER models, relational schemas, keys, relationships, and normalization for effective database design.
CO3	Evaluate database designs by assessing ER models, relational schemas, keys, relationships, and normalization techniques for data integrity and efficiency.
CO4	Create efficient relational database designs by developing ER models, defining schemas, keys, relationships, and applying normalization techniques.

Exp. No.	Contents
1	Create a database and show table creation. Define tables with primary and foreign keys.
2	Basic SQL Queries – Retrieve, filter, and sort data using SELECT, WHERE, and ORDER BY.
3	Design an ER diagram for an E-Commerce system, and convert ER Diagram to Relational Schema. Translate entities and relationships into My SQL tables. Show One-to-One, One-to-Many, Many-to-Many Relationships.
4	Normalization Steps (1NF, 2NF, 3NF, BCNF) – Demonstrate normalization of a database.
5	DDL Commands: CREATE, ALTER, DROP
6	DML Commands: INSERT, UPDATE, DELETE
7	DQL: Complex Queries Using GROUP BY and Aggregation
8	Joins: INNER JOIN, LEFT JOIN, RIGHT JOIN. Create a database to show Sub queries and Nested Queries.
9	Create a sql database to demonstrate Stored Procedures & Functions
10	Transactions & ACID Properties – Implement a banking transaction.

Course Code	VAC-202A				
Category	Value Added Courses				
Course Title	Wellbeing through Yoga				
Scheme and Credits	L	T	P	Credits	Semester-IV
	2	0	0	2	
Course Objectives	The objectives of this course are: 1. To understand the basic concepts, philosophy, and importance of Yoga for holistic health. 2. To explore the role of Asanas in improving physical wellbeing and overall fitness. 3. To understand the benefits of Pranayama and Bandhas for physical health and energy regulation. 4. To learn meditation and Mudras for enhancing mental wellbeing and mindfulness.				
Assessment	15 Marks				
End Semester Examination	35 Marks				
Total	50 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Define** the fundamental concepts, history, and philosophy of Yoga, including Ashtanga and Hatha Yoga.	Level-1 Remember
CO2	**Explain** the role of Asanas, Pranayama, Bandhas, and Mudras in promoting physical and mental wellbeing.	Level-2 Understand
CO3	**Apply** Yogic practices such as Asanas, breathing techniques, and meditation for improving physical health, mental balance, and overall wellness.	Level-3 Apply
CO4	**Apply** the interconnection between mind, body, and spirit to manage stress, mindfulness, and holistic health.	Level-3 Apply

Note:

1. Examiner will set nine questions in total. Question one will have 7 short questions of 1 marks (each) from all units. Remaining eight questions of 7 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first question being compulsory and selecting one from each Unit.

Unit No.	Contents
Unit-I	**Introduction to Yoga:-** History and Philosophy of Yoga, Ashtanga Yoga & Hatha Yoga, Importance of Yoga.
Unit-II	**Physical Wellbeing through Asanas:-** Basics of human physiology & anatomy, Benefits of Asanas in Physical Health, Practice of some important Asanas (Vrikshasana, Utkatasana, Padahasthasana, Trikonasana, Veerasana,; Baddha Padamasana, Uttitha Padamasana, Pawanmuktasana Mandukasana, Uttanmandukasana, Pashimottanasana, Matsyasana, Naukasana, Uttanpadasana, Sarvangasana, Halasana, Bhujangasana, Shalabhasana, Dhanurasana, Makarasana, Shavasana).
Unit-III	**Physical Wellbeing through Pranayama and Bandhas:-** Introduction to Pranayama and its Benefits, Basic Breathing Exercises (Puraka, Rechaka and Kumbhaka, Anulom Vilom, Bhastrika Bhramari, Kapalbhati), Introduction to Bandhas and their practical procedure.
Unit-IV	**Mental Wellbeing through Meditation and Mudras:-** Connection between Mind, Body, and Spirit, Benefits of Meditation on Mental Health, Benefit of Mudras for Meditation, Introduction to Mudras and their practical procedure, Guided Meditation Sessions (Mindfulness, Loving-kindness).

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Suggested Readings:

- The Heart of Yoga: Developing a Personal Practice by T.K.V. Desikachar.
- Light on Yoga by B.K.S. lyengar.
- Yoga in daily life by Kiss Josie Orient paper, New Delhi.
- History of yoga by S P Singh, PHISPC Centre for studies of civilization.
- Ashtanga Yoga by Swami Devavrata, Arsha Yoga Sansthan, Mirzapur, Faridabad.
- Ashtanga Yoga by Dr. Jagwanti Deswal.
- Yogavidya: Ek Adhyayan by Dr. Surendra Kumar.

Useful Video Links:

Unit No.	Topics	Links
Unit-I	Ashtanga Yoga	http://www.digimat.in/nptel/courses/video/110101165/L60.html
Unit-II	Benefits of Asanas in Physical Health	https://youtu.be/rmTB7uaFOfs?si=3Dq3IME4q0MNFFog
Unit-III	Pranayama Practices and Conscious Breathing	http://www.digimat.in/nptel/courses/video/110101165/L76.html
Unit-IV	Meditation and Mindfulness	http://digimat.in/nptel/courses/video/109105199/L27.html

CourseCode	VAC-204A				
Category	Value Added Courses				
Course Title	Communication Skills				
Scheme and Credits	L	T	P	Credits	Semester-IV
	2	0	0	2	
Course Objectives	The objectives of this course are: 1. To understand the basics of listening, speaking, reading, writing, and non-verbal communication. 2. To explore effective communication techniques and language skills. 3. To understand basic computer skills, digital platforms, social media, and digital marketing. 4. To learn ethical, safe, and responsible use of digital technologies and online communication.				
Assessment	15 Marks				
End Semester Examination	35 Marks				
Total	50 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Define** the fundamental concepts of listening, speaking, reading, writing, non-verbal communication, and digital literacy.	Level-1 Remember
CO2	**Explain** effective communication skills, basic computer applications, social media usage, digital marketing concepts, and cybersecurity principles.	Level-2 Understand
CO3	**Apply** language skills, non-verbal communication techniques, digital tools, and online platforms for effective academic and professional communication.	Level-3 Apply
CO4	**Apply** written, spoken, and digital information to ensure ethical communication, informed decision-making, and secure digital practices.	Level-3 Apply

Note:

1. Examiner will set nine questions in total. Question one will have 7 short questions of 1 marks (each) from all units. Remaining eight questions of 7 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first question being compulsory and selecting one from each Unit.

Unit No.	Contents
Unit-I	**Listening:-** Techniques of Effective Listening, Listening and Comprehension, Probing Questions, Barriers to Listening **Speaking:-** Pronunciation, Enunciation, Vocabulary, Fluency, Common Errors.
Unit-II	**Reading:-** Techniques of Effective Reading, Gathering Ideas and Information from a Given Text, Evaluating these Ideas and Information, Interpreting the Text **Writing:-** The Writing Process, Effective Writing Strategies, Different Modes of Writing.
Unit-III	**Basic Computer Skills:-** Introduction to Microsoft (MS) Office Suite, Open Educational Resources, Basic Virtual Platforms, Trending Technologies, Machine Learning, Artificial Intelligence (AI), Internet of Things (IoT), **Social Media:-** Introduction to Social Media Websites, Advantages of Social Media, Ethics and Etiquettes of Social Media, How to Use Google Search Better?, Effective Ways of Using Social Media **Digital Marketing:-** Introduction to Digital Marketing, Traditional Marketing versus Digital Marketing, Digital Marketing Tools, Social Media for Digital Marketing, Digital Marketing Analytics

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	Digital Ethics and Cyber Security:- Digital Literacy Skills, Digital Etiquette, Digital Life Skills; Cyber Security: Understanding and introducing the environment of security, Types of attacks and attackers, The art of protecting secrets.
Unit-IV	**Non-Verbal Communication:-** Meaning of nonverbal communication, Advantages of using nonverbal communication, Introduction to modes of nonverbal communication, Open and Closed body language, Eye contact and Facial expression, Hand gestures, Do's and Don'ts in NVC, Learning from experts, Activities-based learning

Suggested Readings:

- Ahmed, R. (2015. June 18). Five essential listening skills for English learners. British Council. https://www.britishcouncil.org/voices-magazine/five-essential-listening skills-English learners.
- Skills You Need. (n.d.). Barriers to Effective Listening. Skills You Need. https://www. skillsyouneed.com/ips/ineffective-listening.html.
- Weiler, A. (2017. October 7). How to Improve English Pronunciation. Strategies in language learning. https://www.strategiesinlanguagelearning.com/how-to-improve englishpronunciation/.
- Kirkham, L. (2022. February 16). How to Enunciate. Wiki how. https://www.wikihow.com/ Enunciate.
- English for everyone. (n.d.). Homonyms, Homographs, and Homophones. English for everyone. https://englishforeveryone.org/PDFs/Homonyms,%20Homographs,%20Homophones.pdf.
- British Council. (n.d.). Learn English Teens. British Council. https://learnenglishteens. britishcouncil.org/exams/speaking-exams/fluency.
- Team Learn Pick. (n.d.). 8 Common Mistakes We Make While Speaking English. Learn Pick. https://www.learnpick.in/blog/8-common-mistakes-make-speaking English.
- Snyder, M. S. (2016. August 16). Oops, Did I Say That? 15 Common English Mistakes You Never Noticed Before. Fluentu. https://www.fluentu.com/blog/english/common-mistakes-inEnglish.
- Hogue, Ann. 1995. First Steps in Academic Writing. Pearson Longman.
- Taylor, Shirley. 2006. Communication for Business. Pearson Education.

Useful Video Links:

Unit No.	Topics	Links
Unit-I	Listening Skills	http://digimat.in/nptel/courses/video/109104031/L10.html
Unit-II	Principles of Effective Writing	https://youtu.be/4bKe2mvKUlA?si=FV3_z7lljw9nck2S
Unit-III	Digital Marketing	https://youtu.be/Gl6mJFvlKgI?si=nD_hE4A4V30V_UA0
Unit-IV	Non-Verbal Communication	http://digimat.in/nptel/courses/video/109104031/L05.html

Course Code	AEC-202A				
Category	Ability Enhancement Course				
Course Title	Hindi-II				
Scheme and Credits	L	T	P	Credits	Semester IV
	2	0	0	2	
Course Objectives	The objectives of this course are • पत्रकारिता के अर्थ और विकास, वर्तमान समय में महत्व, हिंदी पत्रकारिता में रोजगार की संभावनाएँ और लेखन की भाषा और उत्कर्ष • प्रूफ संशोधन, प्रूफ शोधक के गुण और प्रकार, प्रूफ संशोधन में रोजगार और हिन्दी भाषा में प्रूफ का महत्त्वपूर्ण				
Assessment	15 Marks				
End Semester Examination	35 Marks				
Total	50 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	पत्रकारिता, प्रूफ रीडिंग साक्षात्कार कौशल, और जीवन कौशल की भूमिका और महत्व को व्याख्या करें जिसमें हिन्दी पत्रकारिता में रोजगार की संभावनाएँ, भाषा समन्वय, और जीवन कौशल का समन्वय शामिल हो।	Level 1: Remember
CO2	पत्रकारिता, प्रूफ रीडिंग, साक्षात्कार और जीवन कौशल के विभिन्न आयामों का विश्लेषण करें, जिसमें प्रभावी संचार तकनीक, भाषा की शुद्धता, और आत्म-जागरूकता का विकास सम्मिलित है।	Level 2: Understand
CO3	हिन्दी पत्रकारिता, प्रूफ रीडिंग, साक्षात्कार कौशल, और जीवन कौशल के सिद्धांतों को वास्तविक जीवन स्थितियों में प्रयोग करें, ताकि व्यावहारिक ज्ञान और दक्षता विकसित हो सके।	Level 3: Apply
CO4	पत्रकारिता, प्रूफ रीडिंग, साक्षात्कार तकनीक, और जीवन कौशल में सुधार के लिए नवीनतम रुझानों और तकनीकों को व्याख्या करें और उनके प्रभाव का मूल्यांकन करें।	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 7 parts of 1 marks each from all units and remaining eight questions of 7 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

पत्रकारिता का अर्थ, उद्भव और विकास, वर्तमान समय में पत्रकारिता का महत्व, हिंदी पत्रकारिता में रोजगार की संभावनाएँ, समाचार लेखन, रिपोर्टिंग, प्रेस विज्ञप्ति, समाचार लेखक की भाषा, समाचार लेखक का वैचारिक उत्कर्ष, हिंदी भाषा संवर्धन में पत्रकारिता का योगदान।

Unit-II

प्रूफ संशोधन की परिभाषा, प्रूफ शोधक के आवश्यक गुण, प्रूफ के प्रकार, प्रूफ संशोधन के महत्त्वपूर्ण चिह्न, प्रूफ रीडर के लिए आवश्यक सावधानियाँ, प्रूफ संशोधन में रोजगार, प्रूफ संशोधन का हि ंदी भाषा संवर्धन में महत्त्व।

Unit-III

साक्षात्कार का अर्थ, परिभाषा एवं स्वरूपः कैरियर में साक्षात्कार कौशल का महत्त्व, समालाप्य की भाषा, सम्प्रेषणः अर्थ, परिभाषा एवं प्रक्रियाः भाषा–संप्रेषण के चरणः श्रवण, अभिव्यक्ति, वाचन, लेखनः सम्प्रेषण कौ प्रभावी बनाने के नियम।

Unit-IV

जीवन कौशल का अर्थ एवं स्वरूपः जीवन कौशल की विशेषताएँ, जीवन कौशल की आवश्यकता एवं महत्त्व, जीवन कौशल के आधारः स्वावलंबन, सहयोगपूर्ण भावना, समस्या समाधान की योग्यता, ज्ञानार्जन की प्रवृत्ति, कुशाग्रता, चातुर्य, मधुर भाषी, संवेदनशील, स्व–जागरूक, अन्वेषणात्मक दृष्टिकोण, उदात्त सुदृढ .–मनोबल, निश्चयात्मकवृत्तिः।

Suggested Readings:

- हिंदी पत्रकारिता इल डी. के. शर्मा
- समाचार लेखन और रिपोर्टिंग इल सोमवार शर्मा
- पत्रकारिता और समाचार लेखन इल सुभाष शर्मा
- प्रूफ संशोधन और उसका महत्त्व इल अमित शर्मा
- साक्षात्कार और सम्प्रेषण इल सुरेन्द्र शर्मा
- जीवन कौशल विकास इल आर. के. शर्मा

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Useful Video Links:

Unit No.	Topics	Links
Unit-I	पत्रकारिता अर्थ और परिभाषा प्रकार	https://youtu.be/XOIDpEJz930?feature=shared
Unit-II	संपादन के सिद्धांत	https://youtu.be/RpnR-YxJTNU?feature=shared
Unit-III	समाचार संकलन तथा संपादन	https://youtu.be/rvYiv30no5k?feature=shared
Unit-IV	जीवन कौशल का महत्व	https://youtu.be/8gXlaoAAfS0?feature=shared

Course code	AEC-204A				
Category	Ability Enhancement Course				
Course title	संस्कृत-II				
Scheme and Credits	L	T	P	Credits	Semester-IV
	2	0	0	2	
Course Objectives	The objectives of this course are 1. To understand Sanskrit sounds, their classification, and points of articulation in linguistic study. 2. To understand phonetic changes through Sandhi rules involving vowels, consonants, and visarga. 3. To understand Sanskrit sentence structure and different types of word formations. 4. To understand nominal compounding processes and major types of Sanskrit Samāsa.				
Assessment	15 Marks				
End Semester Examination	35 Marks				
Total Marks	50				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

CO	Course Outcome	RBT Level
CO1	**Identify** Sanskrit sounds, Sandhi types, sentence elements, and compounds.	Level 1: Remember
CO2	**Explain** Sanskrit phonetics, Sandhi rules, sentence structure, and compounds.	Level 2: Understand
CO3	**Apply** phonetic rules, Sandhi, sentence formation, and compounding techniques.	Level 3: Apply
CO4	**Analyze** Sanskrit phonetics, Sandhi, sentence structure, and compounds.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will have 07 short questions of 1 mark (each) from all units. Remaining eight questions of 7 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first question is compulsory and selecting one from each Unit.

Unit No.	Content
Unit-I	**General introduction to Sanskrit Sounds** संस्कृत ध्वनियों का सामान्य परिचय i. Vowels (Simple Vowels, Complex Vowels) स्वर (अच्) (शुद्ध स्वर, संयुक्त स्वर) ii. Consonants (Stops Nasal, Semi Vowels, Sibilants, Anusvara and Visarga) व्यञ्जन (हल्) (स्पर्श नासिक्य अन्तस्थ, ऊष्म, अनुस्वार, विसर्ग) iii. Points of Articulation (Throat, Roof, Palate, Teeth, Lips, Nose) उच्चारण स्थान (कण्ठ, मूर्धा, तालु, दन्ताः, ओष्ठौ, नासिका)

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Unit-II	**General introduction to Conditional Phonetic Changes** सन्धि का सामान्य परिचय i. Phonetic change where vowel is replaced स्वरसन्धि ii. Phonetic change where consonant is replaced व्यञ्जनसन्धि iii. Phonetic change where visarga is replaced विसर्गसन्धि
Unit-III	**General introduction to the Structure of Sentences** वाक्य संरचना का सामान्य परिचय i. Sentence वाक्य ii. Word (Subanta, Tinanta, Kridanta, Taddhita) पद (सुबन्त, तिङन्त, कृदन्त, तद्धित
Unit-IV	**General introduction to Nominal Compounding** समास का सामान्य परिचय i. Avyayeebhava, Tatpurusha अव्ययीभाव, तत्पुरुष ii. Dvandva, Bahuvreehi द्वन्द्व, बहुव्रीहि

Suggested Readings:-

- Anuvada Chandrika, by Dr. Yadunandan Mishra, Chaukhambha Orientaliya, Delhi, 2021.
- students Guide to Sanskrit Composition,by Apte, Vaman Shivram, The Standard Publishing Company, Girgaon, Bombay, 1925.
- Rupa Chandrika by Dr. Brahmananda Tripathi, Chaukhamba Surbharati Prakashan, Varanasi, 2008.
- Kridanta Rupa Mala – Srijan Jha – App. Available on Google Play Store.
- Online tools for Sanskrit grammer developed by computational linguistics group, Department of Sanskrit, University of Delhi:http://du.ac.in.

Useful Video Links:

Unit No	Topics	Links
Unit-I	अच् [स्वर] तथा हल् [व्यंजन	https://www.youtube.com/watch?v=BTTRaMpE4XE
Unit-II	स्वरसन्धि	https://www.youtube.com/watch?v=XYQ-PNN9D9w
Unit-III	वाक्य संरचना	https://www.youtube.com/watch?v=SQoZIOz6RYs
Unit-IV	अव्ययीभाव, तत्पुरुष, द्वन्द्व, बहुव्रीहि	https://www.youtube.com/watch?v=L-a2w7heyOE

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An Autonomous Institute

Approved by AICTE, New Delhi and Affiliated to MDU, Rohtak

NAAC 'A' GRADE

GITAM

SCHEME OF EXAMINATION AND SYLLABI

OF

3-4 YEAR

BACHELOR OF BUSINESS ADMINISTRATION PROGRAM

(BBA)

WITH EFFECT FROM THE SESSION 2025-26

BACHELOR OF BUSINESS ADMINISTRATION (BBA)

BBA / BBA (Honors) / BBA (Honors with Research)

Program Overview

The Bachelor of Business Administration (BBA) is a comprehensive 3-year undergraduate program, extendable to 4 years for Honors/Honors with Research, designed as per NEP-2020 and AICTE Model Curriculum. This program provides flexible entry and exits options, industry-oriented skill development, and multi-disciplinary learning through core courses, electives, skill enhancement modules, value-added courses, and research projects.

BBA Program Objectives and Outcomes

The BBA Program aims to develop competent, ethical, and visionary business leaders who can contribute meaningfully to national progress and excel in the global business environment. The following Program Objectives and Outcomes reflect our commitment to academic excellence, leadership development, and holistic personality growth.

Program Objectives

1. Acquire and demonstrate comprehensive theoretical and practical knowledge of management and business, with the ability to critically analyse Indian and global business environments and apply insights across diverse contexts.
2. Cultivate the mindset to act as responsible managers, entrepreneurs, and leaders, integrating knowledge and skills to contribute meaningfully to national development and to act as responsible global citizens.
3. Demonstrate effective communication skills to present opinions, ideas, and strategies with clarity, logical reasoning, and critical thinking.
4. Develop the ability to understand, articulate, and navigate complex business environments with mindfulness and strategic clarity.
5. Exhibit commitment to roles and responsibilities as active members of multi-cultural teams, effectively managing diversity in cross-cultural settings.
6. Uphold the highest standards of professional and ethical conduct, fostering trust and integrity in all business practices.
7. Evolve into emotionally intelligent leaders and informed decision-makers, capable of inspiring and motivating teams to achieve organizational goals.
8. Strengthen problem-solving capabilities and decision-making acumen to provide innovative and effective business solutions.
9. Build research and analytical skills to explore, understand, and critically evaluate both Indian and global business environments.

Program Outcomes

The program provides multiple entry and exits points in alignment with NEP-2020, enabling students to earn a Certificate, Diploma, Degree, or Honors Degree with Research, progressively enhancing their knowledge and skills.

At the End of First Year: UG Certificate in Business Administration

1. Understand and conceptualize the foundational principles and theories of management.
2. Recognize the importance of effective communication for presenting ideas and opinions in professional settings.
3. Demonstrate the ability to comprehend and describe the business environment and its dynamics.
4. Apply logical thinking and data interpretation skills to identify and analyse basic business problems.

At the End of Second Year: UG Diploma in Business Administration

1. Demonstrate intermediate level understanding of management concepts along with basic managerial and analytical skills.
2. Apply effective communication and logical reasoning in business decision-making and collaborative environments.

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3. Exhibit professional conduct and appreciate workplace ethics and responsibilities.
4. Work effectively in team settings, embracing the value of group work and collaborative problem solving.
5. Develop creativity and innovative thinking to approach business challenges.

At the End of Third Year: Bachelor of Business Administration (BBA)

1. Exhibit comprehensive factual and theoretical knowledge of management and business functions.
2. Critically evaluate and analyze Indian and global business environments across multiple contexts.
3. Recognize and perform roles as managers, entrepreneurs, and leaders in diverse business scenarios.
4. Communicate effectively using critical thinking, logical reasoning, and structured analysis.
5. Demonstrate consistent adherence to professional and ethical standards in managerial practices.

At the End of Fourth Year: BBA (Honors) / BBA (Honors with Research)

1. Integrate advanced theoretical and practical knowledge of management to critically analyze and respond to Indian and global business challenges.
2. Articulate and evaluate business strategies with clarity, mindfulness, and a holistic perspective.
3. Demonstrate leadership, accountability, and effective participation as members of multicultural and diverse teams.
4. Exhibit emotional intelligence, strategic decision-making, and the ability to motivate and influence teams.
5. Apply problem-solving and analytical skills to deliver innovative solutions and support informed managerial decisions.
6. Develop advanced research and inquiry skills to conduct in-depth studies of Indian and global business environments, contributing to new knowledge creation.

Exit Options as per NEP-2020:

1. After 1 Year: UG Certificate in Business Administration
2. After 2 Years: UG Diploma in Business Administration
3. After 3 Years: BBA Degree
4. After 4 Years: BBA (Honors) / BBA (Honors with Research)

Eligibility for 4th Year Admission:

Minimum eligibility criteria for opting the course in the fourth year will be as follows:

- **For BBA (Honors):** Completion of 3-Year BBA Degree
- **BBA (Honors with Research):** Minimum 75% marks or equivalent CGPA in BBA Degree up to Sixth Semester.

Note: The students who are eligible for BBA (Honors with Research) shall have the choice to pursue either BBA (Honors) or BBA (Honors with Research).

Credit System and Course Codes

Definition of Credit:

- 1 Hour Lecture (L) per week = 1 Credit
- 1 Hour Tutorial (T) per week = 1 Credit
- 1 Hour Practical (P) per week = 0.5 Credit
- 2 Hours Practical (P) per week = 1 Credit

Course Code and Components:

- L – Lecture
- T – Tutorial
- P – Practical
- DSC – Core Course
- AEC – Ability Enhancement Course
- MDC – Multi-Disciplinary Elective Course
- VAC – Value Added Course
- SEC – Skill Enhancement Course

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- LC – Lab Course
- INT – Summer Internship Report/ Capstone Project
- RP – Project Report/Research Project/Dissertation
- DSE – Discipline Specific Elective (Human Resource Management/ Business Analytics/ Marketing/ Supply Chain Management/ Finance/ International Business)
- OE – Open Elective (SWAYAM / Other Department Courses)

SEMESTER-WISE CREDIT DISTRIBUTION

Semester-Wise Credit Distribution of the proposed BBA, BBA (Honors and BBA (Honors with Research) Program

Semester	Core Courses	Ability Enhancement Courses	Multi-Disciplinary Elective Course	Value Added Courses	Skill Enhancement Courses	Discipline Specific Elective	Total
I	12	*2/4	2	2	*2/0	-	20
II	12	*4/2	2	2	*0/2	-	20
III	12	-	2	2	4	-	20
IV	16	-	-	2	2	-	20
V	8	-	-	-	4	8	20
VI	6	-	-	-	6	8	20
BBA (Honors)							
Semester	**Core Courses**	**Ability Enhancement Courses**	**Multi-Disciplinary Elective Course**	**Value Added Courses**	**Skill Enhancement Courses**	**Discipline Specific Elective**	**Total**
VII	4	-	4	-	4	8	20
VIII	-	-	-	-	8	12	20
BBA (Honors with Research)							
Semester	**Core Courses**	**Ability Enhancement Courses**	**Multi-Disciplinary Elective Course**	**Value Added Courses**	**Skill Enhancement Courses**	**Discipline Specific Elective**	**Total**
VII	12	-	-	-	-	8	20
VIII	20	-	-	-	-	-	20

***Note:** The prescribed credits may be covered in either First or Second Semester and must be completed within the First Year of the program.

Category-wise Distribution

Description	Core Courses	Ability Enhancement Courses	Multi-Disciplinary Elective Course	Value Added Courses	Skill Enhancement Courses	Discipline Specific Elective	Total
BBA	66	6	6	8	18	16	120
BBA (Honors)	70	6	10	8	30	36	160
BBA (Honors with Research)	98	6	6	8	18	24	160
3 Years BBA Program					**Total Credits=120**		
4 Years BBA (Honors) and BBA (Honors with Research) Program					**Total Credits=160**		

Note: Students can take an extra credit course from their own department or from another department as per the Institute norms.

Induction Program (Mandatory)

A 3-week Student Induction Program has to be conducted at the start of the first year to familiarize students with the academic environment, develop soft skills, and promote holistic learning.

Components Include:

- Physical Activities & Fitness
- Creative Arts & Literary Activities
- Universal Human Values and Ethics
- Language & Proficiency Modules
- Expert Lectures – at least one per semester
- Industrial Visits – one per semester
- Orientation with Department, Branch, and Innovations

Mandatory Academic Activities

1. Industrial Visits: One per semester
2. Workshops: One-week professional/industry/entrepreneurial workshop after the 5th semester
3. Expert Lectures: At least one per semester by industry/domain experts

Summer Internship & Projects

Evaluation includes Work Done, Project Report, Presentation, and Viva-Voce

Internal Assessment Includes:

- Class Participation and Performance
- Attendance
- Assignments & Quizzes
- Lab Records & Practical Viva-Voce
- Mid-Semester Tests (Best 2 out of 3 considered)

Grading System

Each course (Theory/ Practical) is assigned 100 marks, irrespective of the number of credits.

Scheme of Studies and Examination
BBA – 1st Semester (GITAM)
w.e.f. 2025-26

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Formative Assessment	Summative Assessment	Practical /Viva- Voce	Total
1	Core Courses	DSC-BBA-101B	Business Organization	3	1	0	4	4	30	70	-	100
2	Core Courses	DSC-BBA-103B	Basics of Accounting	3	1	0	4	4	30	70	-	100
3	Core Courses	DSC-BBA-105B	Basics of Economics	3	1	0	4	4	30	70	-	100
4	Multidisciplinary Courses	Refer Table No.- I	.....	2	0	0	2	2	50	50	-	100
5	Ability Enhancement Courses	AEC-101B	General English-I	1	1	0	2	2	65	35	-	100
6	Additional Courses	Refer Table No.- II	**(Additional Course)** Foreign Language (To be decided by the Institute/College at them level) (1-1-0) OR Any Course of Similar Credits on Any Foreign Languages from SWAYAM portal	-	-	-	-	No credit	-	-	-	-
7	Skill Enhancement Courses	SEC-101B	Computer Fundamentals and Office Automation Tools	1	0	0	1	1	15	35	-	50
		LC-SEC-103B	Computer Fundamentals and Office Automation Tools Lab	0	0	2	2	1	35	-	15	50
8	Value Added Courses	VAC-113B	Environmental Studies	2	0	0	2	2	65	35	-	100
Total Credits								**20**				**700**

Note:

1. The duration of all the end-term theory examinations shall be 3 hours.
2. The Criteria for awarding the formative assessment of 30 marks throughout the Program shall be as under:
   a) Sessional Examination: 15 marks.
   b) Assignments/ Presentations/ Seminars and Class Participation: 10 marks
   c) Attendance: 5 marks
   (Less than 65% - 0 marks; Upto 70% - 2 marks; Upto 75% - 3 marks; Upto 80% - 4 marks; Above 80% - 5 marks)
3. The panel of examiners for end-semester theory examinations shall be prepared and approved by the BOS, comprising internal and external examiners based on their expertise, specialization, and area of interest.

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4. The formative assessment criteria for **Multi-Disciplinary Course** in Semester I will be as follows:

Sessional Test	20 Marks
Assignment/ Case Study/ Mini Project	15 Marks
Quiz/ Group Discussion/ Debate	10 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

5. The formative assessment criteria for **Ability-Enhancement Course** in Semester I will be as follows:

Sessional Test	30 Marks
Peer Discussion/ Debate/ Extempore Speech	10 Marks
Role Play	05 Marks
Assignment/Essay/ Article/ Report Writing	15 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

6. The formative assessment criteria for **Value Added Course** in Semester I will be as follows:

Sessional Test	30 Marks
Class Assignment/ Case Study/ Mini Project	15 Marks
Quiz/ Seminar/ Group Discussion/ Debate	15 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

7. The formative assessment criteria for **Skill-Enhancement Course** in Semester I will be as follows:

Skill-Enhancement Course (Theory)	
Sessional Test	10 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks
Skill-Enhancement Course (Lab)	
Lab Work (Practical File)/ Field Work (Report)/ Portfolio	15 Marks
Assignment/ Seminar/ Presentation	15 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

8. An '**Additional Course**' is a non-credit course that is undertaken for learning purposes only. If completed, the '**Additional Course**' may be recorded and will be assessed on a **Grading** basis.

Marks (%)	Letter Grade	Grade Point
>90	O(Outstanding)	10
>75 to 90	A+(Excellent)	9
> 65 to 75	A (Very good)	8
>55 to 65	B+(Good)	7
> 50 to 55	B (Above average)	6
> 40 to 50	C(Average)	5
40	P (Pass)	4
Less than 40	F(Fail)	0
-	Ab (Absent)	0

Semester-I

Table No. I (Multidisciplinary Courses)

S. NO.	Category	Course Code	Course Name
1	Multidisciplinary Courses	MDC-BBA-101B	Foundations of Management
2	Multidisciplinary Courses	MDC-ASH-103B	Introductory Mathematics
3	Multidisciplinary Courses	MDC-105B	Indian Vision for Human Society
4	Multidisciplinary Courses	MDC-107B	Indian Culture and Civilization
5	Multidisciplinary Courses	MDC-109B	Indian Science, Engineering and Technology
6	Multidisciplinary Courses	MDC-111B	Indian Town Planning and Architecture
7	Multidisciplinary Courses	MDC-113B	Indian Health, Wellness and Psychology

Table No. II Additional Course

S. No.	Category	Course Code	Course Name
1	**Additional Courses**	AEC-103B	French

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Scheme of Studies and Examination
BBA – 2nd Semester (GITAM)
w.e.f. 2025-26

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Formative Assessment	Summative Assessment	Practical /Viva- Voce	Total
1	Core Courses	DSC-BBA-102B	Principles of Management and Organizational Behavior	3	1	0	4	4	30	70	-	100
2	Core Courses	DSC-BBA-104B	Marketing Management	3	1	0	4	4	30	70	-	100
3	Core Courses	DSC-BBA-106B	Business Statistics and Logic	3	1	0	4	4	30	70	-	100
4	Multidisciplinary Courses	MDC-108B	Media Literacy and Critical Thinking	2	0	0	2	2	50	50	-	100
5	Ability Enhancement Courses	AEC-102B	Business Communication	1	1	0	2	2	65	35	-	100
		AEC-104B	General English-II	1	1	0	2	2	65	35	-	100
6	Additional Courses	Refer Table No.- I	**(Additional Course)** Hindi or Sanskrit and Modern Indian Languages (To be decided by the Institute/College at them level) (1-1-0) or Any Course of similar credits in any Indian language from SWAYAM portal	-	-	-	-	No credit	-	-	-	-
7	Value Added Courses	VAC-102B	Indian Constitution	2	0	0	2	2	65	35	-	100
Total Credits								**20**				**700**

Note:

1. The duration of all the end-term theory examinations shall be 3 hours.
2. The Criteria for awarding the formative assessment of 30 marks throughout the Program shall be as under:
   a) Sessional Examination: 15 marks.
   b) Assignments/ Presentations/ Seminars and Class Participation: 10 marks
   c) Attendance: 5 marks
   (Less than 65% - 0 marks; Upto 70% - 2 marks; Upto 75% - 3 marks; Upto 80% - 4 marks; Above 80% - 5 marks)
3. The panel of examiners for end-semester theory examinations shall be prepared and approved by the BOS, comprising internal and external examiners based on their expertise, specialization, and area of interest.
4. The formative assessment criteria for **Multi-Disciplinary Course** in Semester II will be as follows:

Sessional Test	20 Marks
Assignment/ Case Study/ Mini Project	10 Marks
Book Review/ Essay/ Seminar	10 Marks
Quiz/ Group Discussion/ Debate	05 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

5. The formative assessment criteria for **Ability-Enhancement Course** in Semester II will be as follows:

Sessional Test	30 Marks
Peer Discussion/ Debate/ Extempore Speech	10 Marks

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Role Play	05 Marks
Assignment/Essay/ Article/ Report Writing	15 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

6. The formative assessment criteria for **Value Added Course** in Semester II will be as follows:

Sessional Test	30 Marks
Class Assignment/ Case Study/ Mini Project	15 Marks
Quiz/ Seminar/ Group Discussion/ Debate	15 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

7. An '**Additional Course**' is a non-credit course that is undertaken for learning purposes only. If completed, the '**Additional Course**' may be recorded and will be assessed on a **Grading** basis.

Evaluation will be based on formative assessment

Written Test	25 Marks
Peer Discussion/ Debate/ Extempore Speech	40 Marks
Role Play	10 Marks
Essay/ Article/ Report Writing	20 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

Marks (%)	Letter Grade	Grade Point
>90	O(Outstanding)	10
>75 to 90	A+(Excellent)	9
> 65 to 75	A (Very good)	8
>55 to 65	B+(Good)	7
> 50 to 55	B (Above average)	6
> 40 to 50	C(Average)	5
40	P (Pass)	4
Less than 40	F(Fail)	0
-	Ab (Absent)	0

8. Exit Criteria after First Year of BBA Program: The students shall have an option to exit after 1st year of Business Administration Program and will be awarded with a UG Certificate in Business Administration. Students on exit have to compulsorily complete additional 04 Credits either in a Skill based subject or work based Vocational Course offered during summer term or Internship/Apprenticeship / Social Responsibility & Community Engagement- encompassing community engagement with an NGO after the second semester of minimum 08 weeks of duration as decided by the Institute. The exiting students will clear the subject / submit the Internship Report as per the Institute schedule.

Total Credits (20+20=40+4) for UG Certificate (Business Administration)	**44**

Semester-II

Table No. I Additional Course

S. NO.	Category	Course Code	Course Name
1	**Additional Courses**	AEC-106B	Hindi

Re-entry Criteria into Second Year (Third Semester)

The student who takes an exit after one year with an award of certificate may be allowed to re-enter into third Semester for completion of the BBA Program as per the Institute's schedule after earning requisite credits in the First year.

Scheme of Studies and Examination

BBA – 3rd Semester

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Formative Assessment	Summative Assessment	Practical / Viva- Voce	Total
1	Core Courses	DSC-BBA-201B	Cost and Management Accounting	3	1	0	4	4	30	70	-	100
2	Core Courses	DSC-BBA-203B	Legal and Ethical Issues in Business	3	1	0	4	4	30	70	-	100
3	Core Courses	DSC-BBA-205B	Human Resource Management	3	1	0	4	4	30	70	-	100
4	Multi-Disciplinary Elective Courses	MDC-201B	Indian Systems of Health and Wellness	1	1	0	2	2	100	-	-	100
5	Value Added Courses	VAC-201B	Disaster Management	0	0	4	4	2	100	-	-	100
6	Skill Enhancement Courses	SEC-201B	Management Information System	2	0	4	4	4	100	-	-	100
Total Credits								**20**				**600**

Note:

1. The duration of all the end-term theory examinations shall be 3 hours.
2. The Criteria for awarding the formative assessment of 30 marks throughout the Program shall be as under:
   a) Sessional Examination: 15 marks.
   b) Assignments/ Presentations/ Seminars and Class Participation: 10 marks
   c) Attendance: 5 marks
   (Less than 65% - 0 marks; Upto 70% - 2 marks; Upto 75% - 3 marks; Upto 80% - 4 marks; Above 80% - 5 marks)
1. The panel of examiners for end-semester theory examinations shall be prepared and approved by the BOS, comprising internal and external examiners based on their expertise, specialization, and area of interest.
4. The formative assessment criteria for **Multi-Disciplinary Course** in Semester III will be as follows:

Sessional Test	30 Marks
Assignment/ Case Study/ Mini Project	30 Marks
Book Review/ Essay/ Seminar	15 Marks
Quiz/ Group Discussion/ Debate	20 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

5. The formative assessment criteria for **Value Added Course** in Semester III will be as follows:

Regular Assessment through observation and class discussion	40 Marks
Field Work (Report)/ Mini Project	30 Marks
Assignment	25 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

6. The formative assessment criteria for **Skill-Enhancement Course** in Semester III will be as follows:

Sessional Test	20 Marks
Lab Work (Practical File)/ Field Work (Report)/ Portfolio	30 Marks
Case Study/Mini Project	15 Marks
Assignment/ Seminar/ Presentation	30 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

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Scheme of Studies and Examination
BBA – 4th Semester

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Formative Assessment	Summative Assessment	Practical / Viva- Voce	Total
1	Core Courses	DSC-BBA-202B	Entrepreneurship and Startup Ecosystem	1	1	0	2	2	30	70	-	100
2	Core Courses	DSC-BBA-204B	Operations Management	3	1	0	4	4	30	70	-	100
3	Core Courses	DSC-BBA-206B	Financial Management	3	1	0	4	4	30	70	-	100
4	Core Courses	DSC-BBA-208B	Business Research Methodology	3	1	0	4	4	30	70	-	100
5	Core Courses	DSC-BBA-210B	International Business	2	0	0	2	2	30	70	-	100
6	Value Added Courses	VAC-202B	Business Environment and Public Policy	2	0	0	2	2	100	-	-	100
7	Skill Enhancement Courses	SEC-202B	Design Thinking and Innovation	1	1	0	2	2	100	-	-	100
Total Credits								**20**				**700**

Note:

1. The duration of all the end-term theory examinations shall be 3 hours.
2. The Criteria for awarding the formative assessment of 30 marks throughout the Program shall be as under:
   a) Sessional Examination: 15 marks.
   b) Assignments/ Presentations/ Seminars and Class Participation: 10 marks
   c) Attendance: 5 marks
   (Less than 65% - 0 marks; Upto 70% - 2 marks; Upto 75% - 3 marks; Upto 80% - 4 marks; Above 80% - 5 marks)
3. The panel of examiners for end-semester theory examinations shall be prepared and approved by the BOS, comprising internal and external examiners based on their expertise, specialization, and area of interest.
4. At the end of the Fourth Semester, every student shall undergo Summer Training/ Internship/ Capstone for Eight Weeks in the industry/ Research or Academic Institute. This component will be evaluated during the fifth semester. The candidates will submit the SIR in the manner specified in the Ordinance.
5. The formative assessment criteria for **Value Added Course** in Semester IV will be as follows:

Sessional Test	40 Marks
Class Assignment/ Case Study/ Mini Project	30 Marks
Quiz/ Seminar/ Group Discussion/ Debate	25 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

6. The formative assessment criteria for **Skill Enhancement Course** in Semester IV will be as follows:

Sessional Test	30 Marks
MCQs/Quizzes/Group Discussion	20 Marks
Case Study/ Mini Project	25 Marks
Seminar/ Presentation	20 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

7. Exit Criteria after Second Year of BBA Program
   The students shall have an option to exit after 2nd year of Business Administration Program and will be awarded with a UG Diploma in Business Administration. Students on exit have to compulsorily complete additional 04 Credits either in a Skill based subject or work based Vocational Course offered during summer term or Internship/ Apprenticeship/ Social Responsibility & Community Engagement encompassing community engagement with an NGO/ Capstone Project after the fourth semester of minimum 8 weeks of duration as decided by the Institute (securing 84 credits). The exiting students will clear the subject/ submit the Internship Report as per the Institute schedule.

Total Credits (20+20+20+20=80+4) for UG Diploma (Business Administration)	**84**

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Re-entry Criteria into Third Year (Fifth Semester)
The student who takes an exit after the second year with an award of Diploma may be allowed to re-enter into fifth Semester for completion of the BBA Program as per the University schedule after earning requisite credits in the Second year.

Scheme of Studies and Examination
BBA – 5th Semester

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Formative Assessment	Summative Assessment	Practical / Viva-Voce	Total
1	Core Courses	DSC-BBA-301B	Strategic Management	3	1	0	4	4	30	70	-	100
2	Core Courses	DSC-BBA-303B	Logistics and Supply Chain Management	3	1	0	4	4	30	70	-	100
3	Discipline Specific Electives	Table-I Discipline Specific Elective	Specialization-I (Course-1)	3	1	0	4	4	30	70	-	100
4	Discipline Specific Electives	Table-I Discipline Specific Elective	Specialization-II (Course-1)	3	1	0	4	4	30	70	-	100
5	Discipline Specific Electives	Table-I Discipline Specific Elective	Additional DSE (3-1-0) (Audit Course) *	-	-	-	-	No Credit	-	-	-	-
6	Internship	INT-BBA-301B	Summer Internship Report/ Capstone Project	-	-	-	4	4	-	-	100	100
	Total Credits							**20**				**500**

Note:
1.*An Audit Course is a non-credit course that is undertaken for learning purposes only. If successfully completed, the audit course may be recorded. Additional DSE is an Audit Course (Non-Credit but compulsory) to be opted by the student from the list of specializations offered other than the two specializations chosen by her/ him.
2. Four credits of internship earned by a student during summer internship after the 2nd semester or 4th semester will be counted in the 5th semester of a student who pursues a 3-year UG Program without taking exit option.
3. The criteria for Internship Evaluation will be as follows:
After completion of internship, students need to prepare a comprehensive report highlighting their learning and takeaways during the internship period. The internship report prepared after completion shall be assessed in the 5th semester as a compulsory course. The candidates will submit the internship report in the prescribed format designed by the department. The report shall be signed by the Internship Supervisor from respective Department and Mentor from internship providing organisations. Evaluation of internship report and viva-voce will be jointly conducted by Internship Supervisor and Mentor on the time and date notified by the concerned HoD. The mentor from host organization may participate in the evaluation through online/ offline mode. In case of nonavailability of respective mentor, the available relevant mentor as decided by the concerned head of the department, may be utilized for the purpose of evaluation.
Suggested distribution of marks will be as below:
Assessment by Mentor- 30 Marks (Skills learned- 15 Marks; Regularity- 10 Marks; Conduct- 5 Marks)
Internship Report - 40 Marks
Viva-Voce - 30 Marks
4. The student shall start working on the Major Project in this semester as per the guidelines. It will be evaluated in sixth semester as a compulsory paper.
5. Students are required to choose any two specialization areas offered under a dual specialization scheme from the given three groups, selecting not more than one specialization from one Group. A minimum of **TWENTY** students is required to offer any specialization area from any two groups. The specialization area opted for in the 5th Semester would remain the same in all further semesters.

GROUP A	GROUP-B	GROUP-C
Human Resource Management	Marketing	Finance
Business Analytics	Supply Chain Management	International Business

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Scheme of Studies and Examination

BBA – 6th Semester

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Formative Assessment	Summative Assessment	Practical / Viva- Voce	Total
1	Core Courses	DSC-BBA-302B	Project Management	3	1	0	4	4	30	70	-	100
2	Core Courses	DSC-BBA-304B	Business Taxation	2	0	0	2	2	30	70	-	100
3	Discipline Specific Electives	Table-I Discipline Specific Elective	Specialization-I (Course-2)	3	1	0	4	4	30	70	-	100
4	Discipline Specific Electives	Table-I Discipline Specific Elective	Specialization-II (Course-2)	3	1	0	4	4	30	70	-	100
5	Discipline Specific Electives	Table-I Discipline Specific Elective	Additional DSE (3-1-0) (Audit Course) *	-	-	-	-	No Credit	-	-	-	-
6	Skill Enhancement Courses	SEC-306B	Corporate Governance	2	0	0	2	2	100	-	-	100
7	Project Report	RP-BBA-302B	Major Project Report	-	-	-	4	4	-	-	100	100
Total Credits								**20**				**600**

Note:

1. *An Audit Course is a non-credit course that is undertaken for learning purposes only. If successfully completed, the audit course may be recorded. Additional DSE is an Audit Course (Non-Credit but compulsory) to be opted by the student from the list of specializations offered other than the two specializations chosen by her/ him.
2. Students exiting the Program shall be awarded a 3-year Bachelor of Business Administration upon securing 120 credits.
3. At the end of the Sixth Semester, Students opting for 4th year of BBA (Honors) shall undergo Summer Internship-II for Eight Weeks in the industry/ Research or Academic Institute. This component will be evaluated during the Seventh semester. The candidates will submit the SIR in the manner specified in the Ordinance.
4. The formative assessment criteria for **Skill Enhancement Course** in Semester VI will be as follows:

Sessional Test	30 Marks
MCQs/Quizzes/Group Discussion	20 Marks
Case Study/ Mini Project	25 Marks
Seminar/ Presentation	20 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

5. In case of the Project reports/ Dissertation/ Research Project, the assessment shall be jointly carried out by the internal and external examiners. There shall be no Internal assessment component for Dissertation/ Project Report. External examiners shall be invited from amongst the panel of examiners recommended by the department BOS.

Total Credits (20+20+20+20+20+20) for 3-Year UG Degree in Business Administration	**120**

Exit Criteria after Third Year of BBA Program

The students shall have an option to exit after 3rd year of Business Administration Program and will be awarded with a Bachelor's in Business Administration.

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Re-entry Criteria into Fourth Year (Seventh Semester)

The student who takes an exit after third year with an award of BBA may be allowed to re-enter into the seventh semester for completion of the BBA (Honors) or BBA (Honors with Research) Program as per the University schedule after earning requisite credits in the Third year.

Minimum eligibility criteria for opting the course in the fourth year will be as follows:

- **BBA (Honors with Research):** Minimum 75% marks or equivalent CGPA in BBA Degree up to Sixth Semester.
- **For BBA (Honors):** BBA Degree

Scheme of Studies and Examination
BBA – 7th Semester (Honors)

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Formative Assessment	Summative Assessment	Practical / Viva-Voce	Total
1	Core Courses	DSC-BBA-H-401B	Entrepreneurial Leadership	2	2	0	4	4	30	70	-	100
2	Discipline Specific Electives	Table-I Discipline Specific Elective	Specialization-I (Course-3)	3	1	0	4	4	30	70	-	100
3	Discipline Specific Electives	Table-I Discipline Specific Elective	Specialization-II (Course-3)	3	1	0	4	4	30	70	-	100
4	Open Elective	OE-BBA-H-401B	AI for Business	3	1	0	4	4	100	-	-	100
5	Internship	INT-BBA-H-401B	Internship Report-II	-	-	-	-	4	-	-	100	100
Total Credits								**20**				**500**

Note:

1. The duration of all the end-term theory examinations shall be 3 hours.
2. The Criteria for awarding the formative assessment of 30 marks throughout the Program shall be as under:
   a) Sessional Examination: 15 marks.
   b) Assignments/ Presentations/ Seminars and Class Participation: 10 marks
   c) Attendance: 5 marks
   (Less than 65% - 0 marks; Upto 70% - 2 marks; Upto 75% - 3 marks; Upto 80% - 4 marks; Above 80% - 5 marks)
3. The panel of examiners for end-semester theory examinations shall be prepared and approved by the BOS, comprising internal and external examiners based on their expertise, specialization, and area of interest.
4. The formative assessment criteria for **Open Elective Course** in Semester VII will be as follows:

Sessional Test	30 Marks
MCQs/Quizzes/Group Discussion	20 Marks
Case Study/ Mini Project	25 Marks
Seminar/ Presentation	20 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

5. The criteria for Internship Evaluation will be as follows:

After completion of internship, students need to prepare a comprehensive report highlighting their learning and takeaways during the internship period. The internship report prepared after completion shall be assessed in the 5th semester as a compulsory course. The candidates will submit the internship report in the prescribed format designed by the department. The report shall be signed by the Internship Supervisor from respective Department and Mentor from internship providing organisations. Evaluation of internship report and viva-voce will be jointly conducted by Internship Supervisor and Mentor on the time and date notified by the concerned HoD. The mentor from host organization may participate in the evaluation through online/ offline mode. In case of nonavailability of respective mentor, the available relevant mentor as decided by the concerned head of the department, may be utilized for the purpose of evaluation.

Suggested distribution of marks will be as below:

Assessment by Mentor- 30 Marks (Skills learned- 15 Marks; Regularity- 10 Marks; Conduct- 5 Marks)

Internship Report - 40 Marks and Viva-Voce - 30 Marks

6. In the Seventh Semester, every student has to submit a synopsis for a dissertation to the department prepared in consultation with his/ her Research Supervisor and appear before a Research Advisory Committee (RAC) constituted by the the concerned Department. This component will be evaluated during the eighth semester.

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Scheme of Studies and Examination
BBA (Honors) – 8th Semester (Honors)

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Formative Assessment	Summative Assessment	Practical / Viva- Voce	Total
1	Discipline Specific Electives	Table-I Discipline Specific Elective	Specialization-I (Course-4)	3	1	0	4	4	30	70	-	100
2	Discipline Specific Electives	Table-I Discipline Specific Elective	Specialization-II (Course-4)	3	1	0	4	4	30	70	-	100
3	Discipline Specific Electives	Table-I Discipline Specific Elective	Specialization-I (Course-5) OR Specialization-II (Course-5)	3	1	0	4	4	30	70	-	100
4	Research Project/Dissertation	RP-BBA-H-402B	Dissertation Work	-	-	-		8			200	200
Total Credits								**20**				**500**

Note:
1. In case of the Project reports/ Dissertation/ Research Project, the assessment shall be jointly carried out by the internal and external examiners. There shall be no Internal assessment component for Dissertation/ Project Report. External examiners shall be invited from amongst the panel of examiners recommended by the department BOS.

Total Credits (20+20+20+20+20+20+20+20) for Four Year BBA Honors	**160**

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Scheme of Studies and Examination
BBA – 7th Semester (Honors with Research)

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Formative Assessment	Summative Assessment	Practical / Viva-Voce	Total
1	Core Courses	DSC-BBAR-401B	Advanced Data Analysis Tools	2	0	2	4	4	30	70	-	100
2	Core Courses	DSC-BBAR-403B	Advanced Research Methodology	2	0	2	4	4	30	70	-	100
3	Discipline Specific Electives	Table-I Discipline Specific Elective	Specialization-I (Course-3)	3	1	0	4	4	30	70	-	100
4	Discipline Specific Electives	Table-I Discipline Specific Elective	Specialization-I (Course-3)	3	1	0	4	4	30	70	-	100
5	Internship Report	INT-BBAR-401B	Internship Report	-	-	-	-	4			100	100
Total Credits								**20**				**500**

Note:

1. The criteria for Internship Evaluation will be as follows:

After completion of internship, students need to prepare a comprehensive report highlighting their learning and takeaways during the internship period. The internship report prepared after completion shall be assessed in the 5th semester as a compulsory course. The candidates will submit the internship report in the prescribed format designed by the department. The report shall be signed by the Internship Supervisor from respective Department and Mentor from internship providing organisations. Evaluation of internship report and viva-voce will be jointly conducted by Internship Supervisor and Mentor on the time and date notified by the concerned HOD. The mentor from host organization may participate in the evaluation through online/ offline mode. In case of nonavailability of respective mentor, the available relevant mentor as decided by the concerned head of the department, may be utilized for the purpose of evaluation.

Suggested distribution of marks will be as below:

Assessment by Mentor- 30 Marks (Skills learned- 15 Marks; Regularity- 10 Marks; Conduct- 5 Marks)

Internship Report - 40 Marks and Viva-Voce - 30 Marks

2. In the Seventh Semester, every student has to submit a synopsis for a dissertation to the department prepared in consultation with his/ her Research Supervisor and appear before a Research Advisory Committee (RAC) constituted by the the concerned Department. This component will be evaluated during the eighth semester.

Scheme of Studies and Examination
BBA – 8th Semester (Honors with Research)

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Formative Assessment	Summative Assessment	Practical / Viva- Voce	Total
1	Research Project/ Dissertation	RP-BBA-R-402B	Dissertation	-	-	-	-	20	-	-	500	500
Total Credits								**20**				**500**

Note:

1. The topic of the Dissertation to be submitted for evaluation in the eighth Semester shall be submitted by the student along with a brief synopsis after finalization in the 7th Semester in consultation with his/ her Research Supervisor and appear before a Research Advisory Committee (RAC) constituted by the concerned Department.
2. In case of the Project reports/ Dissertation/ Research Project, the assessment shall be jointly carried out by the internal and external examiners. There shall be no Internal assessment component for Dissertation/ Project Report. External examiners shall be invited from amongst the panel of examiners recommended by the department BOS.
3. Students undertaking the research dissertation may have their research findings patentable, presented at conferences or seminars, or published in peer-reviewed journals.

Total Credits (20+20+20+20+20+20+20+20) for Four Year BBA Honors with Research	**160**

Table I: Discipline-Specific Electives

List of Courses Offered for Various Specializations under Discipline-Specific Electives

Human Resource Management			
Course Code	**Semester**	**Course**	**Title of the Course (s)**
DSE-BBA-HR-301B	5	1	Training & Development
DSE-BBA-HR-302B	6	2	Performance & Compensation Management
DSE-BBA-HR-401B	7	3	Change Management and Organizational Development
DSE-BBA-HR-402B	8	4	HRD– Systems & Strategies
DSE-BBA-HR-404B	8	5	Talent Acquisition and Management
Business Analytics			
Course Code	**Semester**	**Course**	**Title of the Course (s)**
DSE-BBA-BA-301B	5	1	Social media & Web Analytics
DSE-BBA-BA-302B	6	2	Data Analytics using R/Python
DSE-BBA-BA-401B	7	3	Finance Analytics
DSE-BBA-BA-402B	8	4	Marketing Analytics
DSE-BBA-BA-404B	8	5	HR Analytics
Marketing			
Course Code	**Semester**	**Course**	**Title of the Course (s)**
DSE-BBA-MM-301B	5	1	Consumer Behavior
DSE-BBA-MM-302B	6	2	Sales Marketing
DSE-BBA-MM-401B	7	3	Retail Marketing
DSE-BBA-MM-402B	8	4	Integrated Marketing Communication
DSE-BBA-MM-404B	8	5	Digital Marketing
Supply Chain Management			
Course Code	**Semester**	**Course**	**Title of the Course (s)**
DSE-BBA-SCM-301B	5	1	Inventory Management
DSE-BBA-SCM-302B	6	2	Logistics & Distribution Management
DSE-BBA-SCM-401B	7	3	Management Decision Models
DSE-BBA-SCM-402B	8	4	Quality Management and Business Process Improvement
DSE-BBA-SCM-404B	8	5	International Supply Chain
Finance			
Course Code	**Semester**	**Course**	**Title of the Course (s)**
DSE-BBA-FIN-301B	5	1	Financial Planning
DSE-BBA-FIN-302B	6	2	Financial Markets Products and Services
DSE-BBA-FIN-401B	7	3	Financial Derivatives
DSE-BBA-FIN-402B	8	4	Investment Analysis & Portfolio Management
DSE-BBA-FIN-404B	8	5	Direct Tax

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International Business			
Course Code	**Semester**	**Course**	**Title of the Course (s)**
DSE-BBA-IB-301B	5	1	Global Business Environment
DSE-BBA-IB-302B	6	2	Transnational & Cross-Cultural Marketing
DSE-BBA-IB-401B	7	3	EXIM Policy and Documentation
DSE-BBA-IB-402B	8	4	International Ventures, Mergers & Acquisitions
DSE-BBA-IB-404B	8	5	International Trade Policy & Strategy

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Kablana, Distt. Jhajjar (Haryana)
तमसो मा ज्योतिर्गमय
GITAM

SYLLABI

OF

2nd Semester

BACHELOR OF BUSINESS ADMINISTRATION PROGRAMME

WITH EFFECT FROM THE

ACADEMIC SESSION 2025-26

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA
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Course Code	DSC-BBA-102B				
Category	Core Courses				
Course Title	**Principles of Management and Organizational Behavior**				
Scheme and Credits	L	T	P	**Credits**	**Semester-II**
	3	1	0	**4**	
Course Objectives	The objectives of this course are 1. To understand the fundamental concepts, principles, and evolution of management along with planning, organizing, staffing, directing, and controlling functions. 2. To explore ethical, social, cross-cultural, and sustainable management practices for effective organizational performance and leadership. 3. To understand decision-making, strategic thinking, and performance management skills using modern management and strategic management approaches. 4. To learn about the individual and group behavior in organizations, including motivation, personality, leadership, communication, and organizational culture.				
Formative Assessment	30 Marks				
Summative Assessment	70 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Define** fundamental concepts of Management and organizational behavior.	Level-1 Remember
CO2	**Explain** the principles, functions, and evolution of management and organizational behavior.	Level-2 Understand
CO3	**Apply** various management tools and techniques in organizational scenarios.	Level-3 Apply
CO4	**Analyze** the role of various management practices for organizational performance.	Level-4 Analyze

Note:

1. Examiner will set nine questions in total. Question one will have 07 short questions of 2 mark (each) from all units. Remaining eight questions of 14 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first question is compulsory and selecting one from each Unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Fundamentals of Management and Planning**: Meaning, significance and Principles of management; Levels of management and managerial skills; Evolution of management thought; Classical, Behavioural, Quantitative, Systems, Contingency and Modern approaches Functions of management; Planning – nature, types and process; Decision-making; Organizational structure, Design and types, authority, responsibility and delegation, Centralization Vs Decentralization of authority & responsibility, MBO and MBE; Staffing – recruitment and selection.
Unit-II	**Control and Strategic Management:** Meaning and Nature of Directing; Hawthorn effect Communication in management; Controlling – process and types; Performance measurement; Strategic management – concept and SWOT analysis; Strategy implementation and evaluation; Ethical issues in management; Corporate social responsibility; Sustainable management practices.

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Unit-III	**Organizational Behavior and Individual Behavior**: Organizational behavior – meaning, importance and historical development; Factors influencing organizational behavior; Contributing disciplines and models of OB; Individual behavior; Personality – determinants, type A and B, Big Five personality types and stages; Attitudes and job-related attitudes; Learning and perception; Values – terminal and instrumental; Motivation – concept and importance; Motivation theories – Maslow, Herzberg, McGregor; Contemporary motivation theories – Goal-setting, Reinforcement and Self-efficacy.
Unit-IV	**Group Behavior, Leadership and Organizational Culture:** Groups and teams – concept and stages of group development; Group norms, groupthink and group conflict; Types of teams and e-teams; Team building; Leadership – concept and theories (Behavioral, contingency); Transformational and charismatic leadership; Indian leadership styles with other countries; base of Power; Organizational culture – concept and impact; Creating and sustaining culture; Ethical and positive cultures; Cross-cultural management-need and importance; Stress and its management.

Suggested Readings:

- Management Principles and Applications by V. S. P. Rao, Taxmann Publications
- Principles of Management by D. Bright et al., OpenStax Textbooks, Houston
- Principles of Management by Premvir Kapoor, Khanna Book Publishing
- Management by S. P. Robbins and M. A. Coulter, Pearson
- Organizational Behavior by K. Aswathappa, Himalaya Publishing House, Mumbai, 18th Edition
- Organizational Theory and Behavior by L. M. Prasad, Sultan Chand & Sons, New Delhi
- Organizational Behavior: An Evidence-Based Approach by Fred Luthans, McGraw Hill Publishers Co. Ltd., New Delhi
- Organizational Behavior by Stephen Robbins, Prentice Hall of India Ltd., New Delhi

Useful Video Links:

Unit No	Topics	Links
Unit-I	Principles of Management	https://www.nptelprep.in/courses/110105146/videos?utm
Unit-II	Strategic Management	https://www.nptelprep.in/courses/110108047/videos?utm
Unit-III	Introduction to Organization Management, Nature, Scope and Complexity	https://nptel.ac.in/courses/110102016?utm
Unit-IV	Leadership and Team Effectiveness	https://www.nptelprep.in/courses/110107159

Course Code	DSC-BBA-104B				
Category	Core Courses				
Course Title	**Marketing Management**				
Scheme and Credits	L	T	P	**Credits**	**Semester-II**
	3	1	0	4	
Course Objectives	The objectives of this course are: 1. To Understand the nature, scope, evolution, core concepts and various orientations of marketing. 2. To Assess contemporary marketing practices including ethics, social responsibility, rural, green and social marketing for sustainable business growth. 3. To understand pricing, promotion and distribution channel decisions and their role in creating customer value and competitive advantage. 4. To learn about product decisions including PLC, branding, product mix, portfolio strategies (BCG matrix), innovation and new product development.				
Formative Assessment	30 Marks				
Summative Assessment	70 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Recall** fundamental concepts, terminology and frameworks related to marketing management.	Level-1 Remember
CO2	**Explain** concepts, processes and relationships to demonstrate conceptual understanding about marketing management.	Level-2 Understand
CO3	**Apply** appropriate concepts and tools to solve practical and contextual problems related to marketing.	Level-3 Apply
CO4	**Analyze** situations and data to examine patterns, issues and implications for effective decision-making.	Level-4 Analyze

Note:

1. Examiner will set nine questions in total. Question one will have 07 short questions of 2 marks (each) from all units. Remaining eight questions of 14 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total; first question is compulsory and selecting one from each Unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Introduction:** Nature, Scope and Importance of Marketing, Evolution of Marketing; Core marketing concepts; Company orientation -"Production concept, Product concept, selling concept, Marketing concept, Holistic marketing concept; Marketing Environment: Demographic, Economic, Political, Legal, Socio cultural, Technological environment (Indian context); Market and competition analysis, Market Analysis and Creating and Delivering Customer Value. types of marketing (B2C, B2G, B2B, C2C)
Unit-II	**Segmentation, Targeting and Positioning:** Concept; Levels of Market Segmentation, Basis for Segmenting Consumer Markets; Consumer Behaviour, The Rise of Consumer Democracy, Stimulus Response Model of Consumer Behaviour, Buyer's Cultural, Social, Personal, and Psychological Characteristics particularly in Indian context, Consumer Buying Decision Process, Business Customer's Buying Decision Process, and Traditional vs. Experiential Marketing's View of Customer

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Unit-III	**Product decisions:** Concept of Product Life Cycle (PLC), PLC marketing strategies, Product Classification, Product Line Decision, Product Mix Decision, Branding Decisions, Packaging & Labelling. Portfolio approach – Boston Consulting Group (BCG) matrix. Introduction to Brand Management and Innovation and New Product Development. Pricing Decisions: Determinants of Price, Pricing Methods (Non-mathematical treatment), and Adapting Price. Promotion Decisions: Factors determining promotion mix, Promotional Tools – Fundamentals of advertisement, Sales Promotion, Public Relations & Publicity and Personal Selling. Marketing Channel Decision: Channel functions, Channel Levels, Types of Intermediaries: Wholesalers and Retailers, Introduction to Retail Management.
Unit-IV	**Marketing of Services:** Unique Characteristics of Services, Marketing Strategies for Service Firms-7Ps.Contemporary issues in Marketing, E-commerce, Digital Marketing, Ethics and social responsibility in Marketing, Integrated Marketing, Online Payments, Rural Marketing, Social Marketing, Green Marketing (Introductory aspects only).

Suggested Readings:

- Marketing Management (16th Edition) by P. Kotler, K. Keller, et al., Pearson Education Pvt. Ltd.
- Strategic Market Management: Global Perspectives by D. A. Aaker and Christine Moorman, John Wiley & Sons
- Marketing Management by Philip Kotler, Kevin Keller, Alexander Chernev and Jagdish N. Sheth, Pearson Higher Education
- Principles of Marketing (17th Edition) by P. Kotler, G. Armstrong and P. Y. Agnihotri, Pearson Education
- Marketing Management: Indian Context Global Perspective (6th Edition) by V. S. Ramaswamy and S. Nandakumar, Sage Publications India Pvt. Ltd.
- Digital Marketing (7th Edition) by D. Chaffey and F. Ellis-Chadwick, Pearson Higher Education

Useful Video Links:

Unit No	Topics	Links
Unit-I	Marketing Management	https://www.digimat.in/nptel/courses/video/110104068/L01.html
Unit-II	Market Segmentation, Targeting, and Positioning	https://digimat.in/nptel/courses/video/110107147/L23.html
Unit-III	Pricing Products and Services	https://digimat.in/nptel/courses/video/110107147/L39.html
Unit-IV	Rural Marketing	http://onlinecourses.swayam2.ac.in/nou25_mg25/preview

Course Code	DSC-BBA-106B				
Category	Core Courses				
Course Title	**Business Statistics and Logic**				
Scheme and Credits	L	T	P	**Credits**	**Semester-II**
	3	1	0	4	
Course Objectives	The objectives of this course are: 1. To understanding data classification, presentation, and statistical measures of central tendency, dispersion, skewness, and kurtosis for effective data analysis. 2. To learn about relationships between variables using correlation and regression techniques for interpretation and prediction. 3. To introduce fundamental concepts of probability and probability distributions and apply them to solve real-life and business-related problems. 4. To enhance logical, analytical, and reasoning skills through numerical, analytical, and deductive reasoning techniques.				
Formative Assessment	30 Marks				
Summative Assessment	70 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Recall** fundamental concepts and terminology used in business statistics and logical analysis.	Level-1 Remember
CO2	**Describe** the application of statistical methods to interpret and summarize data accurately.	Level-2 Understand
CO3	**Apply** statistical tools and techniques to solve problems.	Level-3 Apply
CO4	**Analyze** data and statistical methods in real-world applications.	Level-4 Analyze

Note:

1. Examiner will set nine questions in total. Question one will have 07 short questions of 2 mark (each) from all units. Remaining eight questions of 14 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first question is compulsory and selecting one from each Unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Measures of Central Tendency, Dispersion, Measures of Skewness and Kurtosis:** Classification and tabulation of data, frequency distribution, diagrams and graphs, measures of central tendency arithmetic mean, weighted arithmetic mean, median, mode, geometric mean and harmonic mean (theory only) and meaning of partition values- quartiles, deciles, percentiles, measures of dispersion - range, quartile deviation, mean deviation from mean and median, standard deviation and coefficient of variation. Skewness - meaning, difference between dispersion and skewness, Karl Pearson's and Bowley's measures of skewness, concept of kurtosis, types of kurtoses and importance.
Unit-II	**Correlation and Regression:** Meaning, definition and use of correlation, covariance, scatter diagram, types of correlation, Karl Pearson's correlation coefficient, Spearman's Rank correlation coefficient, probable error. Regression - meaning and utility of regression analysis, comparison between correlation and regression, regression lines –x on y, y on x, regression equations and regression coefficients. Meaning

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Unit-III	**Probability and Probability distributions:** Introduction to probability, basic concepts of probability- classical definition, addition and multiplication rules, probability distributions – binomial, poisson and normal distributions, expected value.
Unit-IV	**Introduction to Logic:** Number series, coding decoding and odd one out series, direction sense test, seating arrangements – linear and circular, blood relations, arithmetic and geometric progressions, Inductive and deductive reasoning.

Suggested Readings:

- Statistics for Management by R. I. Levin and D. S. Rubin, Pearson, Delhi
- Statistics: Theory and Practice by Pillai and Bagavathi, S. Chand Publishing
- Statistical Methods by S. P. Gupta, Sultan Chand and Sons
- Fundamentals of Statistics by S. C. Gupta, Himalaya Publishing House
- The Practice of Business Statistics by Sharma and Gupta, Khanna Publishing House
- Business Statistics by J. K. Sharma, Vikas Publishing House

Useful Video Links:

Unit No	Topics	Links
Unit-I	Introduction to Statistics and Data	https://nptel.ac.in/courses/110107114?utm
Unit-II	Regression	https://nptel.ac.in/courses/110107114?utm
Unit-III	Introduction to Probability Theory and Statistics	https://onlinecourses.nptel.ac.in/noc25_ma33/preview?utm
Unit-IV	Nature and Scope of Deductive and Inductive Arguments	https://www.nptelprep.in/courses/109104040/materials?utm

Course Code	MDC-108B				
Category	Multidisciplinary Courses				
Course Title	**Media Literacy and Critical Thinking**				
Scheme and Credits	L	T	P	**Credits**	**Semester-II**
	2	0	0	**2**	
Course Objectives	The objectives of this course are: 1. To understand fundamental concepts, terms, and principles related to media, communication, and critical thinking. 2. To foster media literacy principles for navigating digital media landscapes and evaluating credibility. 3. To understand media production dynamics and ownership structures in the Indian context. 4. To address ethical and regulatory considerations in media practices.				
Formative Assessment	50 Marks				
Summative Assessment	50 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Define** fundamental concepts, terms related to media, communication, and critical thinking.	Level-1 Remember
CO2	**Understand** the complexities of media production, distribution, and audience behaviour.	Level-2 Understand
CO3	**Apply** media literacy principles to make informed decisions about media consumption and production.	Level-3 Apply
CO4	**Apply** various techniques to gather media content and information across different platforms.	Level-3 Apply

Note:

1. Examiner will set nine questions in total. Question one will have 05 short questions of 2 marks (each) from all units. Remaining eight questions of 10 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first question is compulsory and selecting one from each Unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Foundations of Media Literacy and Critical Thinking:** Core principles of media literacy and critical thinking; Definition and significance of media literacy, its historical evolution within the Indian context; Understanding media as a powerful communication tool and its role in shaping societal perceptions and behaviours.
Unit-II	**Deconstructing Media Texts:** Forms of media texts, including print, broadcast, digital, and social media; Textual analysis and the deconstruction of visual media using semiotics; The impact of media representations on individual perceptions and societal attitudes, from relevant case studies in the Indian context.

Unit-III	**Media Consumption and Production Dynamics:** Dynamics of media production, distribution, and consumption in India: Influence of ownership and control structures on media content; Techniques for critically evaluating media content and analysing audience consumption patterns
Unit-IV	**Ethics, Regulation, and Digital Media Literacy:** Ethical and regulatory considerations inherent in media practices and the evolving landscape of digital media literacy. Ethical principles in media, the regulatory framework governing media content, and the role of self-regulatory bodies in upholding ethical standards; Digital media's impact on contemporary media literacy practices, strategies for navigating online information, and promoting digital citizenship.

Suggested Readings:

- Media Literacy (8th Edition) by W. J. Potter, SAGE Publications
- Media Literacy in the Digital Age by R. Hobbs, Routledge
- Thought and Knowledge: An Introduction to Critical Thinking (5th Edition) by D. F. Halpern, Psychology Press
- Thinking, Fast and Slow by Daniel Kahneman, Farrar, Straus and Giroux
- Media Literacy Education in Action: Theoretical and Pedagogical Perspectives by J. Kahne and B. Bowyer
- The Media Literacy Handbook by K. Barbour and J. Marshall, ASCD
- Media Laws and Ethics in India by N. K. Bhaskar, Lexis Nexis
- The 7 Habits of Highly Effective People: Powerful Lessons in Personal Change (30th Anniversary Edition) by S. R. Covey, Simon and Schuster

Useful Video Links:

Unit No	Topics	Links
Unit-I	Media Literacy: Policy Perspectives, Concept, Need and Scope	https://www.youtube.com/watch?v=39n9sDB0grc
Unit-II	Text, Textuality and Digital Media	http://digimat.in/nptel/courses/video/109102156/L01.html
Unit-IV	Digital and Social Media Marketing	https://www.digimat.in/nptel/courses/video/110107432/L33.html

Course Code	**AEC-102B**				
Category	Ability Enhancement Courses				
Course Title	**Business Communication**				
Scheme and Credits	L	T	P	**Credits**	**Semester-II**
	1	1	0	**2**	
Course Objectives	The objectives of this course are: 1. To understand the fundamental principles of communication within organizational and professional contexts. 2. To develop effective interpersonal and team communication skills for contemporary workplace environments. 3. To enhance written communication abilities for various professional documents, reports, and organizational correspondence. 4. To learn oral, cross-cultural, and career-related communication competencies and professional etiquette.				
Formative Assessment	65 Marks				
Summative Assessment	35 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Recall** fundamental principles, models, and types of communication in organizational and professional contexts.	Level-1 Remember
CO2	**Explain** interpersonal and team communication strategies and their relevance in workplace scenarios.	Level-2 Understand
CO3	**Apply** effective communication skills across professional documents, reports, and organizational correspondence.	Level-3 Apply
CO4	**Use** various communication materials and digital tools effectively in real-world organizational scenarios.	Level-3 Apply

Note:

1. Examiner will set nine questions in total. Question one will have 07 short questions of 1 mark (each) from all units. Remaining eight questions of 07 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total; first question is compulsory and selecting one from each Unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Foundations of Organizational and Written Communication:** Introduction to communication in organizations; business environment and communication; models of communication; basics of communication—types, channels, barriers; 7Cs of communication; formal and informal communication; listening skills; communication on social media platforms. Written communication—planning and executing messages; emails; formal business letters (planning and layout); informal digital messages; negative messages (direct and indirect); persuasive messages; request letters; sales letters; complaint and follow-up letters; promotion letters; job application letters; cover letters; resume; resignation letters.
Unit-II	**Interpersonal Communication:** Interpersonal and team communication; communication during online meetings; communication with virtual teams and in the gig economy. Presentation skills—verbal and non-verbal communication.
Unit-III	**Organizational and Written Communication:** Intra-organizational and workplace communication: meaning, need, and types. Written communication in organizations—office circulars, notices, agenda, memoranda, office orders, newsletters. Positive and negative messages. E-mail communication—advantages, safety, smart writing, and e-mail etiquette. ethical issues in social media communication. Business and corporate communication—types of business reports, formal reports, proposals, RFP responses, minutes of meetings, annual report summaries. Corporate communication channels and audiences. Communication during crisis and organizational change. Culture as communication.

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Unit-IV	**Oral, Cross-Cultural Communication and Career Skills:** Oral communication—meaning, techniques, and media: face-to-face, telephonic, teleconferencing, press conference, radio, public address, podcasts. Oral presentations, group discussions, team communication, online meeting communication, professional etiquette. Negotiation skills and cross-cultural communication—BATNA, body language, globalization, cultural frameworks, diverse workforce communication, intercultural skills etiquettes, and interview skills.

Suggested Readings:

- Communication Skills in English by AICTE, Khanna Book Publishing
- Business Communication: Connecting in a Digital World by R. V. Lesikar and M. E. Flatley, McGraw-Hill Education
- Effective Business Communication by H. A. Murphy, H. Hildebrandt and J. P. Thomas, McGraw Hill
- Business Communication: Connecting at Work by H. S. Mukerjee, Oxford Publication
- Business Communication Today by C. L. Bovee, J. V. Thill and R. L. Raina, Pearson
- Communication Skills in English (with Lab Manual) by Anjana Tiwari, Khanna Book Publishing Co.
- Business Communication: Connecting at Work by H. S. Mukerjee, Oxford Publication

Useful Video Links:

Unit No	Topics	Links
Unit-I	Introduction to communication in organizations	http://digimat.in/nptel/courses/video/110105052/L01.html
Unit-II	Non-Verbal Communication	https://www.digimat.in/nptel/courses/video/109104031/L09.html
Unit-III	Workplace Communication	http://digimat.in/nptel/courses/video/109107394/L12.html
Unit-IV	Evolution of Digital Literary Practices	http://digimat.in/nptel/courses/video/109107394/L18.html

Course Code	AEC-104B				
Category	Ability Enhancement Courses				
Course Title	General English-II				
Scheme and Credits	L	T	P	Credits	Semester-II
	1	1	0	2	
Course Objectives	The objectives of this course are 1. To understand the role of stress, intonation, and phonetic transcription in effective spoken English. 2. To understand the structure and usage of clauses and verb forms, including tenses, modals, and non-finites. 3. To understand the mechanics of writing, barriers to effective writing, and strategies to overcome them. 4. To understand various forms of writing, including paragraphs, dialogues, letters, emails, and blogs.				
Formative Assessment	65 Marks				
Summative Assessment	35 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Recall** stress patterns, intonation types, verb forms, clauses, and modals, tense and writing formats.	Level-1 Remember
CO2	**Describe** the role of stress, intonation, grammar, and writing mechanics in effective communication.	Level-2 Understand
CO3	**Apply** stress, intonation, grammar, and writing strategies to produce clear spoken and written English.	Level-3 Apply
CO4	**Apply** effective spoken and written texts using accurate stress, intonation, grammar, and structure.	Level- 3 Apply

Note:

1. Examiner will set nine questions in total. Question one will have 07 short questions of 1 mark (each) from all units. Remaining eight questions of 07 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first question is compulsory and selecting one from each Unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**Introduction of Stress**: Role of stress , primary stress and secondary stress (marking primary stress on commonly used words) Transcription (of commonly used multisyllabic words) **Phonetics and Intonation**: Intonation – concept and uses of rising tone, falling tone, rising-falling tone, falling-rising tone
Unit-II	**Grammar- Clauses and Verbs**: Clauses: Noun, Adjective, Adverbial and Conditional Verbs: Finite/Non-Finite, Infinitive, Gerund, Participles, Modals, Tense
Unit-III	**Writing Skills and Mechanics**: Introduction to Writing Skills and Mechanics of Writing Barriers to Effective Writing and Steps to overcome them.
Unit-IV	**Practical Writing Applications**: Paragraph Writing : Descriptive, Argumentative, Expository Dialogue Writing , Letter Writing , Email Writing, Resume writing and Blog Writing

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Suggested Readings:

- English for Ability Enhancement, Orient Blackswan
- English Phonetics for Indian Students by T. Balasubramanian, Macmillan India Limited
- Better Spoken English by Shreesh Chaudhary, Vikas Publishing House Pvt. Ltd.
- Speak Better Write Better English by Norman Lewis, Goyal Publishers and Distributors Pvt. Ltd.
- Oxford Advanced Learner's Dictionary, Oxford University Press
- Practical English Usage by Michael Swan, Oxford University Press
- A Practical English Grammar by A. J. Thomson and A. V. Martinet, Oxford University Press

Useful Video Links:

Unit No	Topics	Links
Unit-I	Stress and Intonation	https://archive.nptel.ac.in/courses/109/106/109106094/
Unit-II	Modals	https://auece.digimat.in/nptel/courses/video/109106201/L24.html
Unit-III	Introduction to Writing Skills	https://archive.nptel.ac.in/courses/109/107/109107172/
Unit-IV	Paragraph Writing	https://archive.nptel.ac.in/courses/109/106/109106094/

Course Code	VAC-102B				
Category	Value Added Courses				
Course Title	**Indian Constitution**				
Scheme and Credits	L	T	P	**Credits**	**Semester-II**
	2	0	0	**2**	
Course Objectives	The objectives of this course are: 1. To develop an understanding of the Indian Constitution beyond legal and political lenses, emphasizing its significance for business students 2. To recognize the importance of comprehending constitutional basics and their impact on trade, economy, and business practices 3. To understand the transition from state-led industrialization to liberalization, highlighting the constitutional underpinnings of these economic shifts. 4. To analyse the inclusion of economic justice in the preamble and its implications for post-colonial economic policies.				
Formative Assessment	65 Marks				
Summative Assessment	35 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Recall** key principles, frameworks, and historical developments related to economic and constitutional governance.	Level-1 Remember
CO2	**Explain** the relationship between legal provisions and their impact on economic and societal structures.	Level-2 Understand
CO3	**Apply** constitutional and legal concepts in contemporary economic and regulatory scenarios.	Level-3 Apply
CO4	**Apply** constitutional and legal concepts to assess policy decisions and legal frameworks in complex economic context	Level-3 Apply

Note:

1. Examiner will set nine questions in total. Question one will have 07 short questions of 1 mark (each) from all units. Remaining eight questions of 07 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first question is compulsory and selecting one from each Unit.
2. At least four cases will be discussed, one from each unit.

Unit No.	Contents
Unit-I	**An Economic History of the Constitution of India:** Historical understanding of the constitution as an economic document. Understanding the Preamble, starting from the land reform cases in the 1950s to the validity of the bitcoin ban imposed by the RBI, this module signpost all of the important economic moments in the constitutional history of post-colonial India; Constitutional design, Legal, Regulation and economic justice.
Unit-II	**Fundamental Rights and Business in India:** Article 19(1)(g), grants every citizen the right, to practise any profession, or to carry on any profession, occupation, trade, or business. Like other fundamental rights, this right is subject to reasonable restrictions impose by the state. This particular provision of the Constitution has been one of the most severely litigated freedoms. Fundamental Duties.
Unit-III	**Fiscal Federalism:** Article articles 301 to 307 of the Constitution pertains to Trade, Commerce and Intercourse within the Territory of India; Challenges associated with fiscal federalism in India including the vertical fiscal imbalance; Article 280 of the Constitution.
Unit-IV	**Constitutional Battles that Shaped the Economy:** This module will be taught through key case studies that demonstrate the complex and fascinating overlap between the constitution and business and shall use Saurabh Kirpal's book Fifteen Judgments: Cases that Shaped India's Financial Landscape as our guide through this landscape. The case studies include the banning of diesel engine cars, Telecom regulation and ownership of broadcast media, Demonetisation, Aadhaar, the lifting of restrictions on dealing in cryptocurrencies.

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Suggested Readings:

- The Oxford Handbook of the Indian Constitution by Sujit Choudhry, Madhav Khosla and Pratap Bhanu Mehta, Oxford University Press

Cases:

- Rustom Cavasjee Cooper v. Union of India, (1970) 1 SCC 248
- State of Rajasthan v. Mohan Lal Vyas, AIR 1971 SC 2068
- Mithilesh Garg v. Union of India, (1992) 1 SCC 168; AIR 1992 SC 221
- Chintamanrao v. State of Madhya Pradesh, AIR 1951 SC 118
- Cooverjee B. Bharucha v. Excise Commissioner, Ajmer, AIR 1954 SC 220
- T. B. Ibrahim v. Regional Transport Authority, Tanjore, AIR 1953 SC 79
- Harman Singh v. Regional Transport Authority, Calcutta, AIR 1954 SC 190
- Dwarka Prasad Laxmi Narain v. State of U.P., AIR 1954 SC 224
- State of Bombay v. R. M. D. Chamarbaugwala, AIR 1957 SC 699
- Parbhani Transport Co-operative Society Ltd., Regional Transport Authority, Aurangabad, AIR 1960 SC 801
- State of Bombay v. R. M. D. Chamarbaugwala, (1957) SCR 874
- G. K. Krishnan v. State of Tamil Nadu, (1975) 1 SCC 375
- Automobile Transport (Rajasthan) Ltd. v. State of Rajasthan, AIR 1962 SC 1406

Useful Video Links:

Unit No	Topics	Links
Unit-I	Background, History & Framing of the Constitution of India	https://www.youtube.com/watch?v=rs1D1rIfhWM
Unit-II	Fundamental Duties	https://nptel.ac.in/courses/129105608
Unit-III	Finance Commission under Article 280	http://kcl.digimat.in/nptel/courses/video/129105410/L27.html
Unit-IV	Saurabh Kirpal's book Fifteen Judgments: Cases that Shaped India's Financial Landscape	https://youtu.be/lA55pZ9IBmk?si=fH5bBxn2dsKCrsQ4

Course code	AEC-106B				
Category	Additional Courses				
Course title	Hindi				
Scheme and Credits	L	T	P	Credits	Semester-II
	1	1	0	2	
Course Objectives	The objectives of this course are 1 विद्यार्थियों को हिन्दी भाषा के महत्व एवं गुणवता से सुविज्ञ करवाकर हिन्दी की ओर उन्मुख करना। 2 विद्यार्थियों को हिन्दी भाषा की वैज्ञानिकता के विषय में बतलाकर इसके गौरव से सुपरिचित करवाना। 3 हिन्दी भाषा के माध्यम से नवयुवक- नवयुवतियों को राष्ट्रीयता के पुनीत भावों की ओर उन्मुख करना।				

Course Outcomes: After studying this course, the students will be able to

CO	Skills Demonstrated	RBT Level
CO1	लिपि भाषा और साहित्य के बुनियादी सिद्धांतों का अवलोकन करें।	Level 1: Remember
CO2	भाषा की संरचनाए अर्थ और अभिव्यक्ति के पहलुओं की समझ विकसित करें।	Level 2: Understand
CO3	भाषाई और साहित्यिक सिद्धांतों को वास्तविक जीवन में लागू करने की क्षमता प्राप्त करें।	Level 3: Apply
CO4	भाषा लिपि और साहित्य के विभिन्न पहलुओं का विश्लेषण करके जटिल साहित्यिक और सांस्कृतिक मुद्दों को समझें।	Level 4: Analyze

Unit No.	Content
Unit-I	**लिपि का मानकीकरण**, मानक वर्णमाला, देवनागरी अंक माला, अनुस्वार और विसर्ग, अनुनासिक, वर्तनी की शुद्धता के लिए ध्यान देने योग्य बातें वर्तनी संबंधी अशुद्धियों के कारण वर्तनी संबंधी अशुद्धियों को दूर करने के उपाय
Unit-II	**सृजनात्मक साहित्य का अर्थ**, परिभाषा और स्वरूपः आलोचनात्मक साहित्य का अर्थ, परिभाषा और स्वरूपः सृजनात्मक साहित्य का भाषा विकास में महत्व, निबंध लेखन, कहानी लेखन, काव्य लेखन
Unit-III	**अनुवाद अर्थ**, परिभाषा और स्वरूपय अनुवाद का महत्त्व, अनुवादक के गुण, अनुवाद के प्रकार अनुवाद में कंप्यूटर का योगदान, सीरियलों का हिंदी अनुवाद, बैंकिंग साहित्य का अनुवाद, डबिंग क्षेत्र में अनुवाद, लिप्यंतरण, हिंदी साहित्य का अन्य भाषाओं में अनुवाद, अनुवाद क्षेत्र में रोजगार
Unit-IV	**पत्र प्रस्तुतीकरण का अर्थ** पत्र प्रस्तुतीकरण और नवीन शोधात्मक वैचारिकता पत्र प्रस्तुतीकरण और शिक्षक की भूमिका, प्रस्तोता का मनोबल, वक्तृत्व कला का विकास शोधात्मक अभिरुचि का विकास

प्रेरणास्पद पुस्तके :

- शुद्ध लेखन और हिन्दी का मानक रूप डॉ० हरिश्चन्द्र वर्मा, विद्या भारती, संस्कृति शिक्षा संस्थान कुरुक्षेत्र (हरियाणा)
- बृहत् हिन्दी कोशः, सम्पा० कालिका प्रसाद, राजवल्लभ सहाय, मुकुन्दीलाल श्रीवास्तव, ज्ञानमण्डल लिमिटेड, वाराणसी
- परिशोध, मुख्य सम्पादक, डॉ० लक्ष्मीनारायण शर्मा, मानव- मूल्य विशेषांक 1993
- भारतीय जीवनमूल्य, डॉ० धर्मपाल मैनी, भारतीय संस्कृति संस्थान, गुड़गाँव
- बृहत् प्रशासन शब्दावली, हिन्दी-अंग्रेजी, वैज्ञानिक तथा तकनीकी शब्दावली आयोग, नई दिल्ली-110006
- बृहत् प्रशासन शब्दावली, अंग्रेजी-हिन्दी वैज्ञानिक तथा तकनीकी शब्दावली आयोग, नई दिल्ली-110006
- बृहत् पारिभाषिक शब्द-संग्रह, मानविकी, खंड-1 वैज्ञानिक तथा तकनीकी शब्दावली आयोग, केन्द्रीय हिन्दी निदेशालय शिक्षा तथा समाज कल्याण मंत्रालय, भारत सरकार
- प्रयोजनमूलक अनुवाद, डॉ० सुरेश सिंहल मोनिका प्रकाशन, दिल्ली-110053
- अनुवाद सिद्धान्त एवं व्यवहार, डॉ० सुरेश सिंहल, अभिनव प्रकाशन, दिल्ली-6

Useful Video links:

Unit No	Topics	Links
Unit-I	लिपि का मानकीकरण	https://www.youtube.com/watch?v=g1jcWLojnj4&t=2s
Unit-II	सृजनात्मक साहित्य का अर्थ	https://www.youtube.com/watch?v=aUOgArzWtTU
Unit-III	अनुवाद	https://www.youtube.com/watch?v=B1-xF-WBDXI
Unit-IV	प्रस्तुतीकरण का अर्थ	https://www.youtube.com/watch?v=NkXI3lgDkrw

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CERTIFICATE COURSE ON DIGITAL MARKETING

SESSION: 2025-26

Eligibility Criteria: At least Senior Secondary Examination (10+2) with at least 50% marks (47.5% in case of SC/ST /Blind/Visually/Differently abled etc. candidates of Haryana Only) from board of school education Haryana, Bhiwani or any other examination recognized by Maharshi Dayanand University, Rohtak as equivalent thereto.

Program Duration: 6 Months (Twice in an Academic Year)
Course Credits: 3

No. of Seats: 30
The reservation of seats is as given below:

Sr. No	Name of Program	Break of seats as per State Govt. Reservation Policy									No. of Sanctioned Seats
		AIC	EWS*	HOGC	SC#		BC (A)	BC (B)	DA/PwD/PH/ ESM/DFF##	EWS*	
					OSC	DSC					
1	Certificate Course in Digital Marketing	4	-	11	3	3	4	3	1	1	30

Note: In the event of vacant seats remaining after the final date of allotment based on reservations, these may be allocated to general category candidates.

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SCHEME AND SYLLABUS CERTIFICATE COURSE

Course Code	**CC-DME-01**				
Category	Certificate Course				
Program Name	Digital Marketing				
Course Title	**Digital Marketing**				
Duration	6 Months **(Offering Twice in an Academic Year)**				
Scheme and Credits	L	T	P	**Credits**	
	3	0	0	**3**	
Course Objectives	The objectives of this course are • To provide a comprehensive understanding of digital marketing platforms, web store creation, and search engine optimization concepts. • To develop the ability to plan and execute effective social media marketing campaigns across multiple platforms. • To equip students with skills to use digital analytics and experimentation tools for monitoring and optimizing marketing performance. • To enable students to design and implement integrated digital marketing campaigns including SEO, mobile, and email marketing. • To enhance practical skills through hands-on exercises in web store creation, SEO, social media, email, mobile campaigns, and analytics.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Recall key concepts, tools, and processes of digital marketing, including web store creation, SEO, SEM, social media, mobile, email, and analytics	Level 1: Remember
CO2	Explain strategies, workflows, and objectives for web store setup, SEO, social media campaigns, mobile promotions, email marketing, and integrated campaigns.	Level 2: Understand
CO3	Apply digital marketing techniques, including building web stores, executing social media campaigns, and designing ads, running mobile/email campaigns, and using analytics tools.	Level 3: Apply
CO4	Analyze website performance, SEO effectiveness, social media metrics, and multi-channel campaigns to identify gaps and optimize results.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT-I : Web store Creation & SEO

Web store Creation: Process of building a digital web store, registering a domain name, configuring web hosting, designing website layout & store pages, creating product/service pages, Integrating forms, checkout elements, basic payment workflow.
Search Engine Setup & Optimization: Search engine working & application, Crawling, indexing & ranking basics, Keyword selection & mapping, Using AdWords Keyword Planner, On-site optimization fundamentals, back linking plan (without tools), Directory submission methods, Basics of Search Engine Marketing, bidding for keywords, Understanding Ad Rank

UNIT-II: Social Media Marketing

Social Media Setup: Creating business profiles (FB, IG, LinkedIn, Twitter, YouTube), Structuring social media calendars, Strategic use of hashtags, reels, stories, retweets,
Facebook, Instagram & LinkedIn Marketing: Platform-specific marketing strategies, Facebook banner & ad creative planning, Facebook Ad setup basics, Instagram branding & content flow, Creating Instagram banners & video creatives, LinkedIn brand presence planning, Creating LinkedIn Company Pages
YouTube & Twitter Marketing: YouTube marketing workflow, creating promotional YouTube videos, Setting up YouTube channels for business, Twitter marketing strategy, Use of tweets, retweets & hashtags in campaigns

UNIT-III: Digital Analytics & Experimentation

Web Analytics: Role of analytics and digital campaigns, Google Analytics account setup, Traffic flow analysis, Exit rate interpretation, Bounce rate tracking, CTR measurement, User flow & behavioral insights, Event tracking basics
Social Media Analytics: Facebook Analytics structure, Twitter Analytics metrics, YouTube Analytics (retention, reach, engagement), Instagram Analytics (impressions, reach, profile activity)
Experimentation & Testing: A/B testing process, Variant creation, Test analysis & reporting, Optimizing campaigns through insights

UNIT-IV: Integrated Campaigns, SEO, Mobile & Email Marketing

Mobile Marketing: Types of mobile ad formats, WhatsApp, SMS, App-based promotion, Mobile campaign development, measuring mobile ad effectiveness, Targeting diverse mobile audience segments in India.
Search Engine Optimization Tasks: SEO workflow, Technical SEO fundamentals, On-page SEO (titles, Meta tags, and structure), Off-page SEO (ethical link building), Outreach planning, content structure improvement, SEO maintenance & reporting.
Email & Integrated Execution: Building email lists, designing marketing emails, Automation & drip flow, Integrating Web + Social + Mobile campaigns

Suggested Readings:

- Digital Marketing for Dummies – Ryan Deiss & Russ Henneberry
- Marketing 5.0: Technology for Humanity – Philip Kotler
- Digital Marketing Essentials – Jeff Larson & Stuart Draper
- Ultimate Guide to Google Ads – Perry Marshall
- The Power of Subconscious Mind-Joseph Murphy
- Social Media Marketing Workbook – Jason McDonald
- Face book Marketing: An Hour A Day – Chris Tread away

Latest books can be referred by the Experts on Digital Marketing

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~~Annexure 3.8~~
Annexure 4.10 f

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CERTIFICATE COURSE ON "Tally ERP 9"

SESSION: 2025-2026

Eligibility Criteria: At least senior secondary examination (10+2) with at least 50% marks (47.5% in case of SC/ST/Blind/Visually/Differently abled etc. candidates of Haryana only) from board of school education Haryana, Bhiwani or any other examination recognized by Maharshi Dayanand University, Rohtak as equivalent thereto.

Duration: 6 Months (Offering twice in an academic year)

Course Credits: 4

No. of Seats: 30

The reservation of seats is as given below

Sr. No.	Name of Program	Break of seats as per State Govt. Reservation Policy							DA/PwD/ PH/ESM/ DFF##	EWS**	No. of Sanctioned Seats
		AIC	EWS*	HOGC	SC#		BC (A)	BC (B)			
					OSC	DSC					
1	Certificate Course on Tally ERP	4	-	11	3	3	4	3	1	1	30

Note: In the event of vacant seats remaining after the final date of allotment based on reservations, these may be allocated to general category candidates.

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SCHEME AND SYLLABUS OF CERTIFICATE COURSE

Course Code	**CC-TALLY-01**				
Category	Certificate Course				
Course Title	Tally ERP 9				
Scheme and Credits	L	T	P	**Credits**	
	3	0	2	4	
Course Objectives	The objectives of this course are • To understand basic accounting concepts, principles, and financial statements. • To familiarize students with Tally ERP 9 setup, company creation and configuration. • To equip learners with the skills to create and manage accounting and inventory masters in Tally ERP 9. • To Practice students to record transactions, perform reconciliation, ratio analysis, and generate reports in Tally ERP 9.				
Assessment	20 Marks				
End Semester Practical	20 Marks				
End Semester Examination	60 Marks				
Total Marks	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Define** basic accounting concepts, principles, and the key components of Tally ERP 9 including company creation, masters, vouchers, and financial statements.	Level 1: Remember
CO2	**Describe** the use of Tally ERP 9, including GST features, masters, and vouchers, in preparing accurate financial statements.	Level 2: Understand
CO3	**Apply** accounting rules and Tally ERP 9 features to create companies, set up masters, record voucher entries, and generate financial reports.	Level 3: Apply
CO4	**Analyze** business transactions and records using Tally ERP 9 tools, including vouchers, inventory adjustments, bank reconciliation, and trial balance, to ensure accuracy and completeness.	Level 4: Analyze

Note: The Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each, and the remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, the first being compulsory and selecting one from each unit.

Unit No.	Contents
Unit-I	**Accounting Fundamentals & Basic Concepts:** Basics of Accounting: definitions, accounting terminology (assets, liabilities, revenue, expenses, etc.), Accounting concepts, conventions and principles. Double-entry bookkeeping system, debit & credit rules, types of accounts, journal & ledger, trial balance Preparation of financial statements: Trading Account, Profit & Loss Account, Balance Sheet(Including GST transactions); Income & Expenditure Account, Receipts & Payments Account.
Unit-II	**Introduction to Tally & Company Setup:** Overview of Tally ERP 9 software — what is Tally, versions (ERP 9, Prime) and differences. Installation/activation/licence setup (if covered) and configuration basics. Creating a company in Tally: entering company information, selecting financial year/book, modifying or deleting company data, shutting or re-opening company, backup & restore, security controls (Tally Vault/data security), audit features.
Unit-III	**Masters – Groups, Ledgers, Inventory Masters:** Chart of Accounts: creating Groups and Ledgers, multiple groups/ledgers as needed. Inventory Masters (if doing inventory module): Stock Groups, Stock Categories, Stock Items, Units of Measure, Godowns/Locations, optional batch/expiry tracking, Bills of Materials (for manufacturing/assembly).
Unit-IV	**Transaction Processing & Voucher Entries:** Voucher entries (Accounting Vouchers: payment, receipt, journal, contra; Inventory Vouchers; and invoices). Sales, Purchase entries; Debit and Credit notes; Purchase/Sales orders; Stock journal; Delivery/Receipt notes; Rejection entries; Manufacturing journals (if manufacturing module is included). Bank reconciliation, cheque printing or banking features if applicable. Ratio Analysis.

Suggested Readings:

- Financial Accounting by R. L. Gupta & M. Radhaswamy, Sultan Chand & Sons
- Tally ERP 9 + GST Implementation by Akshay Rajgaria,BPB Publications
- Tally ERP 9 (Power of Simplicity) by Shraddha Singh, V&S Publishers
- Tally ERP 9: Basic Accounts, Invoice & Inventory by Asok K. Nadhani , BPB Publications

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ORDINANCE
MASTER OF BUSINESS ADMINISTRATION
(from the academic session 2025-26)

1 Preliminaries

1.1 This ordinance shall apply to MBAProgrammes offered by this Institute.

Program	Normal duration	Extended duration
MBA	Two Years (04 semesters)	Five Years

An academic year shall consist of two semesters (odd & even) each of approximately 18 weeks or 90 working days duration inclusive of the period of examination and semester break. The eligibility criteria for admission to each programme, fee structure, academic calendar, scheme of studies and examinations, examination schedule, sports calendar and cultural activity calendar etc. for the academic year shall be published in the prospectus/Institute website.

2. Ordinance: Master of Business Administration

Notwithstanding anything contained in any other ordinance with regard to the matter hereunder, the courses of study for the Degrees of Master of Business Administration and the conditions for admission thereto shall be as under:

This ordinance shall be applicable along with other rules related to Re-evaluation, Punishment rules in case of UMC, Rules to award medals, Examination rules etc. amended from time to time.

2.1 The Master of Business Administration Degree courses shall extend over a minimum period of two years. Teaching in each academic year shall be divided into two semesters, each semester extending to 18 weeks or 90 working days including practical, semester examination and semester break. Teaching for odd semesters will normally be from August to December and for even semesters from January to May.

2.2 At the end of the each semester, there shall be an examination wherein candidates shall be examined in the courses studied by them in that semester. Each semester examination shall be designated as First Semester Examination, Second Semester Examination, and Third Semester Examination and so on.

2.3 The examinations for all semesters will normally be held in December/January and also in May/June on such dates as may be fixed by the Controller of Examinations as per the schedule provided by the Institute. The date(s) of commencement of examination as well as the last date(s) for the receipt of the examination forms and fees shall also be notified by the Controller of Examinations to the concerned teaching departments The concerned teacher should ensure that 100% syllabus is covered in his/her course before the start of semester examinations.

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2.4 The Courses of the study and the examinations shall be as approved by the Academic Council from time to time. The medium of instructions and Examination shall ordinarily be English except otherwise decided by the Academic Council. The question paper will be set in English, except otherwise decided by the board of studies concerned and approved by the Academic Council. Every candidate shall be examined in the subjects as laid down in the syllabus approved by the Academic Council from time to time. The credits for each course/subject as also the contact hours per week will be mentioned in the scheme of studies approved by the Academic Council.

2.5. Evaluation Process:

(i) End Semester Examination (Theory Examination):

Questions papers for the end semester examination shall be set by paper setters appointed by Controller of Examinations from a panel of examiners submitted by the Chairman of the Board of Studies duly approved by respective BOS. In case a question paper is not received in time from a paper setter COE shall get the paper set from an alternate examiner who is otherwise competent to do so in the panel approved by BOS. The evaluation of answer scripts shall be done as per procedure laid down by the Institute.

(ii) Practical Examination:

Examination in Practical and viva-voce shall be conducted jointly by the two examiners. One examiner shall be appointed by the Controller of Examinations from a panel of examiners submitted by Chairman of B.O.S. of respective departments and one examiner by Head of the department.

(iii) Sessional (Internal Assessment):

The internal assessment of the students (out of 40 marks) shall be as per the criteria given below:

S. No.	Components of Minors	Weightage
A	**THEORY COURSES:**	
1	Sessional Test – I	60% weightage of the total internal marks by considering best two of the three sessional tests
2	Sessional Test – II	
3	Sessional Test-III	
4	Assignment/Classwork	20%
5	Attendance	20%
B	**LAB COURSES:**	
1	Attendance	32%
2	Lab. Work / Project	48%
3	Viva Voce/Test	20%

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Wherever the evaluation is through presentation, it will be done by a Committee constituted by the Head of the concerned Department or Director of the Institute under his/her Chairmanship.

Every student has to appear in minimum of two sessional tests. If a student does not take a sessional test, he/she shall be awarded zero marks in that test. The marks obtained in sessional/practical/theory/seminar/Research Project are to be submitted to the Examination wing duly signed by the Head of the Department before the close of semester examination or a date fixed by the COE. The examination wingshall convert the marks in to equivalent grades as per the grading procedure.

(iv) Summer Internship Report Evaluation

All the students will submit their Summer Internship Report in a format as prescribed in the "Detailed Guidelines for Summer Internship" within a period of one month in the concerned department of their Institute; this period shall be counted from the last date of completion of their Summer Internship. Students will have to give a presentation on the work done during the internship and his/her performance out of 25 marks will be evaluated on the basis of this presentation by a committee constituted by the Head of the Department. The evaluation of the remaining 75 marks shall be made by external examiner appointed by the Controller of Examinations on the recommendation of Chairman, Board of Studies of the Department.

(v) Project Report

Every student will be required to submit a research proposal by the end of the Third Semester and it will be pursued by him/her under the supervision of an internal supervisor. The completed Project Report in the format as prescribed in the "Detailed Guidelines for Project Report" will be submitted by the students prior to the date of the commencement of the Final Examinations for the Fourth Semester and this date will be notified by the Controller of Examinations of the Institute.

(vi) Project Report Evaluation

The Project shall be evaluated by Examiners as per the scheme of studies and examinations. The internal assessment shall be done by the concern supervisor of the candidate. The external assessment shall be done on the basis of evaluation of the project report by an external expert appointed by the Controller of Examinations from the panel of examiners approved by Chairman, BOS.

2.6 The examination shall be open to a candidate who:

(i) has attended regularly the prescribed courses of studies for the relevant semester examination in the department/affiliated institutions recognized by the Institute for the degree of Master of Business Administration.

(ii) has his/her name submitted to the Controller of Examinations by the Head of the department.

(iii) has a good moral character.

(iv) Unless otherwise stated in the Ordinance, a student must have a minimum of 75% attendance in each course/subject individually for the semester. Relaxation in shortage of Lectures up to 20% will be allowed by the Director of the Institute on following grounds.

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i. Self-illness
ii. Illness/Death of Parents, Brother, Sister or any other close family member.
iii. Any other reason beyond the control of the student to the satisfaction of the Director.
iv. A student who actively appears in the sessional test(s) shall be granted corresponding attendance.

Students participating in sports, games, cultural, co-curricular activities, hackathons, or similar competitions (as certified by the concerned HOD) will be treated as 'on duty' for the time spent, including travel. Attendance will be granted as follows:

State/National/Inter-University Level: Up to 15% by the Director, with reasons recorded.
International Level: Up to 20% by the Director, with reasons recorded.
Exceptional: Attendance up to 75% may be granted by the Director, on Committee recommendation, for rare brilliance or outstanding performance.

(v) The percentage of attendance of a candidate shall be calculated from the date of admission of the candidate or first day of start of semester.

2.7 **Registration/Continuous Absence/Re-admission**

(i) Every student has to register himself/herself at the starting of each semester. Teaching Department/Institution shall make the provision of Registration.
(ii) If a student is continuously absent during entire semester without any intimation and did not deposit requisite fee of the semester, his registration/admission shall be cancelled & Re-admission will not be allowed.
(iii) If candidate has registered himself/herself and requisite fee has been deposited & candidate is absent during a semester to the extent that he/she is unable to fulfill the requirement of attendance as per rules, then he/she will be detained in that semester. Re-admission will be allowed in the same semester of next academic year.
(iv) Detention/Admission cancellation order will be issued by Director.
(v) Re-admission will be allowed by Director. Candidate has to apply 15 days before the start of semester & will deposit the requisite fee along with other regular students. Otherwise Registration/admission shall be cancelled.

2.8 If a candidate, after attending the classes for the course of studies in the Department/Institute either not appeared or having appeared in any semester examination has failed in one or more paper(s) for that examination, he/she can appear for such paper(s) at subsequent examinations without attending a fresh course of studies for that semester. Such a candidate may, in the meantime, prosecute his / her studies for the next semester(s) and appear in the examination(s) for the same along with the examination for the lower semester(s).

2.9 The student will be automatically eligible for promotion to the next semester provided he/she fulfils the other essential eligibility criterion for promotion as mentioned in the ordinance. A candidate who is unable to pass the Master of Business Administration Programme within a maximum of Five consecutive academic years from the date of his/her admission shall lose the right to pursue the degree programme. In exceptional cases, mercy chance can be given by the Director to a candidate if he/she applies as per rules.

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2.10 The minimum passing marks/grade for passing any semester Examination shall be:

i. A candidate must secure at least 40% marks in the aggregate of Assessment (Refer 2.5 (iii)) and end semester examinations for each theory and practical course/subject. Additionally, obtaining a minimum of 40% marks in the end semester examination is mandatory. If a candidate fails to meet the required aggregate marks, they will need to reappear in the respective courser course/subject during subsequent theory/practical examinations, as per clause 2.3. However, such candidates are not required to repeat the sessional (internal assessment) work.

ii. Minimum pass grade in each course is 'P' grade. Grade will be awarded after adding the marks of sessional and major test/practical examination i.e. SGPA of 4.0

iii. Where a course is evaluated on the basis of Assessment marks only i.e. there is no end-semester examination, the candidate will be required to secure at least 40% marks to pass the course.

iv. 1% of total marks including sessional of the scheme of a semester of those theory courses/subjects whose examinations are conducted in the end of the semester (i.e. May/June and November/December examinations) shall be awarded as grace marks to pass in one or more courses/subjects of that semester.

v. Students enrolled in final semester and those who have completed all semester of academic program shall be allowed a special sessional examination of weightage 40% of the maximum sessional marks. This examination will be conducted by the Department/College/Institution only for those students who have scored less than 40% marks in the sessional and got re-appear due to deficiency in sessional awards. It is further clarified that this special sessional examination is not for improvement of marks. Out of total awards secured by the candidate in this special sessional examination only the marks required to pass the course/subject shall be considered towards the final score.

A candidate who fails to obtain the requisite marks/grade in any course shall be required to appear in the concerned course in the subsequent examination(s) as per the clause 2.3, 2.7 & 2.8.

2.11 If a candidate has completed his/her degree by passing all the coursesand he/she wants to improve his/her grade, he/she may be allowed to improve by depositing the requisite fee as per the Institute Rules. He/she is allowed to appear in at the most half of the theory papers only of a semester along with the regular candidates of that semester and the sessional (internal assessment) part will be retained. Such opportunity of improvement shall be given only during the extended duration of academic programme applicable. If the improved CGPA is less than the original, then the original will be retained.

2.12 The result of a student at the end of each semester Examination and after completion of course shall be declared on the basis of the SGPA & CGPA (cumulative grade point average) obtained by the student.

2.13 At the end of each semester examination, the COE shall publish the result, provided that in a case where candidate who was permitted to take examination for higher semester but has not cleared the lower semester examination his result for the higher semester examination will be declared provisionally. Each successful candidate shall be issued a Detailed Marks Card of the result on having passed the semester examination.

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2.14 There shall be an Examination Grievances Committee regarding end semester theory examinations comprising:-

1.	Director	Chairman
2.	Head of the Department offering the course	Member
3.	Nominee of Director	Member
4.	Controller of Examinations	Member-Secretary

The Complaint regarding question paper of end semester theory examination, if any, shall be submitted by the student(s)/teacher through Head of the Department within 7 days of the examination to the office of Controller of Examinations. The Committee shall examine and submit the report with specific recommendation regarding re-examination or award of grace marks with justification to the Controller of Examinations within 7 days. The Director shall be the final authority to take decision on the recommendation of the Committee.

2.15 Notwithstanding the integrated nature of the course wherever it is spread over more than one academic year, the Ordinance in force at the time a student joins the course shall hold good only for the examination held during or at the end of the semester and nothing in this Ordinance shall be deemed to debar the Institute from amending the Ordinance and the amended Ordinance, if any, shall apply to all students whether old or new as per the decision of Academic Council.

3. SCHOLARSHIP:

Scholarship may be awarded to students as per the terms and conditions stipulated by Governing Body of the Institute.

4. CREDIT SYSTEM:

The Institute has introduced credit system for all the students admitted in the Bachelor of Technology Degree courses from the Academic Year 2024-25. The prominent features of this system are the process of continuous evaluation of a student's performance, and a flexibility to allow the student to progress at an optimum pace.

Each Academic Program has a certain number of credits which describe its weightage to get under graduate degree in Engineering as prescribed in the scheme of studies and examinations. A student will be eligible to get under graduate degree with Honours or additional Minor Engineering, if he/she completes an additional 20 credits in any specific subject. These could be acquired through Massive Open Online Courses (MOOC'S).

A student's performance is measured by the number of credits that he/she has completed satisfactorily. A minimum grade point average is required to be maintained for satisfactory progress.

Each subject/course (component of subject/course) has a certain number of credits which reflect its weightage and is normally decided on the basis of effective contacts hours. It is mentioned in the scheme of studies and examinations.

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4.1 The sessional examinations will be conducted centrally by the Examination Committee. Evaluation of the answer scripts will be carried out by the faculty members of the respective departments. After completing the evaluation, the marks must be submitted to the office of the Controller of Examinations. In case of any grievance, it may be submitted to the Head of the Department, who will arrange for the answer book to be rechecked and address the issue in the best interest of the student.

4.2 The marks/grade awarded to a student in any particular subject will be based on the performance of the student evaluated throughout the semester. The syllabus of the Sessional Test will be what is covered in that particular term. The Semester Examination will be based on the entire syllabus.

4.3 The Head of the Department shall forward the assessment awards/grades to the Examination Wing within 10 days after the semester ends and examination process starts. The evaluated answer sheets of sessional test are to be kept by the examination wing for at least four months of declaration of results. The Examination wing will keep the evaluated answer sheets/Dissertation/Project Report of the end semester examination for at least four months after the declaration of results.

5. GRADING SYSTEM:

For the award of grades in a course/subject, all component-wise evaluation shall be done in marks. The marks would be converted to grades as per the guidelines given below

5.1 Letter Grades and Grade Points:

The Semester Grade Point Average (SGPA) is computed from the grades as a measure of the student's performance in a given semester. The SGPA is based on the grades of the current term, while the Cumulative GPA (CGPA) is based on the grades in all courses taken after joining the program of study. The HEIs may also mention marks obtained in each course and a weighted average of marks based on marks obtained in all the semesters taken together for the benefit of students.

Marks (%)	Letter Grade	Grade Point
>=90 AND <100	O+ (Exemplarily Outstanding)	10
>=80 AND <90	O (Outstanding)	9
>=70 AND <80	A+ (Excellent)	8
>=60 AND <70	A (Very good)	7
>=55 AND <60	B+ (Good)	6
>=50 AND <55	B (Above average)	5.5
>=40 AND <50	C (Average)	5
=40	P (Pass)	4
Below 40	F (Fail)	-
ABSENT	AB	-

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(a) Computation of SGPA and CGPA: The SGPA is the ratio of the sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.,

$$SGPA\ (S_i) = \frac{\sum(C_i \times G_i)}{\sum C_i}$$

Where C_i is the number of credits of the i^{th} course and G_i is the grade point scored by the student in the i^{th} course.

Example for Computation of SGPA

Semester	Course	Credit	Letter Grade	Grade Point	Credit Point
I	Course 1	3	A+	8	3X8=24
I	Course 2	4	A	7	4X7=28
I	Course 3	3	B+	6	3X6=18
I	Course 4	3	O+	10	3X10=30
I	Course 5	3	C	5	3X5=15
I	Course 6	4	B+	6	4X6=24
		20			**139**
	SGPA				139/20=**6.95**

The Cumulative Grade Point Average (CGPA) is also calculated in the same manner taking into account all the courses undergone by a student in all the semesters of a program, i.e.

$$CGPA = \frac{\sum(C_i \times S_i)}{\sum C_i}$$

Where, S_i is the SGPA of the i^{th} semester and C_i is the total number of credits in that semester.

Example for Computation of CGPA

Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6
Credit: 21 SGPA: 6.9	Credit: 22 SGPA:7.8	Credit: 25 SGPA: 5.6	Credit: 26 SGPA: 6.0	Credit: 26 SGPA: 6.3	Credit: 25 SGPA: 8.0
CGPA = 6.73 (21X6.9+22X7.8+25X5.6+26X6.0+26X6.3+25X8.0)/145					

The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

HOD MGMT

(i) While calculating percentage of marks to award grades, 0.5 or higher fraction may be raised to the next higher whole number.

(ii) The awards/grades shall be submitted by the evaluator concerned to the office of Controller of Examination immediately after the evaluation.

(iii) The procedure for evaluation and award of grades for summer internship training in industries or other options shall be decided by the Controller of Examinations (or a committee constituted by Director of the Institute) as per their scheme of examinations. The candidate shall be required to submit a comprehensive report within one month of completion of training/project. Report will be completed under the supervision of the officer of the company/Institution under whose guidance and supervision the training/project was completed by the candidate in that company/Institute. The candidate will add supervisor's certificate in the beginning of the report stating that the report is an out-come of work done by the candidate during his/her training/project.

5.2 Computation of Division

Marks (%)	Division
>=75%	1st Division with Distinction
>=60% AND <75%	1st Division
>=50% AND <60%	2nd Division
>=40% AND <50%	3rd Division

6. Power to Remove Difficulties:

If any difficulty arises in giving effect to the provisions of this Ordinance, the Director of the Institute may, by order, make such provisions not inconsistent with the Act, Statutes, Ordinances or other Regulations, as appears to be necessary or expedient to remove the difficulty, however subject to ratification of such order by the Statutory bodies of the Institute.

Annexure 4.11 a

DEPARTMENT OF COMPUTER SCIENCE AND APPLICATIONS
GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, JHAJJAR

An Autonomous Institute | NAAC 'A' Grade Institute | Affiliated to MDU, Rohtak

Minutes of 3rd Meeting of Board of Studies of Computer Science and Applications Department held on 22.12.2025

The 3rd meeting of Board of Studies of Department of Computer Science and Applications was held on 22.12.2025 at 11:00 A.M in the Conference Hall of the Institute.

The following members were present for the BOS meeting:

S.No	Name of the Member	Affiliation/Organization	Designation within Board of Studies
1	Prof.(Dr.) Anil Kumar	Chairperson	Professor, Head, CSA, GITAM, Kablana
2	Prof. Rahul Rishi (Deptt. of CSE, UIET, MDU, Rohtak)	Member	Subject Expert, (University Nominee)
3	Prof. Shailender Verma (Deptt of CSE, DTU, Delhi)	Member	Subject Expert, Outside the Parent University
4	Mr. Jitender Singh	Member	Assistant Prof. & CSA, GITAM, Kablana
5	Dr.Praveen Kumari	Member	Assistant Professor, CSA, GITAM Kablana
6	Mrs. Meenu Sharma	Member	Assistant Professor, CSA, GITAM Kablana
7	Dr.Prince	Member	Assistant Professor, CSA, GITAM Kablana
8	Dr. Kavita	Member	Assistant Professor, CSA, GITAM Kablana
9	Dr. Diksha	Member	Assistant Professor, CSA, GITAM Kablana
10	Ms. Pooja	Member	Assistant Professor, CSA, GITAM Kablana
11	Ms. Priya	Member	Assistant Professor, CSA, GITAM Kablana
12	Ms. Rani	Member	Assistant Professor, CSA, GITAM Kablana
13	Ms.Annu	Member	Assistant Professor, CSA, GITAM Kablana
14	Ms. Chandani Sahu	Member	Assistant Professor, CSA, GITAM Kablana
15	Mr. Amit	Member	Assistant Professor, CSA, GITAM Kablana

16	Ms. Manju	Member	Assistant Professor, CSA, GITAM Kablana
17	Ms. Jyoti	Member	Assistant Professor, CSA, GITAM Kablana
18	Ms.Yogindra	Member	Assistant Professor, CSA, GITAM Kablana
19	Ms. Bhawna Aggarwal	Member	Assistant Professor, CSA, GITAM Kablana
20	Ms. Jyoti Pandey	Member	Assistant Professor, CSA, GITAM Kablana
21	Ms. Swati Saraf	Member	Assistant Professor, CSA, GITAM Kablana
22	Ms. Sweta	Member	Assistant Professor, CSA, GITAM Kablana
23	Ms. Renu	Member	Assistant Professor, CSA, GITAM Kablana
24	Ms. Ankita	Member	Assistant Professor, CSA, GITAM Kablana
25	Ms. komal Rawat	Member	Assistant Professor, CSA, GITAM Kablana
26	Mr. Deepak kumar	Member	Assistant Professor, CSA, GITAM Kablana
27	Mr. Deepak	Member	Assistant Professor, CSA, GITAM Kablana
28	Ms. Divya	Member	Assistant Professor, CSA, GITAM Kablana
29	Ms. Neelam	Member	Assistant Professor, CSA, GITAM Kablana
30	Mr. Sachin Kumar	Member	Assistant Professor, CSA, GITAM Kablana
31	Ms. Nitika	Member	Industry/ Corporate Sector (Associate Analyst, Content Engineering)
32	Mr. Yumesh	Member	Alumni (Embedded Designs Services India Private Limited)
33	Ms. Seema Rani	Member	Assistant Professor, CSA, GITAM Kablana
34	Ms. Inderjeet Kaur	Member	Assistant Professor, CSA, GITAM Kablana
35	Ms. Annu Rani	Member	Assistant Professor, CSA, GITAM Kablana
36	Mr. Amit	Member	Assistant Professor, CSA, GITAM Kablana
37	Ms. Megha	Member	Assistant Professor, CSA, GITAM Kablana

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA
HOD-MCA

At the outset the Chairperson welcomed all the members present in the meeting. The agenda items, as circulated prior to the meeting, were taken up for discussion.

Agenda wise Discussion and Resolutions

Item No. 3.1

To confirm the minutes of the 2nd Meeting of the Board of Studies of Computer Science and Applications Department held on 23.05.2025.

Resolved that the minutes of the 2nd meeting of the Board of Studies of Computer Science and Applications Department held on 23.05.2025 **(ANNEXURE -3.1, Pages 1 - 4 already circulated)** be confirmed.

Item No. 3.2

Follow up Action Report on the decisions taken in the 2nd Meeting of Board of Studies of Computer Science and Applications Department held on 23.05.2025.

Resolved that the follow up action on the decisions taken in the 2nd Meeting of Board of Studies held on 23.05.2025 be noted **(ANNEXURE -3.2, Page No. 5).**

Item No. 3.3

Proposal to start Certificate Courses on "Blockchain Application Development" and "Web Development & Marketing" from Academic Session 2025-26.

The BOS discussed the proposed Certificate Courses, covering all aspects, including the title of the course, objectives, eligibility criteria, duration, credit structure, Scheme of Examinations and Syllabus.

Resolved that the Certificate Courses on "Blockchain Application Development" and "Web Development & Marketing" be approved. Further resolved that the same is recommended to the Academic Council for Approval **(ANNEXURE 3.3, Pages 6 –15).**

Item No. 3.4

a) Revised Scheme of Examinations of BCA 2nd year and 3rd year and Syllabus of Ability Enhancement Course, Value Added Course, Discipline Specific Course-Minor Course and Major Discipline Relevant Course (Vocational)–Minor (A-Scheme) *w.e.f.* 2025-26.

Resolved that the Revised Scheme of Examinations of BCA 2nd Year and 3rd Year (A-Scheme) be approved. Further resolved that the same is recommended to the Academic Council for approval **(ANNEXURE 3.4 Pages 16-38).**

b) Approval of the Scheme of Examinations of BCA (1st to 8th Semester) B-Scheme and Syllabus of BCA 2nd semester (B Scheme) *w.e.f* 2025-26.

Resolved that the Scheme of Examinations of the BCA (B-Scheme) 1st to 8th Semester and the Syllabus of BCA 2nd Semester (B Scheme) be approved. Further resolved that the same is recommended to the Academic Council for approval **(ANNEXURE 3.4 Pages 39-79).**

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD-MCA

Item No. 3.5

To note the Correct Code of Open Elective Courses (OEC) MCA 3rd Semester.

Resolved that the correct code of Open Elective Courses (OEC) of MCA 3rd Semester be noted **(ANNEXURE 3.5, Pages 80-82).**

Item No. 3.6

Panel of Examiners for Theory and Practical's of BCA and MCA Programs for Academic Year 2025-26

A Proposed Panel of Examiners for both theory paper setting and practical examinations was presented before the Board of Studies. The panel includes academic experts and industry professionals. Resolved that panel of examiners is approved and same is sent to COE GITAM. The approved panel is attached as **(ANNEXURE 3.6, Pages 82--86).**

Item No. 3.7

Any Other Item with the Permission of the Chair.

The meeting concluded with the thanks to the Chair.

Chairperson
Board of Studies
Deptt of Computer Science and Applications

Annexure 4.11 b

DEPARTMENT OF COMPUTER SCIENCE AND APPLICATIONS

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, JHAJJAR

An Autonomous Institute | NAAC 'A' Grade Institute | Affiliated to MDU, Rohtak

CERTIFICATE COURSE ON BLOCKCHAIN APPLICATION DEVELOPMENT

SESSION 2025-26

Eligibility Criteria: at least senior secondary examination (10+2) with 50% marks (47.5% in case of SC/ST/Blind visually/Diffenrtly abled etc candidates of Haryana only), from board of school education Haryana, bhiwani or any other examination recognized by Maharshi Dayanand University equivalent thereto.

Program Duration: 6 Months (Twice in Academic year)

Course Credits: 4*

Number of Seats: 30

The reservation seats is as given below:

Sr no	Name of Program	Break of Seat as per Sate Govt Reservation Policy							DA/PWD/ PH/ESM/ DFF#	EWS	No of Reservation Seat
		AIC	EWS *	HO GC	SC		BC (A)	BC (B)			
					OSC	DSC					
01	Blockchain Application Development	4		11	3	3	4	3	1	1	30

Note: In the event of vacant seats remaining after the final date of allotment based on reservations, these may be allocated to general category candidates.

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD-MCA

DEPARTMENT OF COMPUTER SCIENCE AND APPLICATIONS
GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, JHAJJAR
An Autonomous Institute | NAAC 'A' Grade Institute | Affiliated to MDU, Rohtak

SCHEME AND SYLLABUS CERTIFICATE COURSE

Course Code	**CC-BC-01**				
Category	**Certificate Course**				
Program Name	Blockchain Application Development				
Duration	**6 Months** (Twice in Academic year)				
Scheme and Credits	L	T	P	**Credits**	
	3	0	0	**3**	
Course Objectives	The objectives of this course are • Understand the foundational principles and architecture of blockchain systems. • Explore cryptographic techniques and consensus mechanisms that enable secure and decentralized applications. • Familiarize with blockchain development tools, APIs, and ecosystem components relevant for real-world integration. • Design secure, scalable, and role-based blockchain application architectures suitable for use- cases like voting, supply chain, and asset tracking.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define the basic components, types, and foundational concepts of Blockchain and Distributed Systems.	Level 1: Rembering
CO2	Explain cryptography, transactions, UTXO/account models, and consensus mechanisms in blockchain networks.	Level 2: Understanding
CO3	Apply smart contract principles and blockchain tools (EVM, Solidity, Web3, MetaMask) to interact with blockchain networks.	Level 3 : Apply
CO4	Analyze decentralized application (DApp) architectures, including on-chain/off-chain data flows and authentication models.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit - I

Foundations of Blockchain& Distributed Systems: What is Blockchain?, Components: Block, Chain, Ledger, Network, Types: Public, Private, Consortium, Peer-to-Peer (P2P) networking,Blockchain vs Traditional Databases, Use-Cases: Voting, Supply Chain, Finance, Identity.

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Cryptography, Transactions, and Consensus: Hash functions (SHA-256, Keccak-256), Digital Signatures & Public Key Infrastructure (PKI), Transactions & Validation, UTXO vs Account-based model (Bitcoin vs Ethereum), Consensus Mechanisms: PoW, PoS, PoA, PBFT.

Unit - II

Smart Contracts & Ethereum Architecture: Introduction to Smart Contracts, Ethereum Virtual Machine (EVM), Smart Contract Lifecycle, Gas, fees, storage, and events, Common , Smart Contract Patterns (Ownable, Modifier, Pausable), Solidity Syntax (Conceptual Overview).

Unit - III

Blockchain Tooling, Web3, and APIs: Ethereum Nodes: Ganache, Infura, Alchemy, Web3 Standards: Web3.js, Web3.py (Conceptual Overview), MetaMask Wallet & Transaction Signing, Token Standards: ERC-20, ERC-721, Etherscan, Blockchain Explorers, and Public APIs

Unit - IV

Architecture of Decentralized Applications (DApps): Frontend–Backend–Blockchain Interactions, DApp Architecture for Voting & Supply Chain, User Authentication: Wallet vs Login, Data Flow: On-Chain vs Off-Chain, Off-Chain Storage (IPFS, Databases).

Text/Reference Books:

1. "Mastering Blockchain" by Imran Bashir "Machine Learning: A Probabilistic Perspective" by Kevin P. Murphy
2. "Mastering Ethereum" by Andreas M. Antonopoulos & Gavin Wood

Further suggested Reading:

1. "Building Ethereum DApps" by Roberto Infante
2. "Blockchain Basics: A Non-Technical Introduction in 25 Steps" by Daniel Drescher

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD-MCA

Course Code	**LC-CC-BC-01**
Category	**Certificate Course**
Course Title	**Blockchain Application Development Lab**
Duration	**6 Months (Twice in Academic year)**
Scheme and Credits	L: 0, T: 0, P: 2, **Credits: 1**
Course Objectives	The objectives of this course are to • Understand the concept of blockchain. • Study the components: Block, Chain, Ledger, and Network. • Learn the working principles of blockchain.
Assessment	**10 Marks**
End Semester Examination	**15 Marks**
Total	**25 Marks**
Duration of Exam	**3Hours**

Course Outcomes: After successful completion of this course, the students will be able to

Cos	Skills Demonstrated	RBT Level
CO1	**Apply** blockchain concepts, cryptography, and Web3 tools to implement basic blockchain programs.	Level-3 Apply
CO2	**Analyze** blockchain architecture, Ethereum tools, and decentralized systems..	Level-4 Analyze
CO3	**Evaluate** blockchain solutions for real-world applications..	Level-5 Evaluate
CO4	**Design** and develop blockchain-based decentralized applications (DApps)..	Level-6 Create

Exp. No	Contents
1.	Demonstrate blockchain fundamentals to illustrate components such as Block, Chain, Ledger, and Network.
2.	Differentiate between centralized databases and decentralized blockchain systems.
3.	Examine cryptographic hashing and digital signature mechanisms used in blockchain security.
4.	Implement smart contract concepts and execute them using the Ethereum Virtual Machine (EVM).
5.	Utilize programming concepts to perform matrix addition and subtraction.
6.	Investigate Ethereum nodes and developer tools used for blockchain development.
7.	Execute blockchain interaction using Web3 libraries and wallet authentication.
8.	Assess blockchain data storage techniques and decentralized storage systems.
9.	Deconstruct frontend–backend–blockchain interaction in decentralized applications.
10.	Appraise blockchain applications in supply chain management and product tracking.
11.	Develop and deploy a secure blockchain-based voting system.

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD-MCA

Mini Project Details:

Component	Description
Project Title	Decentralized Voting System using Ethereum
Problem Statement	Traditional voting systems suffer from fraud, lack of transparency, and centralized control. A blockchain-based voting DApp ensures security, immutability, and transparency.
Technology Stack	Solidity, Ethereum, JavaScript, Web3.js, MetaMask, IPFS
Modules	Voter registration, vote casting, vote verification, result declaration
Security Features	Immutable ledger, cryptographic verification, decentralized storage
Outcome	Secure and transparent voting application

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD-MCA

DEPARTMENT OF COMPUTER SCIENCE AND APPLICATIONS

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, JHAJJAR

An Autonomous Institute | NAAC 'A' Grade Institute | Affiliated to MDU, Rohtak

CERTIFICATE COURSE ON WEB DEVELOPMENT & MARKETING

SESSION 2025-26

Eligibility Criteria: at least senior secondary examination (10+2) with 50% marks (47.5% in case of SC/ST/Blind visually/Diffenrtly abled etc candidates of Haryana only), from board of school education Haryana, bhiwani or any other examination recognized by Maharshi Dayanand University equivalent thereto.

Program Duration: 6 Months (Twice in Academic year)

Course Credits: 4*

Number of Seats: 30

The reservation seats is as given below:

Sr no	Name of Program	Break of Seat as per Sate Govt Reservation Policy							DA/PWD/PH/ESM/DFF#	EWS **	No of Reservation Seat
		AIC	EWS *	HOGC	SC#		BC (A)	BC (B)			
					OSC	DSC					
01	Web Development & Marketing	4		11	3	3	4	3	1	1	30

Note: In the event of vacant seats remaining after the final date of allotment based on reservations, these may be allocated to general category candidates.

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD-MCA

DEPARTMENT OF COMPUTER SCIENCE AND APPLICATIONS
GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, JHAJJAR
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SCHEME AND SYLLABUS CERTIFICATE COURSE

Course Code	**CC-WDM-04**
Category	**Certificate Course**
Program Name	**Web Development & Marketing**
Duration	**6 Months** (Twice in Academic year)
Scheme and Credits	L: 3, T: 0, P: 0, **Credits: 3**
Course Objectives	The objectives of this course are • Identify the core technologies in full-stack Java Script development. • Explain the architecture of web applications and the roles of front end and back end. • Build interactive front end interfaces using HTML,CSS,Tailwind CSS, Java Script, and React. • Develop server-side applications using NodExpress.js, and EJS. • Integrate MongoDB for backend data storage and implement RESTful APIs.
Assessment	40 Marks
End Semester Examination	60 Marks
Total	100 Marks
Duration of Exam	03 Hours

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Define the fundamentals of application development, web and cloud development concepts, web development lifecycle, and various application development tools.	Level 1: Rembering
CO2	Explain HTML5 and CSS concepts including structural elements, form elements, selectors, box model, and layout basics for building structured and styled web pages.	Level 2: Understanding
CO3	Apply JavaScript fundamentals, advanced concepts, and React.js features to develop interactive and dynamic front-end applications.	Level 3 : Apply
CO4	Analyze backend development using Node.js, Express.js, MongoDB, REST APIs, JWT authentication, and secure role-based access to design robust server-side architectures.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (preferably 2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit - I

Introduction to Application Development, Overview of Web and Cloud Development, Aspects of the Web Development Lifecycle , Learning Front-End Development , Front-end and Back-end Web Development, Introducing Application Development Tools , More Application Development Tools , Tools and Technologies , The Importance of Back-End Development

Unit - II

HTML Basics : Introduction to HTML, HTML5 Features, HTML5 Structural Elements (header, nav, section, article, footer), HTML5 Input Elements (email, number, date, range, etc.), Forms & Form Handling, Semantic elements and accessibility.

CSS Basics : Introduction to CSS, Selectors, Properties & Values, Inline, Internal & External CSS, Box model, Layout basics (flexbox, grid – overview), Colors, backgrounds, borders, margins, padding, Basic styling of HTML5 elements

Unit - III

JavaScript Fundamentals : Introduction to JavaScript, Defining Variables (var, let, const), JavaScript Data Types, Using Operators, Implementing Looping (for, while, do-while), Creating Functions (function, arrow function), Understanding Variable Scope (global, block, function).

JavaScript Advanced Concepts : Using JavaScript Objects, Manipulating Strings, Working with Arrays, Adding Error Handling (try–catch), JSON basics, Introduction to Events

Advanced Frontend with React.js: What is React and why use it? SPA (Single Page Application) concept, Virtual DOM vs Real DOM, React project structure overview, Creating first React app using Vite / Create React App, Introduction to React: Components, Props, State, Functional components and React Hooks. Routing with React Router, State management with Context API, Integrating REST APIs into React.

Unit – IV

Server-Side Development with Node.js & Express.js: Introduction to Node.js: Asynchronous JS and event-driven architecture, Working with NPM and creating Node.js apps, Express.js fundamentals: Routing, Middleware, and Request Handling, EJS Templating Engine: Server-rendered pages, File handling and form data in Express.

Database and API Development: Introduction to MongoDB: NoSQL database and data modeling, CRUD operations with MongoDB and Mongoose, RESTful API design and integration, User Authentication with JWT and sessions, Role-based access and secure endpoints.

Text / Reference Books:

1. Learning JavaScript by Ethan Brown
2. Web Development with Node and Express by Ethan Brown
3. Tailwind CSS: From Zero to Production by Adam Wathan
4. Full-Stack React Projects by Shama Hoque
5. MongoDB: The Definitive Guide by Shannon Bradshaw.

Course Code	**LC-CC-WDM-04**
Category	**Certificate Course**
Course Title	**Web Development & Marketing Lab**
Duration	**6 Months (Twice in Academic year)**
Scheme and Credits	L: 0, T: 0, P: 2, **Credits: 1**
Course Objectives	The objectives of this course are to • To understand the fundamentals of application development and its role in solving real-world problems.. • To design and develop basic web pages using HTML5 elements. • To implement user input forms and validation using HTML form elements.. • To develop dynamic user interfaces using React.js. • To create backend servers using Node.js and Express.js. • To design and implement a web-based student record management system.
Assessment	**10 Marks**
End Semester Examination	**15 Marks**
Total	**25 Marks**
Duration of Exam	**3Hours**

Course Outcomes: After successful completion of this course, the students will be able to

Cos	Skills Demonstrated	RBT Level
CO1	**Apply** HTML, JavaScript, React, Node.js, and MongoDB to develop basic web application components.	Level-3 Apply
CO2	**Analyze** the interaction between frontend, backend, and database in web applications.	Level-4 Analyze
CO3	**Evaluate** the performance and functionality of web applications and CRUD operations.	Level-5 Evaluate
CO4	**Design** and develop full-stack web applications using modern web technologies.	Level-6 Create

Exp. No	Contents
1.	Utilize the basics of application development and explain its importance.
2.	Examine web technologies and cloud-based deployment models.
3.	Implement HTML5 elements to design a simple webpage.
4.	Construct HTML form elements to design user input forms.
5.	Execute JavaScript programming concepts to develop simple scripts.
6.	Develop React to create a simple frontend application.
7.	Build Node.js and Express to develop a basic backend server.
8.	Operate MongoDB to perform database CRUD operations.
9.	Dissect the design of a web application for managing student records.
10.	Design a complete full-stack web application using modern web technologies.
11.	Assess web technologies and cloud-based deployment for application development.

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD-MCA

Mini Project Details

Component	Description
Project Title	Student Record Management System
Problem Statement	Managing records manually is time-consuming and error-prone. A full-stack web application is required to store, retrieve, update, and delete records efficiently using modern web technologies.
Technology Stack	React, Node.js, Express.js, MongoDB
Modules	Add Student, View Records, Update Records, Delete Records
Security Features	Authentication, input validation, database security
Expected Outcome	Efficient web-based system for managing student records

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA (JHAJJAR)

An Autonomous Institute (UGC)

Approved by AICTE, New Delhi and Affiliated to MDU, Rohtak

NAAC 'A' GRADE

Scheme of Studies and Examination
Bachelor of Computer Applications

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD-MCA

1. DEFINITION OF CREDIT

1	1 Lecture (L) per week	1 Credit
2	1Tutoria l(T) per week	1 Credit
3	1 Practical (P) per week	0.5 Credit
4	2 Practical (Lab) per week	1 Credit

2. RANGE OF CREDIT

A range of credits from136 to144 for a student to be eligible to get Under Graduate degree in Computer Application. A student will be eligible to get Under Graduate degree with Honours or Research Program, if he/she completes an additional 48 credits.

3. STRUCTURE OF UNDER GRADUATE PROGRAM (BCA)

Sr. No.	Category	Break up of Credits BCA	BCA (Honours)	BCA (With Research)
1	Discipline-Specific Courses(DSC)-Major Course	76*	116*	104*
2	Minor(MIC)/ Minor Vocational(MV)/MIC Vocational(VOC)/Skill Enhancement Courses (SEC)/Internship	37*	45*	45*
3	Multidisciplinary Courses	9*	9*	9*
4	Ability Enhancement Course	8*	8*	8*
5	Value Added Course	6*	6*	6*
6	Research Project/Dissertation	4*	4*	16*
	Total Credits	**140***	**188***	**188***

* Minor variations allowed as per need of the respective disciplines.

Students exiting the program after second semester and securing 48 credits including 4 credits of summer internship will be awarded UG Certificate in the relevant Discipline/Subject. Students exiting the program after fourth semester and securing 96 credits including 4 credits of summer internship will be awarded UG Diploma in the relevant Discipline/Subject. Students will be awarded 3-year UG Degree in relevant major Discipline/Subject upon securing 140 credits.

Four credits of internship earned by a student during summer internship after 2nd semester or 4th semester will be counted in 5th semester of a student who pursue 3 year UG Programs without taking exit option.

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD-MCA

4. COURSE CODE AND DEFINITIONS

Sr. No.	Category	Course Code
1	Discipline-Specific Courses-Major Course	DSC
2	Minor Vocational	MV
3	MIC Vocational(VOC)	MICV
4	Skill Enhancement Courses	SEC
5	Multidisciplinary Courses	MDC
6	Ability Enhancement Courses	AEC
7	Value Added Courses	VAC
8	Internship	INT
9	Research Project	RP
10	Dissertation	DISS

Revised Scheme of Studies and Examination

BCA – 4th Semester

w.e.f. 2025-26

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)				Exam Duration In Hours
				L	T	P			Assessment	End Semester Exam	Practical	Total	
1	Discipline-Specific Courses Major Courses	DSC-BCA-202A	Computer System Architecture	4	0	0	4	4	30	70	-	100	3
2	Discipline-Specific Courses Major Courses	DSC-BCA-204A	Data Communication & Computer Networks	4	0	0	4	4	30	70	-	100	3
3	Discipline-Specific Courses-Major Courses	DSC-BCA-206A	Java Programming	2	0	0	2	2	15	35	-	50	3
		LC-BCA-208A	Java Programming Lab	0	0	4	2	2	15	-	35	50	3
4	Discipline-Specific Courses-Major Courses	DSC-BCA-210A	Computer Graphics	3	0	0	3	3	25	50		75	3
		LC-BCA-212A	Computer Graphics Lab	0	0	2	2	1	10	-	15	25	3
5	Major Discipline Relevant Course (Vocational)-Minor Courses	Refer Table XI	----------	3	1	0	4	4	30	70		100	3
6	Ability Enhancement Courses	Refer Table IX	----------	2	0	0	2	2	15	35	-	50	3
7	Value Added Courses	Refer Table X	----------	2	0	0	2	2	15	35	-	50	3
			Total Credits					**24**	**185**	**365**	**50**	**600**	

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Revised Scheme of Studies and Examination

BCA – 5th Semester

w.e.f. 2026-27

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)				Exam Duration In Hours
				L	T	P			Assessment	End Semester Exam	Practical	Total	
1	Discipline-Specific Courses Major Courses	DSC-BCA-301A	Software Engineering	4	0	0	4	4	30	70	-	100	3
2	Discipline-Specific Courses Major Courses	DSC-BCA-303A	Artificial Intelligence	4	0	0	4	4	30	70	-	100	3
3	Discipline-Specific Courses Major Courses	DSC-BCA-305A	Cloud Computing	3	0	0	3	3	25	50	-	75	3
		LC-BCA-307A	Cloud Computing Lab	0	0	2	1	1	10	-	15	25	3
4	Discipline-Specific Courses Major Courses	DSC-BCA-309A	Object Oriented Analysis and Design using UML	2	0	0	2	2	15	35	-	50	3
		LC-BCA-311A	Object Oriented Analysis and Design using UML Lab	0	0	4	2	2	15	-	35	50	3
5	Major Discipline Relevant Course (Vocational)-Minor Courses	Refer Table XII	----------	3	1	0	4	4	30	70	-	100	3
6	Internship	INT-BCA-317	----------	0	0	0	0	4	30	-	70	100	
			Total Credits					**24**	**185**	**295**	**120**	**600**	

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA ★ HOD-MCA

Revised Scheme of Studies and Examination

BCA – 6th Semester

w.e.f. 2026-27

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Schedule (Marks)				Exam Duration In Hours
				L	T	P			Assessment	End Semester Exam	Practical	Total	
1	Discipline-Specific Courses Major Courses	DSC-BCA-302A	Internet of Things(IoT)	3	0	0	3	3	25	50	-	75	3
		LC-BCA-304A	Internet of Things(IoT) Lab	0	0	2	1	1	10	-	15	25	3
2	Discipline-Specific Courses Major Courses	DSC-BCA-306A	Information and System Security	3	0	0	3	3	25	50	-	75	3
		LC-BCA-308A	Information and System Security Lab	0	0	2	1	1	10	-	15	25	3
3	Discipline-Specific Courses Major Courses	DSC-BCA-310A	Data Warehousing & Mining	3	0	0	3	3	25	50	-	75	3
		LC-BCA-312A	Data Warehousing & Mining Lab	0	0	2	1	1	10	-	15	25	3
4	Discipline-Specific Courses Major Courses	DSC-BCA-314A	Relational Database Management System	2	0	0	2	2	15	35	-	50	3
		LC-BCA-316A	Relational Database Management System Lab	0	0	4	2	2	15	-	35	50	3
5	Major Discipline Relevant Course (Vocational)-Minor Courses	Refer Table XIII	----------	3	1	0	4	4	30	70	-	100	3
6	Project	RP-BCA-322A	Project/Dissertation	0	0	0	0	4	25		75	100	3
			Total Credits					**24**	**190**	**255**	**155**	**600**	

EKLAVYA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABLANA
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Scheme of Studies and Examination

BCA – 7th Semester

w.e.f. 2027-28

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Schedule (Marks)				Exam Duration In Hours
				L	T	P			Assessment	End Semester Exam	Practical	Total	
1	Discipline-Specific Courses Major Courses	DSC-BCA-401A	Advance Software Engineering	3	0	0	3	3	25	50	-	75	3
		LC-BCA-403A	Advance Software Engineering Lab	0	0	2	1	1	10	-	15	25	3
2	Discipline-Specific Courses Major Courses	DSC-BCA-405A	Computational Intelligence	3	0	0	3	3	25	50	-	75	3
		LC-BCA-407A	Computational Intelligence Lab	0	0	2	1	1	10	-	15	25	3
3	Discipline-Specific Courses Major Courses	DSC-BCA-409A	Advance Java Programming	2	0	0	2	2	15	35	-	50	3
		LC-BCA-411A	Advance Java Programming Lab	0	0	4	2	2	15	-	35	50	3
4	Discipline-Specific Courses Major Courses	DSC-BCA-413A	Machine Learning Using Python	2	0	0	2	2	15	35	-	50	3
		LC-BCA-415A	Machine Learning Using Python Lab	0	0	4	2	2	15	-	35	50	3
5	Discipline-Specific Courses Major Courses	DSC-BCA-417A	Theory of Computation	4	0	0	4	4	30	70	-	100	3
6	Minor Vocational	MV-BCA-419A	Operating System & Shell Programming	2	0	0	2	2	15	35	-	50	3
		LC-BCA-421A	Operating System & Shell Programming Lab	0	0	4	2	2	15	-	35	50	3
			Total Credits					**24**	**190**	**275**	**135**	**600**	

INSTITUTE OF TECHNOLOGY & MANAGEMENT, GWALIOR
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Scheme of Studies and Examination

BCA – 8th Semester (Only for Hons.)

w.e.f. 2027-28

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Lead Per Week	Credits	Examination Schedule (Marks)				Exam Duration In Hours
				L	T	P			Assessment	End Semester Exam	Practical	Total	
1	Discipline-Specific Courses Major Courses	DSC-BCA-402H	Block chain Technology and Applications	3	0	0	3	3	25	50	-	75	3
		LC-BCA-404H	Block chain Technology and Applications Lab	0	0	2	1	1	10	-	15	25	3
2	Discipline-Specific Courses Major Courses	DSC-BCA-406H	Artificial Neural Network & Deep Learning	3	0	0	3	3	25	50		75	3
		LC-BCA-408H	Artificial Neural Network & Deep Learning Lab	0	0	2	1	1	10	-	15	25	3
3	Discipline-Specific Courses Major Courses	DSC-BCA-410H	Data Analytics Using R	2	0	0	2	2	15	35	-	50	3
		LC-BCA-412H	Data Analytics Using R Lab	0	0	4	2	2	15	-	35	50	3
4	Discipline-Specific Courses Major Courses	DSC-BCA-414H	Mobile Application Development	2	0	0	2	2	15	35	-	50	3
		LC-BCA-416H	Mobile Application Development Lab	0	0	4	2	2	15	-	35	50	3
5	Discipline-Specific Courses Major Courses	DSC-BCA-418H	Augmented and Virtual Reality	3	0	0	3	3	25	50	-	75	3
		LC-BCA-420H	Augmented and Virtual Reality Lab	0	0	2	1	1	10	-	15	25	3
6	Minor Vocational	MV-BCA-422H	Computer Networks & Programming	2	0	0	2	2	15	35	-	50	3
		LC-BCA-424H	Computer Networks & Programming Lab	0	0	4	2	2	15	-	35	50	3
Total Credits								24	195	255	150	600	

GANDHI INSTITUTE OF TECHNOLOGY & MANAGEMENT, KAGALANA
HOD-MCA

Scheme of Studies and Examination

BCA – 8th Semester (Hons. With Research)

w.e.f. 2027-28

Sr. No	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Schedule (Marks)				Exam Duration In Hours
				L	T	P			Assessment	End Semester Exam	Practical	Total	
1	Discipline-Specific Courses Major Courses	DSC-BCA-402R	Research Methodology	4	0	0	4	4	30	70	-	100	3
2	Discipline-Specific Courses Major Courses	DSC-BCA-404R	Web and Social Media Analytics	3	0	0	3	3	25	50	-	75	3
		LC-BCA-406R	Web and social media Analytics Lab	0	0	2	1	1	10	-	15	25	3
3	Minor Vocational	MV-BCA-408R	Research Ethics	4	0	0	4	4	30	70		100	3
4	Research Project/ Dissertation	RP-BCA-410R/ DISS-BCA-412R	----------	0	0	0	0	12	-	-	300	300	-
			Total Credits					**24**	**95**	**190**	**315**	**600**	

Note:

1. The duration of all the end-term theory examinations shall be 3 hours.
2. The Criteria for awarding the internal assessment throughout the programme shall be as under:
   a) Sessional Examination: 20 Marks (66.67%)
   b) Assignments /Presentations /Seminars and Class Participation: 5 Marks (16.67%)
   c) Attendance : 5 Marks (16.67%)

   Less than 65% : 0% of Attendance marks

   65% - 69.99% : 40% of Attendance marks

   70% - 74.99% : 60% of Attendance marks

   75% - 80% : 80% of Attendance marks

   Above 80% : 100% of Attendance marks

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3. The Criteria for awarding the Internal assessment practical course throughout the Programs hall be asunder:
   a) Practical Assignments /Practical File Assessment) :06 Marks (60% Weightage of
   b) Attendance (Criteria as mentioned above in 2 (c)) :04 Marks (40% Weightage of Assessment)
4. The panel of examiners for end-semester theory examinations shall be prepared and approved by the Department of Computer Science and Application of the internal/external examiners based on their expertise/ specialization/ area of interest.

5. The panel of examiners based on the examiners' expertise/specialization/area of interest for practicum/viva-voce examination shall be recommended by the Department of Computer Science and Application. In case of unavailability of external examiners due to unavoidable circumstances, the Controller of Examinations may allow the conduct of practical examinations by the internal examiners.
6. The panel of examiners for assessment of the Project Reports/Dissertation/Research Project/Summer Internship Reports shall be recommended by the Department of Computer Science and Application.
7. A student while selecting the minor discipline has to ensure that the courses of the opted minor discipline do not match with the major courses of his/her opted programme.
8. The student may choose the Multidisciplinary Courses from other than the courses offered by their own/respective department.

Semester-IV

Table No. IX (Ability Enhancement Course)

S. No.	Category	Course Code	Course Name
1	Ability Enhancement Course	AEC-202A	Hindi-II
2		AEC-204A	Sanskrit-II

Table No. X (Value Added Courses)

S. No.	Category	Course Code	Course Title
1	Value Added Courses	VAC-202A	Wellbeing Through Yoga
2		VAC-204A	Communication Skills

Table No. XI (Major Discipline Relevant Course (Vocational)- Minor Courses)

S. No.	Category	Course Code	Course Name
1	Major Discipline Relevant Course (Vocational)- Minor	MICV-208A	Managerial Skills
2		MICV-210A	Database Management System
3		LC-MICV-212A	Database Management System Lab

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Semester-V

Table No. XII Major Discipline Relevant (Vocational) -Minor Courses

S. No.	Category	Course Code	Course Name
1	Major Discipline Relevant Course (Vocational) - Minor	MICV-307A	Business Policy and Strategy
2		MICV-309A	Computer Networks and Internet
3		LC-MICV-311A	Computer Networks and Internet Lab

Table No. XIII Major Discipline Relevant (Vocational) -Minor Courses

S. No.	Category	Course Code	Course Name
1	Major Discipline Relevant Course (Vocational) - Minor	MICV-308A	Entrepreneurship Development
2		MICV-310A	Web Development
3		LC-MICV-312A	Web Development Lab

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Course code	**AEC-202A**					
Category	Ability Enhancement Course					
Course title	**Hindi-II**					
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**	
	2	0	0	**2**		
Course Objectives	The objectives of this course are • पत्र–लेखन और पत्रकारिता कौशल विकसित करना तथा प्रभावी भाषा अभिव्यक्ति सिखाना। • प्रूफ–रीडिंगकौशल, भाषा–शुद्धि क्षमताऔर त्रुटि पहचान दक्षता विकसित करना। • साक्षात्कार तकनीक, भाषा–प्रस्तुतीकरण और प्रभावी संचार कौशल में दक्ष बनाना। • जीवन–कौशल, व्यतिव विकास, आत्म विश्वास और निर्णय–क्षमता को सुदृढ़ करना।					
Assessment	15 Marks					
End Semester Exam	35 Marks					
Total Marks	50					
Duration of Exam	03 Hours					

Course Outcomes: After studying this course, the students will be able to

CO	Skills Demonstrated	RBT Level
CO1	पत्र–लेखन, प्रूफरीडिंग, साक्षात्कार तथा जीवन–कौशल की मूल अवधारणाएँ पहचानना।	Level-1:Remember
CO2	पत्र–लेखन, प्रूफरीडिंग, प्रस्तुतीकरण और जीवन–कौशल का महत्व समझकर व्याख्या करना।	Level-2:Apply
CO3	पत्र–लेखन, प्रूफरीडिंग, संप्रेषण और जीवन–कौशल को व्यावहारिक परिस्थितियो मे लागू करना।	Level-3:Analyze
CO4	पत्र, प्रूफ, प्रस्तुतीकरण और जीवन–कौशल तत्वों का विश्लेषण कर प्रभाव बढ़ाना।	Level-4: Analyze

Note: Examiner will set Nine questions in total. Question one will have 07 short questions of 1 mark (each) from all units. Remaining eight questions of 7 marks each to beset by taking two questions from each unit. The students have to attempt five questions in total, first question being compulsory and selecting one from each Unit.

Unit-I

पत्रकारिता का अर्थ, उद्भवऔरविकास, वर्तमान समय मेंपत्रकारिता का महत्व, हिंदीपत्रकारितामेंरोजगार की संभावनाएँ, समाचारलेखन, रिपोर्टिंग, प्रेसविज्ञप्ति, समाचारलेखक की भाषा, समाचारलेखक का वैचारिकउत्कर्ष, हिंदीभाषा संवर्धनमेंपत्रकारिता का योगदान

Unit-II

प्रूफसंशोधन की परिभाषा, प्रूफ शोधक के आवश्यक गुण, प्रूफ के प्रकार, प्रूफसंशोधन के महत्त्वपूर्णचिह्न, प्रूफरीडर के लिए आवश्यक सावधानियाँ, प्रूफसंशोधनमेंरोजगार, प्रूफसंशोधन का हिंदीभाषा संवर्धनमेंमहत्त्व

Unit-III

साक्षात्कार का अर्थ, परिभाषा एवंस्वरूपः कैरियरमेंसाक्षात्कारकौशल का महत्त्व, समालाप्य की भाषा, सम्प्रेषणः अर्थ, परिभाषा एवंप्रक्रियाः भाषा–संप्रेषण के चरणः श्रवण, अभिव्यक्ति, वाचन, लेखनः सम्प्रेषणकोप्रभावीबनाने के नियम

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Unit-IV

जीवन कौशल का अर्थ एवंस्वरूप: जीवन कौशल की विशेषताएँ, जीवन कौशल की आवश्यकता एवंमहत्त्व, जीवन कौशल के आधार: स्वावलंबन, सहयोगपूर्णभावना, समस्यासमाधान की योग्यता, ज्ञानार्जन की प्रवृत्ति, कुशाग्रता, चातुर्य, मधुरभाषी, संवेदनशील, स्वदृजागरूक, अन्वेषणात्मक दृष्टिकोण, उदात्तसुदृढ –मनोबल, निश्चयात्मकवृत्ति:

प्रेरणास्पद पुस्तकें

1. डॉ0 हरिश्चन्द्रवर्मा, भाषाऔरभाषाविज्ञान, लक्ष्मी पब्लिशिंगहाऊस, रोहतक 3.
2. सम्पा०कालिकाप्रसाद, राजवल्लभसहाय, मुकुन्दीलालश्रीवास्तव, बृहत् हिन्दीकोश: ज्ञानमण्डललिमिटेड, वाराणसी
3. मुख्य सम्पादक, डॉ० लक्ष्मीनारायण शर्मा, परिशोध, मानव–मूल्य विशेषांक, 1993
4. डॉ० धर्मपालसैनी, भारतीय जीवनमूल्य, भारतीय संस्कृतिसंस्थान, गुडगाँव
5. बृहत् प्रशासन शब्दावली, हिन्दी–अंग्रेजी, वैज्ञानिकतथातकनीकी शब्दावलीआयोग, नई दिल्ली–110

Useful Video links:

UnitNo	Topics	Links
Unit-I	पत्रकारिर्ता	https://www.youtube.com/watch?v=WL_hsThX7c8
Unit-II	प्रूफसंशोधन	https://www.youtube.com/watch?v=VLXq3EXOHQI
Unit-III	साक्षात्कार	https://www.youtube.com/watch?v=0QfVFZnAJks
Unit-IV	जीवन कौशल	https://www.youtube.com/watch?v=Fwm-HjQ6060

Course code	VAC-202A				
Category	Value Added Courses				
Course Title	Wellbeing through Yoga				
Scheme and Credits	L	T	P	Credits	Semester-IV
	2	0	0	2	
Course Objectives	The objectives of this course are: • To understand the basic concepts, philosophy, and importance of Yoga for holistic health. • To explore the role of Asanas in improving physical wellbeing and overall fitness. • To understand the benefits of Pranayama and Bandhas for physical health and energy regulation. • To learn meditation and Mudras for enhancing mental wellbeing and mindfulness				
Assessment	15 Marks				
End Semester Examination	35 Marks				
Total	50 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Define** the fundamental concepts, history, and philosophy of Yoga, including Ashtanga and Hatha Yoga.	Level-1Remember
CO2	**Explain** the role of Asanas, Pranayama, Bandhas, and Mudras in promoting physical and mental wellbeing.	Level-2Understand
CO3	**Apply** Yogic practices such as Asanas, breathing techniques, and meditation for improving physical health, mental balance, and overall wellness.	Level-3Apply
CO4	**Apply** the interconnection between mind, body, and spirit to manage stress, mindfulness, and holistic health.	Level-3 Apply

Note: Examiner will set nine questions in total. Question one will have 7 short questions of 1 marks (each) from all units. Remaining eight questions of 7 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first question being compulsory and selecting one from each Unit.

Unit-I

Introduction to Yoga:-History and Philosophy of Yoga, Ashtanga Yoga & Hatha Yoga, Importance of Yoga.

Unit-II

Physical Wellbeing through Asanas:- Basics of human physiology & anatomy, Benefits of Asanas in Physical Health, Practice of some important Asanas (Vrikshasana, Utkatasana, Padahasthasana ,Trikonasana, Veerasana,, Baddha Padamasana, Uttitha Padamasana, Pawanmuktasana Mandukasana, Uttanmandukasana, Pashimottanasana, Matsyasana, Naukasana,Uttanpadasana, Sarvangasana, Halasana, Bhujangasana, Shalabhasana, Dhanurasana,Makarasana, Shavasana).

Unit-III

Physical Wellbeing through Pranayama and Bandhas:- Introduction to Pranayama and its Benefits, Basic Breathing Exercises (Puraka, Rechaka and Kumbhaka, Anulom Vilom, Bhastrika Bhramari, Kapalbhati),

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Introduction to Bandhas and their practical procedure.

Unit-IV

Mental Wellbeing through Meditation and Mudras:- Connection between Mind, Body, and Spirit, Benefits of Meditation on Mental Health, Benefit of Mudras for Meditation, Introduction to Mudras and their practical procedure, Guided Meditation Sessions (Mindfulness, Loving-kindness).

Suggested Readings:

- The Heart of Yoga: Developing a Personal Practice by T.K.V. Desikachar.
- Light on Yoga by B.K.S. Iyengar.
- Yoga in daily life by Kiss Josie Orient paper, New Delhi.
- History of yoga by S P Singh, PHISPC Centre for studies of civilization.
- Ashtanga Yoga by Swami Devavrata, Arsha Yoga Sansthan, Mirzapur,Faridabad.
- Ashtanga Yoga by Dr. Jagwanti Deswal.
- Yogavidya: Ek Adhyayan by Dr. Surendra Kumar.

Useful Video Links:

Unit No.	Topics	Links
Unit-I	Ashtanga Yoga	http://www.digimat.in/nptel/courses/video/110101165/L60.html
Unit-II	Benefits of Asanas in Physical Health	https://youtu.be/rmTB7uaFOfs?si=3Dq3IME4q0MNFFog
Unit-III	Pranayama Practices and Conscious Breathing	http://www.digimat.in/nptel/courses/video/110101165/L76.html
Unit-IV	Meditation and Mindfulness	http://digimat.in/nptel/courses/video/109105199/L27.html

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Course Code	VAC-204A				
Category	Value Added Courses				
Course Title	**Communication Skills**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	2	0	0	**2**	
Course Objectives	The objectives of this course are: • To understand the basics of listening, speaking, reading, writing, and non-verbal communication. • To explore effective communication techniques and language skills. • To understand basic computer skills, digital platforms, social media, and digital marketing. • To learn ethical, safe, and responsible use of digital technologies and online communication.				
Assessment	15 Marks				
End Semester Examination	35 Marks				
Total	50 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Define** the fundamental concepts of listening, speaking, reading, writing, non-verbal communication, and digital literacy.	Level-1Remember
CO2	**Explain** effective communication skills, basic computer applications, social media usage, digital marketing concepts, and cybersecurity principles.	Level-2Understand
CO3	**Apply** language skills, non-verbal communication techniques, digital tools, and online platforms for effective academic and professional communication.	Level-3Apply
CO4	**Apply** written, spoken, and digital information to ensure ethical communication, informed decision-making, and secure digital practices.	Level-3 Apply

Note: Examiner will set nine questions in total. Question one will have 7 short questions of 1 marks (each) from all units. Remaining eight questions of 7 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first question being compulsory and selecting one from each Unit.

Unit-I

Listening:-Techniques of Effective Listening, Listening and Comprehension, Probing Questions, Barriers to Listening

Speaking:-Pronunciation, Enunciation, Vocabulary, Fluency, Common Errors.

Unit-II

Reading:- Techniques of Effective Reading, Gathering Ideas and Information from a Given Text, Evaluating these Ideas and Information, Interpreting the Text.

Writing:- The Writing Process, Effective Writing Strategies, Different Modes of Writing.

Unit-III

Basic Computer Skills:- Introduction to Microsoft (MS) Office Suite, Open Educational Resources, Basic Virtual Platforms, Trending Technologies, Machine Learning, Artificial Intelligence (AI), Internet of Things (IoT).

Social Media:- Introduction to Social Media Websites, Advantages of Social Media, Ethics and Etiquettes of Social Media, How to Use Google Search Better?, Effective Ways of Using Social Media.

Digital Marketing:- Introduction to Digital Marketing, Traditional Marketing versus Digital Marketing, Digital Marketing Tools, Social Media for Digital Marketing, Digital Marketing Analytics.

Digital Ethics and Cyber Security:- Digital Literacy Skills, Digital Etiquette, Digital Life Skills; Cyber Security: Understanding and introducing the environment of security, Types of attacks and attackers, The art of protecting secrets.

Unit-IV

Non-Verbal Communication:- Meaning of nonverbal communication, Advantages of using nonverbal communication, Introduction to modes of nonverbal communication, Open and Closed body language, Eye contact and Facial expression, Hand gestures, Do's and Don'ts in NVC, Learning from experts, Activities-based learning.

Suggested Readings:

- Ahmed, R. (2015. June 18). Five essential listening skills for English learners. British Council. https://www.britishcouncil.org/voices-magazine/five-essential-listening skills-Englishlearners.
- Skills You Need. (n.d.). Barriers to Effective Listening. Skills You Need. https://www. skillsyouneed.com/ips/ineffective-listening.html.
- Weiler, A. (2017. October 7). How to Improve English Pronunciation. Strategies in language learning. https://www.strategiesinlanguagelearning.com/how-to-improve englishpronunciation/.
- Kirkham, L. (2022. February 16). How to Enunciate. Wiki how. https://www.wikihow.com/ Enunciate.
- English for everyone. (n.d.). Homonyms, Homographs, and Homophones. English for everyone. https://englishforeveryone.org/PDFs/Homonyms,%20Homographs,%20Homophones.pdf.
- British Council. (n.d.). Learn English Teens. British Council. https://learnenglishteens. britishcouncil.org/exams/speaking-exams/fluency.
- Snyder, M. S. (2016. August 16). Oops, Did I Say That? 15 Common English Mistakes You Never Noticed Before. Fluentu. https://www.fluentu.com/blog/english/common-mistakes-inEnglish.
- Hogue, Ann. 1995. First Steps in Academic Writing. Pearson Longman.
- Taylor, Shirley. 2006. Communication for Business. Pearson Education.

Useful Video Links:

Unit No.	Topics	Links
Unit-I	Listening Skills	http://digimat.in/nptel/courses/video/109104031/L10.html
Unit-II	Principles of Effective Writing	https://youtu.be/4bKe2mvKUlA?si=FV3_z7lljw9nck2S
Unit-III	Digital Marketing	https://youtu.be/Gl6mJFvlKgI?si=nD_hE4A4V30V_UA0
Unit-IV	Non-Verbal Communication	http://digimat.in/nptel/courses/video/109104031/L05.html

GANGA INSTITUTE OF TECHNOLOGY & MANAGEMENT, KABALANA
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Course Code	MICV-208A				
Category	Discipline Specific course-Minor Course				
Course Title	**Managerial Skills**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	3	1	0	4	
Course Objectives	The objectives of this course are • To understand and apply key managerial skills, with a focus on coordination, interpersonal roles, and effective management techniques. • To learn problem-solving strategies, foster creativity, and understand the importance of empowerment and delegation in management. • To understand team-building, group behavior, and leadership skills, using techniques like brainstorming and sensitivity training. • To improve communication skills, conduct meetings and interviews, and develop self-confidence and motivational skills for managerial effectiveness.				
Assessment	30 Marks				
End Semester Examination	70 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Define** key concepts of managerial skills, problem-solving, team dynamics, and communication.	Level-1: Remember
CO2	**Explain** the significance of managerial skills in fostering effective management.	Level-2: Understand
CO3	**Apply** managerial skills in the context of delegation and empowerment, group Dynamics and communication styles in organizational problem solving.	Level-3: Apply
CO4	**Analyze** managerial skills in the context of delegation and empowerment, group Dynamics and communication styles in organizational decision making.	Level-4: Analyze

Note: Examiner will set nine questions in total. Question one will have 7 short questions of 2 marks (each) from all units. Remaining eight questions of 14 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first question being compulsory and selecting one from each Unit.

Unit-I

Introduction to managerial skills :Meaning and concept of managerial skills, Need and its importance,Techniques of skill development for effective management, Application of management skills, Coordination and Interpersonal roles.

Unit-II

Problem-solving:- Problem-solving, creativity, innovation, steps of analytical problem solving, limitations of analytical problem solving, impediments of creativity, multiple approaches to creativity.

Empowering and delegating:- Meaning of empowerment, dimensions of empowerment, how to develop empowerment, inhibitors of empowerment, delegating works.

Unit-III

Teams and Groups: Team Building, developing teams and teamwork, advantages of a team, leading a team, team membership, Group Dynamics, Group Behaviour, Cohesion, Importance of Brain Storming, Sensitivity Training, Nominal Group techniques, Leadership and competence development.

Unit-IV

Communication: Process of communication, Need and Importance of communication skills, Types of communication, conduct of meetings, Interviews, reporting of projects, reporting of case analysis, Building self confidence, Role of motivation skills in developing managers

Suggested Readings:

- Essentials of Management by Herald Koontz, Weihrich and Cannice, Tata-Mc Graw Hill Publishing House.
- Management by A. E. James Stoner, Freeman, Gilberth, Pearson Publishing House.
- Management by Robbins, Coulter, Fernandez Pearson Publishing House.
- Principles of Management by L. Richard Daft:, Cengage Learning India.
- Managerial Skills by V.S.P. Rao Excel Books, New Delhi.
- Developing Management skills by David A Whetten, Cameron, PHI.
- Managerial Skills by Ramnik Kapoor Path Makers, Bangalore
- Skills development for Business and Management Students by Kevin Gallagher, Oxford.
- Business Communication Strategies by Monipally, Muttthukutty Tata Mc Graw Hill.
- Organisational Behaviour by P. Robbins Stephen, Pearson.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Introduction to managerial skills	https://www.youtube.com/watch?v=iYzpESZbuQQ
Unit-II	Problem-solving	https://www.youtube.com/watch?v=hiqoCvPs_Jc
Unit-III	Teams and Groups	https://www.youtube.com/watch?app=desktop&si=zavzAEqML949-6rt&v=uG-FLOi4OOU&feature=youtu.be
Unit-IV	Communication	http://kcl.digimat.in/nptel/courses/video/109104031/L01.html

INSTITUTE OF TECHNOLOGY & MANAGEMENT HOD-MCA

Course Code	MICV-210A				
Category	Major Discipline Relevant Course (Vocational)- Minor				
Course Title	Database Management System				
Scheme and Credits	L	T	P	Credits	Semester-IV
	3	0	0	3	
Course Objectives	• To provide a strong foundation in database concepts and relational design, including ER Modelling, normalization, and integrity constraints using MySQL. • To develop practical skills in SQL, transaction management, optimization, and database security, enabling students to build, manage, and scale database-driven applications.				
Assessment	25 Marks				
End Semester Examination	50 Marks				
Total	75 Marks				
Duration of Exam	3 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	Recall core database concepts including relational models, ER modelling, normalization, SQL, transactions, optimization, security, backup, and MySQL integration.	Level1: Remember
CO2	Explain database concepts, relational and ER design, normalization, SQL operations, transactions, optimization, security, and MySQL integration with applications and cloud platforms.	Level2: Understand
CO3	Apply database concepts to design schemas, implement SQL and transactions, optimize queries, ensure security and backup, and integrate MySQL with applications and cloud platforms.	Level3: Apply
CO4	Analyze database requirements to evaluate design, normalization, SQL queries, transactions, optimization, security, and scalability in MySQL and cloud databases.	Level4: Analyze

Note: Examiner will set nine questions in total. Question one will have 5 short questions of 2 marks (each) from all units. Remaining eight questions of 10 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first question being compulsory and selecting one from each Unit.

Unit-I

Database Fundamentals: Definition, purpose, and types of databases (flat-file vs. relational). Components of a **DBMS:** Storage engine, query processor, transaction manager. Applications of databases in industries (e.g., healthcare, e-commerce etc).

Relational Model Basics: Tables, rows, columns, keys (primary, foreign, candidate). Integrity constraints: Entity, referential, domain. Introduction to MySQL: Overview of MySQL as an RDBMS. MySQL architecture and installation.

Unit-II

Entity-Relationship (ER) Modelling: Entities, attributes, relationships (1:1, 1:N , M:N). ER diagram notation(Chen/UML) and case studies. Relational Schema Design: Converting ER diagrams to relational tables.

Normalization: Functional dependencies, anomalies (insertion, deletion, update). 1NF, 2NF, 3NF, and BCNF with practical examples.

Unit-III

Structured Query Language (SQL): DDL: CREATE, ALTER, DROP tables. DML: INSERT, UPDATE, DELETE. DQL: SELECT with clauses (WHERE, GROUP BY, JOIN, subqueries).
Transactions and Concurrency: ACID properties, COMMIT, ROLLBACK, isolation levels.

Unit-IV

Database Optimization: Query optimization using EXPLAIN, indexing strategies. Normalization vs. Denormalization tradeoffs. Security and Backup: User management, roles, and privileges in MySQL. Data encryption, backups (mysqldump), and recovery.
Integration and Scalability: Connecting MySQL with applications. Introduction to cloud databases (e.g., AWSRDS, MySQL on Azure etc).

Suggested Readings:

- Elmasri and Navathe, Fundamentals of Database Systems, Pearson Education.
- C.J.Date, Longman, Introduction to Database Systems, Pearson Education.
- Peter Rob and Coronel, Database Systems, Design, Implementation and Management,Thomson Learning.
- Korth, Silberchatz, Sudarshan, Database System Concepts, McGraw-Hill..
- Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems, McGraw-Hill
- Database Management System by R.P. Mahapatra and Govind Verma
- Database Management Systems: A Practical Approach by Rajiv Chopra
- Database System Concepts by Abraham Silberschatz, Henry F. Korth, and S. Sudarshan

Useful Video Links:

Unit No	Topics	Links
Unit-I	**Database Fundamentals**	https://youtu.be/sEaYXwmsLw0?si=9qVJw3l1cjL23RsK
Unit-II	**Entity-Relationship (ER) Modelling**	https://youtu.be/5TU7zH0Z8ps?si=7qosQo9cH0lGMXYf
Unit-III	**Structured Query Language (SQL)**	https://youtu.be/TB5T2O8Hwm8?si=G2DffC9qXWqNTaGc
Unit-IV	**Database Optimization**	https://youtu.be/_jou55svo1k?si=2kv6pRgc0fzcQMGQ

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Course Code	LC-MICV-212A				
Category	Major Discipline Relevant Course (Vocational)- Minor				
Course Title	Database Management System LAB				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	0	0	2	**1**	
Course Objectives	The objectives of this course are to • **To design and implement relational databases** using ER diagrams, normalization, table creation, keys, and relationships in MySQL. • **To apply SQL and database management techniques** including queries, joins, subqueries, transactions, optimization, stored procedures, and backup and recovery.				
Assessment	10 Marks				
End Semester Examination	15 Marks				
Total	25 Marks				
Duration of Exam	3 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

Cos	Skills Demonstrated
CO1	Apply database design techniques to create relational schemas using ER diagrams, keys, relationships, and normalization in MySQL.
CO2	Analyze database requirements to evaluate ER models, relational schemas, keys, relationships, and normalization for effective database design.
CO3	Evaluate database designs by assessing ER models, relational schemas, keys, relationships, and normalization techniques for data integrity and efficiency.
CO4	Create efficient relational database designs by developing ER models, defining schemas, keys, relationships, and applying normalization techniques.

Exp. No.	Contents
1	Create a database and show table creation. Define tables with primary and foreign keys.
2	Basic SQL Queries – Retrieve, filter, and sort data using SELECT, WHERE, and ORDER BY.
3	Design an ER diagram for an E-Commerce system, and convert ER Diagram to Relational Schema. Translate entities and relationships into MySQL tables.
4	Show One-to-One, One-to-Many, Many-to-Many Relationships.
5	Normalization Steps (1NF, 2NF, 3NF, BCNF) – Demonstrate normalization of a database.
6	DDL Commands: CREATE, ALTER, DROP
7	DML Commands: INSERT, UPDATE, DELETE
8	DQL: Complex Queries Using GROUP BY and Aggregation
9	Joins: INNER JOIN, LEFT JOIN, RIGHT JOIN
10	Create a database to show Subqueries and Nested Queries.

11	Create a sql database to demonstrate Stored Procedures & Functions
12	Transactions & ACID Properties – Implement a banking transaction.
13	Query Optimization Using EXPLAIN.
14	Backup & Recovery Using mysqldump.

Annexure 4.11 d

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA (JHAJJAR)

An Autonomous Institute (UGC)

'A' GRADE ACCREDITED BY NAAC

Evaluation Scheme and Syllabus for Bachelor of Computer Applications BCA/BCA (Honours) / BCA (Honours with Research) and Specialization in

(i) AI & ML
(ii) Data Science

Based on AICTE Curriculum and Credit Framework for BCA Program and Formative Assessment Guidelines under NEP-2020)
(With effect from the Session 2025-26)

Approved by AICTE, New Delhi and Affiliated to MDU, Rohtak

GENERAL COURSE STRUCTURE & THEME

1. DEFINITION OF CREDIT:

1	1 Hr. Lecture (L) per week	1 Credit
2	1 Hr. Tutorial(T) per week	1 Credit
3	1 Hr. Practical(P) per week	0.5Credit
4	2 Hr. Practical(P) per week	1 Credit

2. COURSE CODE AND DEFINITION:

Course code	Definitions
L	Lecture
T	Tutorial
P	Practical
DSC	Discipline- Specific Courses (Core Courses)
AEC	Ability Enhancement Courses
MDC	Multi-Disciplinary Elective Course
VAC	Value Added Courses
SEC	Skill Enhancement Courses
DSE	Discipline Specific Elective
OE	Open Elective
LC	Lab Courses

COURSE NAME: Bachelor in Computer Application, Bachelor in Computer Application (Honours) and Bachelor in Computer Application (Honours with Research)

COURSE LEVEL/ DURATION/SYSTEM:

Undergraduate / Three or Four years/ 6 or 8 Semesters with multiple entry and exit. The following option will be made available to the students joining BCA Research Program:

a. **One Year:** Under Graduate Certificate in Computer Application
b. **Two Years**: Under Graduate Diploma in Computer Application
c. **Three years**: Bachelor in Computer Application(BCA)
d. **Four years**: Bachelor in Computer Application with Honours: BCA (Honours) or Bachelor in Computer Application Honours with Research: BCA (Honours with Research)

MINIMUM ELIGIBILITY CRITERIA:

Minimum eligibility criteria for opting the course in the fourth year will be as follows:

1. **BCA (Honours with Research):** BCA Degree
2. **For BCA (Honours)** : BCA Degree

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Note: The students who are eligible for BCA (Honours with Research) shall have choice to pursue either BCA (Honours) or BCA (Honours with Research).

SEMESTER WISE CREDIT DISTRIBUTION:

SEMESTER WISE CREDIT DISTRIBUTION OF PROPOSED [BCA/BCA (HONOURS)/ BCA (HONOURS WITH RESEARCH)] PROGRAM:

Semester	Core Courses	Ability Enhance-ment Courses	Multi-Disciplinary Elective Course	Value Added Courses	Skill Enhancement Courses	Discipline Specific Elective	Total
I	8	2	2	2	7	-	21
II	14	-	-	2	5	-	21
III	11	0	0	2	4	3	20
IV	15	0	0	0	2	3	20
V	0	0	0	0	6	15	21
VI	4	1	0	0	4	10	19
TOTAL							122*
*Minor Variation are allowed as per the need of program.							
BCA (Honours)							
VII	5	0	3	0	4	8	20
VIII					8	12	20
BCA (Honours with Research)							
VII	12					8	20
VIII	20						20

Category-Wise Distribution

Description	Core Courses	Ability Enhancement Courses	Multi- Disciplinary Elective Course	Value Added Courses	Skill Enhance-ment courses	Discipline Specific Elective	Total
BCA	52	3	2	6	28	31	122
BCA (Honours)	57	3	5	6	40	51	162
BCA (Honours with Research)	84	3	2	6	28	39	162
3 Years BCA Program					**Total Credits=122***		
4 Years BCA (Honours) and BCA (Honours with Research)					**Total Credits=162***		

Note: Students can take extra credit course from their own department or from other department as per the Institute norms.

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INDUCTION PROGRAM

The Essence and Details of Induction program can also be understood from the 'Detailed Guide on Student Induction program', as available on AICTE Portal, (Link:https://www.aicteindia.org/sites/default/files/Detailed%20Guide%20on%20Student%20Induction%20program.pdf).

For more, Refer Appendix III.

Induction program (mandatory)	Three-week duration
Induction program for students to be offered right at the start of the first year.	• Physical activity Creative • Arts • Universal Human Values Literary • Proficiency Modules • Lectures by Eminent People • Visits to local Areas • Familiarization to Department/Branch & Innovations

Mandatory Visits/Workshop/Expert Lectures:

1. It is mandatory to arrange one industrial visit every semester for the students of each branch.
2. It is mandatory to conduct a One-week workshop during the winter break after fifth semester on professional/industry/entrepreneurial orientation.
3. It is mandatory to organize atleast one expert lecture per semester for each branch by inviting resource persons from domain specific industry.

For Summer Internship/Projects/Seminar etc.

1. Evaluation is based on work done, quality of report, performance in viva-voce, presentation etc.

Note: The internal assessment is based on the student's performance in mid semester tests (two best out of three), quizzes, assignments, class performance, attendance, viva-voce in practical, lab record etc.

Scheme of Studies and Examination

BCA –1st Semester

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Assessment	End Semester Exam	Practical	Total
1	Core Courses	DSC-BCA-101B	Mathematical Foundations of Computer Science	4	0	0	4	4	30	70	-	100
2	Skill Enhancement Courses	SEC-BCA-103B	Computer Fundamental and Problem-Solving using C	3	0	0	3	3	25	50	-	75
		LC-BCA-105B	Computer Fundamental and Problem-Solving using C Lab	0	0	2	2	1	10	-	15	25
3	Core Courses	DSC-BCA-107B	PC Software	3	0	0	3	3	25	50	-	75
		LC-BCA-109B	PC Software Lab	0	0	2	2	1	10	-	15	25
4	Skill Enhancement Courses	SEC-BCA-111B	Internet& Web Design	1	0	0	1	1	-	25	-	25
		LC-BCA-113B	Internet & Web Design Lab	0	0	4	4	2	15	-	35	50
5	Multidisciplinary Courses	MDC-BBA-101B	Foundations of Management	2	0	0	2	2	50	50	-	100
6	Ability Enhancement Courses	AEC-101B	General English-I	1	1	0	2	2	65	35	-	100
7	Value Added Courses	VAC-113B	Environmental Studies	2	0	0	2	2	65	35	-	100
8	Additional Course	Refer Table No.-II	**(Additional Course)** Foreign Language (To be decided by the Institute/College at them level) (1-1-0) OR Any Course of Similar Credits on Any Foreign Languages from SWAYAM portal	1	1	0	2	0	-	-	-	-
			Total Credits					21	295	315	65	675

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Note:

1. The duration of all the end-term theory examinations shall be 3 hours.

2. The Criteria for awarding the formative assessment for Core Courses and Skill Enhancement Courses for 1st sem shall be as under:

a) Sessional Examination: 50 %

b) Assignments/ Presentations/ Seminars and Class Participation: 30%

c) Attendance: 20%

(Less than 65% - 0 marks; Upto 70% - 2 marks; Upto 75% - 3 marks; Upto 80% - 4 marks; Above 80% - 5 marks)

3. The panel of examiners for end-semester theory examinations shall be prepared and approved by the BOS, comprising internal and external examiners based on their expertise, specialization, and area of interest.

4. The formative assessment criteria for Multi-Disciplinary Course in Semester I will be as follows

Sessional Test	20 Marks
Assignment/ Case Study/ Mini Project	15 Marks
Quiz/ Group Discussion/ Debate	10 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

5. The formative assessment criteria for **Ability-Enhancement Course** in Semester I will be as follows:

Sessional Test	30 Marks
Peer Discussion/ Debate/ Extempore Speech	10 Marks
Role Play	05 Marks
Assignment/Essay/ Artiele/ Report Writing	15 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

6. The formative assessment criteria for **Value Added Course** in Semester I will be as follows:

Sessional Test	30 Marks
Class Assignment/ Case Study/ Mini Project	15 Marks
Quiz/ Seminar/ Group Discussion/ Debate	15 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

7. An '**Additional Course**' is a non-credit course that is undertaken for learning purposes only. If completed, the '**Additional Course**' may be recordedand will be assessed on a **Grading** basis.

Marks (%)	Letter Grade	Grade Point
>90	O(Outstanding)	10
>75 to 90	A+(Excellent)	9
> 65 to 75	A(Very good)	8
>55 to 65	B+(Good)	7

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> 50 to 55	B(Above average)	6
> 40 to 50	C(Average)	5
40	P (Pass)	4
Less than 40	F(Fail)	0
-	Ab(Absent)	0

Semester-I

Table No. I (Multidisciplinary Courses)

S. NO.	Category	Course Code	Course Name
1	Multidisciplinary Courses	MDC-BBA-101B	Foundations of Management
2	Multidisciplinary Courses	MDC-ASH-103B	Introductory Mathematics
3	Multidisciplinary Courses	MDC-105B	Indian Vision for Human Society
4	Multidisciplinary Courses	MDC-107B	Indian Culture and Civilization
5	Multidisciplinary Courses	MDC-109B	Indian Science, Engineering and Technology
6	Multidisciplinary Courses	MDC-111B	Indian Town Planning and Architecture
7	Multidisciplinary Courses	MDC-113B	Indian Health, Wellness and Psychology

Table No. II Additional Course

S. No.	Category	Course Code	Course Name
1	**Additional Course**	AEC-103B	French

Scheme of Studies and Examination

BCA – 2nd Semester

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Assessment	End Semester Exam	Practical	Total
1	Core Courses	DSC-BCA-102B	Mathematics Foundations to Computer Science-II	3	0	0	3	3	25	50		75
2	Core Courses	DSC-BCA-104B	Data Structures	3	0	0	3	3	25	50	-	75
		LC-BCA-106B	Data Structures Lab	0	0	2	2	1	10	-	15	25
3	Core Courses	DSC-BCA-108B	Computer Architecture	3	0	0	3	3	25	50		75
4	Core Courses	DSC-BCA-110B	Operating Systems	3	0	0	3	3	25	50		75
		LC-BCA-112B	Operating Systems Lab	0	0	2	2	1	10	-	15	25
5	Skill Enhancement Courses	SEC-BCA-114B	Object Oriented Programming using Java	3	0	0	3	3	25	50	-	75
		LC-BCA-116B	Object Oriented Programming using Java Lab	0	0	4	4	2	15	-	35	50
6	Value Added Courses	VAC-114B	Indian Constitution	2	0	0	2	2	65	35		50
7	Ability Enhancement Courses	AEC-102B(Hindi-1) Or AEC-104B(Sanskrit)	Additional Course - Indian or Foreign Language Other than Mother Tongue and English (1- 1-0)) [optional course]*	1	1	0	0*	-	-	-	-	-
Total Credits								**21**	**175**	**285**	**65**	**525**

Note:

1. The duration of all the end-term theory examinations shall be 3 hours.

2. The Criteria for awarding the formative assessment for Core Courses and Skill Enhancement Courses for 2nd sem shall be as under:

a) Sessional Examination: 50 %

b) Assignments/ Presentations/ Seminars and Class Participation: 30%

c) Attendance: 20%

(Less than 65% - 0 marks; Upto 70% - 2 marks; Upto 75% - 3 marks; Upto 80% - 4 marks; Above 80% - 5 marks)

3. The panel of examiners for end-semester theory examinations shall be prepared and approved by the BOS, comprising internal and external examiners based on their expertise, specialization, and area of interest.

4. The formative assessment criteria for **Ability-Enhancement Course** in Semester II will be as follows:

Sessional Test	30 Marks
Peer Discussion/ Debate/ Extempore Speech	10 Marks
Role Play	05 Marks
Assignment/Essay/ Article/ Report Writing	15 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

5. The formative assessment criteria for **Value Added Course** in Semester II will be as follows:

Sessional Test	30 Marks
Class Assignment/ Case Study/ Mini Project	15 Marks
Quiz/ Seminar/ Group Discussion/ Debate	15 Marks
Attendance (Criteria as mentioned above in 2(c))	05 Marks

6. An **'Additional Course'** is a non-credit course that is undertaken for learning purposes only. If completed, the **'Additional Course'** may be recorded and will be assessed on a **Grading** basis.

Marks (%)	Letter Grade	Grade Point
>90	O(Outstanding)	10
>75 to 90	A+(Excellent)	9
> 65 to 75	A(Very good)	8
>55 to 65	B+(Good)	7
> 50 to 55	B(Above average)	6
> 40 to 50	C(Average)	5
40	P (Pass)	4
Less than 40	F(Fail)	0
-	Ab(Absent)	0

After Year 1, Students are advised to take Social Responsibility & Community Engagement - encompassing Community Engagement with an NGO in the vacation time.

An UNDER GRADUATE CERTIFICATE IN COMPUTER APPLICATION will be awarded, if a student wishes to exit at the end of First year.

Exit Criteria after First Year of BCA Programme

Students will have the option to exit the Bachelor of Computer Application (BCA) program after successfully completing the first year. Upon exit, they will be awarded a **UG Certificate in Computer Application**. To be eligible for this certificate, students must complete **an additional 04 credits** in one of the following are as:

1. **Skill-Based Subject** : A course designed to enhance practical and technical skills in the field of computer applications.

2. **Work-Based Vocational Course**: A vocational course offered during the summer term that emphasizes hands-on training and workplace readiness.

3. **Internship/Apprenticeship**: A professional internship or apprenticeship program in a relevant field, with a minimum duration of 08 weeks, which will take place after the second semester.

4. **Social Responsibility & Community Engagement**: Active engagement with an NGO or community organization for a minimum duration of 08 weeks, focusing on real-world problem-solving, social responsibility, and community service.

The mode and specifics of these additional credits will be determined by the respective **University/ Admitting Body** , and students will be required to complete the 08-week program during the summer term following their second semester.

The exiting students will clear the subject / submit the Internship Report as per the University schedule.

Re-entry Criteria in to Second Year(Third Semester)

The student who takes an exit after one year with an award of certificate may be allowed to re-enter in to Third Semester for completion of the BCA Program as per the respective University /Admitting Body schedule after earning requisite credits in the First year.

Students can choose their specialization i.e. Stream with Discipline Specific Elective

[DSE] from Second year onwards as indicated in Appendix-I

Scheme of Studies and Examination

BCA – 3rd Semester

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Assessment	End Semester Exam	Practical	Total
1	Core Courses	DSC-BCA-201B	Probability and Statistics	3	0	0	3	3				
2	Core Courses	DSC-BCA-203B	DataBase Management System	3	0	0	3	3				
		LC-BCA-205B	DataBase Management System Lab	0	0	4	4	2				
3	Core Courses	DSC-BCA-207B	Software Engineering	3	0	0	3	3				
4	Skill Enhancement Courses	SEC-BCA-209B	Python Programming	2	0	0	2	2				
		LC-BCA-211B	Python Programming Lab	0	0	4	4	2				
5	Discipline Specific Elective	DSE-201*B	Professional Elective–I	1	0	0	1	1				
			Professional Elective–I Lab	0	0	4	4	2				
6	Value Added Courses	VAC-201B	Yoga/Sports/NCC/ NSS/Disaster Management	0	0	4	4	2				
			Total Credits					20				

*To be selected from the Proposed Streams with Discipline-Specific Electives-Data Science/Artificial Intelligence and Machine Learning / Full Stack Development proposed by Institute as indicated in DSE table.

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Scheme of Studies and Examination

BCA – 4th Semester

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Assessment	End Semester Exam	Practical	Total
1	Core Courses	DSC-BCA-202B	Entrepreneurship and Startup Ecosystem	1	1	0	2	2				
2	Core Courses	DSC-BCA-204B	Computer Networks	3	0	0	3	3				
		LC-BCA-206B	Computer Networks Lab	0	0	4	4	2				
3	Core Courses	DSC-BCA-208B	Design and Analysis of Algorithm	3	0	0	3	3				
4	Core Courses	DSC-BCA-210B	Artificial Intelligence	3	0	0	3	3				
		LC-BCA-212B	Artificial Intelligence Lab	0	0	4	4	2				
5	Discipline Specific Elective	DSE-202*B	Professional Elective–II	1	0	0	1	1				
		LC-DSE-202*B	Professional Elective–II Lab	0	0	4	4	2				
6	Skill Enhancement Courses	SEC-BCA-202B	Design Thinking and Innovation	1	1	0	2	2				
			Total Credits					20				

Note:

1. At the end of the Fourth Semester every student shall undergo Summer Training /Internship/Capstone for Eight Weeks in the industry/Research or Academic Institute. This component will be evaluated during the fifth semester.
2. An **UNDER GRADUATE DIPLOMA IN COMPUTER APPLICATION** will be awarded, if a student wishes to exit at the end of Second year.

Exit Criteria after Second Year of BCA Programme

Students will have the option to exit the Bachelor of Computer Application (BCA) program after successfully completing the second year . Upon exit, they will be awarded a **UG Diploma in**

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Computer Application. To be eligible for this diploma, students must complete an additional 04 credits in one of the following areas:

1. **Skill-Based Subject**: A specialized course aimed at enhancing technical and practical expertise in computer applications.
2. **Work-Based Vocational Course**: A vocational course offered during the summer term, focused on building practical, industry-relevant skills.
3. **Internship/Apprenticeship**: A professional internship or apprenticeship with a minimum duration of 08 weeks, conducted after the fourth semester, offering hands- on experience in a relevant field.
4. **Social Responsibility & Community Engagement**: Involvement with an NGO or community-based organization for a minimum of 08 weeks, contributing to social initiatives and applying computer application knowledge to solve real-world challenges.
5. **Capstone Project**: Completion of a capstone project integrating the skills and knowledge gained during the first two years of the program, which can be an independent or group project.

The specific mode of completing the additional credits will be decided by the respective **University/Admitting Body**, and students will be required to complete the 08-week program or project during the summer term following their fourth semester.

Students opting for this exit will also be required to **submit an Internship/Apprenticeship Report** or complete the Capstone Project as per the schedule outlined by the University/Admitting Body before they are awarded the UG Diploma.

Re-entry Criteria into Third Year (Fifth Semester)

The student who takes an exit after second year with an award of Diploma may be allowed to re-enter into fifth Semester for completion of the BCA Program as per the respective University / Admitting Body schedule after earning requisite credits in the Second year.

Scheme of Studies and Examination

BCA – 5th Semester

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Assessment	End Semester Exam	Practical	Total
1	Discipline Specific Elective	DSE- 301*B	Professional Elective–III	3	0	0	3	3				
		LC-DSE- 301*B	Professional Elective–III Lab	0	0	4	4	2				
2	Discipline Specific Elective	DSE- 302*B	Professional Elective–IV	3	0	0	3	3				
		LC-DSE- 302*B	Professional Elective–IV Lab	0	0	4	4	2				
3	Discipline Specific Elective	DSE- 303*B	Professional Elective–V	3	0	0	3	3				
		LC-DSE- 303*B	Professional Elective–V Lab	0	0	4	4	2				
4	Skill Enhancement Courses	SEC-BCA-301B	Quantitative Techniques	0	2	0	2	2				
5	Skill Enhancement Courses	SEC-BCA-302B	Internship/capstone Project	0	0	8	8	4				
6	Skill Enhancement Courses	SEC-BCA-303B	Major Project Evaluation in sixth semester]	-	-	-	-	0				
			Total Credits					**21**				

***University Nomenclature Course Code and L-T-P for Discipline Electives depends on the subject that the Institute offers in DSE table .**

Scheme of Studies and Examination

BCA – 6th Semester

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Assessment	End Semester Exam	Practical	Total
1	Core Courses	DSC-BCA-302B	Generative AI	2	0	0	2	2				
		LC-BCA-304B	Generative AI Lab	0	0	4	4	2				
2	Discipline Specific Elective	DSE- 304*B	Professional Elective–VI	3	0	0	3	3				
		LC-DSE- 304*B	Professional Elective–VI Lab	0	0	4	4	2				
3	Discipline Specific Elective	DSE- 305*B	Professional Elective–VII	3	0	0	3	3				
		LC-DSE- 305*B	Professional Elective–VII Lab	0	0	4	4	2				
4	Ability Enhancement Courses	AEC-301B	Soft Skills	0	1	0	1	1				
5	Skill Enhancement Courses	SEC-BCA-302B	Major Project[Initiated in 5th Semester]	0	0	8	8	4				
			Total Credits					19				

***University Nomenclature Course Code and L-T-P for Discipline Electives depends on the subject that the Institute offers in DSE table.**

BACHELOR IN COMPUTER APPLICATION Degree will be awarded, if a student wishes to exit at the end of Third year.

Exit Criteria after Third Year of BCA Programme

The students shall have an option to exit after 3rd year of Computer Application Program and will be awarded with a Bachelor's in Computer Application.

Re-entry Criteria into Fourth Year (Seventh Semester)

The student who takes an exit after third year with an award of BCA may be allowed to re-enter in to Seventh Semester for completion of the BCA (Honours) or BCA (Honours with Research) Program as per the respective University / Admitting Body schedule after earning requisite credits in the Third year.

Minimum eligibility criteria for opting the course in the fourth year will be as follows:

1. **BCA (Honours with Research):** BCA Degree
2. **For BCA (Honours):** BCA Degree

Scheme of Studies and Examination
BCA – 7th Semester (BCA (Honours))
Specialization – AI & ML

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Assessment	End Semester Exam	Practical	Total
1	Multi-Disciplinary Elective course	MDC-BCA-401B	Social Network Analysis	-	-	-	-	3				
2	Core Courses	DSC-BCA-403B	Optimization of ML	3	0	0	3	3				
		LC-BCA-405B	Optimization of ML Lab	0	0	4	4	2				
3	Discipline Specific Elective	DSE- 401*B	Professional Elective – VIII	3	0	0	3	3				
		LC-DSE- 401*B	Professional Elective – VIII Lab	0	0	4	4	2				
4	Discipline Specific Elective	DSE- 402*B	Professional Elective – IX	-	-	-	-	3				
5	Skill Enhancement Courses	SEC-BCA-401B	Dissertation work [evaluation in Eight semester]	-	-	-	-	-				
6	Skill Enhancement Courses	SEC-BCA-403B	Summer Internship II	0	0	8	8	4				
			Total Credits					20				

***University Nomenclature Course Code and L-T-P for Discipline Electives depends on the subject that the Institute offers in DSE table.**

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Scheme of Studies and Examination
BCA – 7th Semester (BCA (Honours))

Specialization –Data Science

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Assessment	End Semester Exam	Practical	Total
1	Multi-Disciplinary Elective Course	MDC-BCA-403B	Advanced Statistical methods for Data Science	-	-	-	-	3				
2	Core Courses	DSC-BCA-407B	Python for Data Science	3	0	0	3	3				
		LC-BCA-409B	Python for Data Science Lab	0	0	4	4	2				
3	Discipline Specific Elective	DSE- 401*B	Professional Elective – VIII	3	0	0	3	3				
		LC-DSE- 401*B	Professional Elective'– VIII Lab	0	0	4	4	2				
4	Discipline Specific Elective	DSE- 402*B	Professional Elective – IX	-	-	-	-	3				
5	Skill Enhancement Courses	SEC-BCA-401B	Dissertation work [evaluation in Eight semester]	-	-	-	-	-				
6	Skill Enhancement Courses	SEC-BCA-403B	Summer Internship II	0	0	8	8	4				
			Total Credits					20				

***Institute Nomenclature Course Code and L-T-P for Discipline Electives depends on the subject that the Institute offers in DSE table .**

Scheme of Studies and Examination
BCA – 8th Semester (BCA (Honours))

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Assessment	End Semester Exam	Practical	Total
1	Discipline Specific Elective	DSE-403*B	Professional Elective – X	3	0	0	3	3				
		LC-DSE-403*B	Professional Elective – X Lab	0	0	4	4	2				
2	Discipline Specific Elective	DSE-404*	Professional Elective – XI	3	0	0	3	3				
		LC-DSE-404*.	Professional Elective – XI Lab	0	0	4	4	2				
3	Discipline Specific Elective	DSE-405*	Professional Elective – XII	2	0	0	2	2				
4	Skill Enhancement Courses	SEC-BCA-402B	Dissertation semester]	0	0	16	16	8				
			Total Credits					20				

***Institute Nomenclature Course Code and L-T-P for Discipline Electives depends on the subject that the Institute offers in DSE table.**

Scheme of Studies and Examination
BCA – 7th Semester (BCA (Honours with Research))

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Assessment	End Semester Exam	Practical	Total
1	Core Courses	DSC-BCA-411B	Advanced Data Analysis Tools	0	2	0	2	2				
		LC-BCA-413B	Advanced Data Analysis Tools Lab	0	0	4	4	2				
2	Core Courses	DSC-BCA-415B	Research Methodology	2	2	0	4	4				
3	Core Courses	DSC-BCA-417B	Research Internship Report and Viva–Voce	0	0	8	8	4				
4	Discipline Specific Elective		Professional Elective – IX	-	-	-	-	4	–	–	–	–
5	Discipline Specific Elective		Professional Elective – X	-	-	-	-	4				
			Total Credits					**20**				

L-T-P w .r .t Open Elective and Discipline Specific Elective depends on the Courses offered by Institute.

Scheme of Studies and Examination
BCA – 8th Semester (BCA (Honours with Research))

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Assessment	End Semester Exam	Practical	Total
1	Skill Enhancement Courses	SEC-BCA-404B	Dissertation (For Research Track)*	-	-	-	-	20				
			Total Credits					20				

*The Dissertation work will start from the beginning of fourth year of BCA (Honours with Research) Program.

Students of Fourth Year shall be assessed for Project Work and Research Internship Report and Viva –Voce and Dissertation (For Research Track).

Proposed Streams with Discipline-Specific Electives (DSE)

1. Data Science

S. No	Semester	Course Code	Professional Elective
1	III	DSE201*B	Basics of Data Analytics using Spreadsheet
2	IV	DSE202*B	Data Visualization
3	V	DSE301*B	Introduction to Data Science
4	V	DSE302*B	Time Series Analysis
5	V	DSE303*B	Machine Learning
6	VI	DSE304*B	Big Data Analytics
7	VI	DSE305*B	Exploratory Data Analysis
8	VII	DSE401*B	Business Intelligence & Analytics
9	VII	DSE402*B	Data Mining & Warehousing
10	VIII	DSE403*B	Advanced Data Visualization
11	VIII	DSE404*B	Cloud Computing for Data Analytics
12	VIII	DSE405*B	Data Security & Privacy

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2. Artificial Intelligence & Machine Learning

S. No	Semester	Course Code	Professional Elective
1	III	DSE201*B	Feature Engineering
2	IV	DSE202*B	Introduction to ML
3	V	DSE301*B	Neural Network
4	V	DSE302*B	Digital Image Processing
5	V	DSE303*B	Natural Language Processing
6	VI	DSE304*B	Deep Learning for Computer Vision
7	VI	DSE305*B	Predictive Analysis
8	VII	DSE401*B	Explainable AI
9	VII	DSE402*B	Evolutionary Algorithm
10	VIII	DSE403*B	Speech Recognition
11	VIII	DSE404*B	Augmented Reality & Virtual Reality
12	VIII	DSE405*B	Security aspects of ML

Note:-

1. From the Academic session 2026 – 2027, the pattern of Skill Enhancement Courses will be revised .
2. The details of Formative Assessment in hardcopy shall be submitted to the Controller of Examinations within a week of uploading the marks on the portal and the relevant records along with the documents based on which the marks have been awarded, and shall be maintained for a minimum period of two years in the Department. The records may be verified/sum oned by the Controller of Examinations.

Course Code	DSC-BCA-102B				
Category	Core Courses				
Course Title	**Mathematics Foundation to Computer Science-II**				
Scheme and Credits	L	T	P	Credits	**Semester-II**
	3	0	0	3	
Course Objectives	The objectives of this course are to • Provide mathematical foundations including algebraic structures, numerical methods, and optimization for solving computational problems. • Enhance problem-solving abilities to address theoretical and practical challenges in computer science applications.				
Assessment	25 Marks				
End Semester Examination	50 Marks				
Total	75 Marks				
Duration of Exam	3Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Describe** fundamental concepts, formulae, and standard methods related to logical operations, algebraic structures, numerical methods, and optimization techniques	Level-2 Understand
CO2	**Apply** the logical operations, various techniques, forms and methods of proof to solve the associated problems.	Level-3 Apply
CO3	**Solve** the problems by using techniques of numerical methods and algebraic structures.	Level-3 Apply
CO4	**Use** optimization techniques to solve the problems related to linear programming and transportation.	Level-3 Apply

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 5 parts of 2 marks each from all units and remaining 8 questions of 10 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT I

Logic and Methods of Proofs: Propositions, logical operations (basic connectives), compound statements, construction of truth table, quantifiers, conditional statements, tautology, contradiction, contingency, logical equivalence. Conjunctive Normal Forms (CNF) and Disjunctive Normal Forms (DNF).Methods of proofs: Rules of inference for propositional logic, modus ponens, modus tollens, syllogism, proof by contradiction, Mathematical Induction.

UNIT II

Algebraic Structures:

Semi-group, Monoid , Group, Subgroup, Cyclic group.

UNIT III

Numerical Methods: Concept and importance of errors in numerical methods.Solution of algebraic and transcendental equations: Bisection method and Newton-Raphson methods.

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Numerical Interpolation: Newton's Forward and Newton's Backward interpolation formula and Lagrange's formula.

Numerical Integration: Trapezoidal rule and Simpson's 1/3 rule Only formula and problem solving for all the topics mentioned above.

UNIT IV

Optimization Techniques:

Linear programming: Introduction, LP formulation, Graphical method for solving LPs with two variables, Special cases in graphical methods, Simplex method, Duality.

Transportation problem: Definition, Linear form, North-west corner method, Least cost method, Vogel's approximation method for finding feasible solution, MODI method for finding optimum solution.

Suggested Readings:

- Kolman B., Busby R. and Ross S., Discrete Mathematical Structures, 6th Edition, Pearson Education, 2015.
- Sastry S.S., Introductory Methods of Numerical Analysis, Fifth Edition ,PHL, 2022.
- Taha Hamdy A., Operations Research: An Introduction, Eighth Edition, Pearson Prentice Hall, 2003.
- S.B. Singh, Discrete Structures, Khanna Book Publishing,2023(AICTE Recommended Textbook)
- Rosen Kenneth H. and Krithivasan Kamala, Discrete Mathematics and its Applications, McGraw Hill, India, 2019.
- Chakravorty J.G. and Ghosh P.R., Linear Programming and Game Theory, Moulik Library, 2017.
- Sharma J.K., Operations Research: Theory and Applications, Fourth Edition, Macmilllan Publishers, 2007.

Useful Video Links:

Unit No.	Topics	Links
UNIT-1	Propositions, logical operations (basic connectives), compound statements	https://www.youtube.com/watch?v=r8G6dxvBDmg
	tautology, contradiction, contingency,	https://www.youtube.com/watch?v=FPXjypbgFUA
	Conjunctive Normal Forms (CNF) and Disjunctive Normal Forms (DNF)	https://www.youtube.com/watch?v=w2DlMu8ZzHE
	Methods of proofs: Rules of inference for propositional logic, modus ponens, modus tollens	https://www.youtube.com/watch?v=0_URFaZQXUU
	Mathematical Induction.	https://www.youtube.com/watch?v=7WUPTe39fMg
UNIT-1	Semi-group, Monoid, Group	https://www.youtube.com/watch?v=ihQyZ7bJcRE
	Subgroup, Cyclic group.	https://www.youtube.com/watch?v=wx676fYedZ0
UNIT-1	Newton's Forward and Newton's Backward interpolation formula	https://youtu.be/Aw6LvaPtESE?si=uMd0moKsGOB4ocTu
	Lagrange's formula.	https://youtu.be/W89qBdRI8e4?si=y-zOk1zmJGppPWZp
	Trapezoidal rule and Simpson's 1/3 rule.	https://youtu.be/EA76ONWBgK4?si=SpIE1WNaO8e0gpnp
UNIT-1	Graphical method for solving LPs with two variables, Simplex method, Duality	https://youtu.be/2EvC1v1FI2k?si=8d1del63m8vJeB_M
	Linear form, method for finding feasible solution, MODI method for finding optimum solution.	https://youtu.be/Ow3XWYnPgSM?si=E01KqUcTKzr6w1fy https://youtu.be/NqXFWCHIbII?si=z-qfuKLGVg1AUXBi

Course Code	DSC-BCA-104B				
Category	Core Courses				
Course Title	**Data Structures**				
Scheme and Credits	L	T	P	**Credits**	**Semester-II**
	3	0	0	3	
Course Objectives	• Understand the fundamental concepts of Data Structures and their applications. • Develop problem-solving skills using Data Structures. • Implement Data Structures using C programming language.				
Assessment	25Marks				
End Semester Examination	50 Marks				
Total	75 Marks				
Duration of Exam	3Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Recall** basic concepts of data structures, algorithms, arrays, searching, and sorting techniques.	Level-1 Remember
CO2	**Explain** linked lists, hashing techniques, and their operations.	Level-2 Understand
CO3	**Apply** stacks, queues, and recursion to solve computational problems.	Level-3 Apply
CO4	**Analyze** tree and graph structures and perform related operations such as traversal, insertion, deletion, and balancing.	Level-4 Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 5 parts of 2 marks each from all units and remaining 8 questions of 10 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT I

Introduction and Overview: Definition ,Classification and Operations of Data Structures. Algorithms: Complexity, Time-Space Tradeoff.

Arrays: Definition and Classification of Arrays, Representation of Linear Arrays in Memory, Operations on Linear Arrays: Traversing, Inserting, Deleting, Searching, Sorting and Merging. Searching: Linear Search and Binary Search, Comparison of Methods. Sorting: Bubble Sort, Selection Sort, and Insertion Sort. Two- Dimensional Arrays, Representation of Two Dimensional Arrays in Memory, Matrices and Sparse Matrices, Multi-Dimensional Arrays.

UNIT II

Linked Lists: Definition, Comparison with Arrays, Representation, Types of Linked lists, Traversing, Inserting, Deleting and Searching in Singly Linked List, Doubly Linked List and Circular Linked List .Applications of Linked Lists: Addition of Polynomials.

Hashing and Collision: Hashing, Hash Tables, Types of Hash Functions, Collision, Collision Resolution with Open Addressing and Chaining.

UNIT III

Stacks: Definition, Representation of Stacks using Arrays and Linked List, Operations on Stacks using Arrays and Linked List, Application of Stacks: Arithmetic Expressions, Polish Notation, Conversion of Infix Expression to Post fix Expression, Evaluation of Postfix Expression.

Recursion: Definition, Recursive Notation, Runtime Stack, Applications of Recursion: Factorial of Number, GCD, Fibonacci Series and Towers of Hanoi.

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Queues: Definition, Representation of Queues using Array and Linked List, Types of Queue: Simple Queue, Circular Queue, Double-Ended queue, Priority Queue, Operations on Simple Queues and Circular Queues using Array and Linked List, Applications of Queues.

UNIT IV

Graphs: Definition, Terminology, Representation, Traversal.

Trees: Definition, Terminology, Binary Trees, Traversal of Binary Tree, Binary Search Tree, Inserting, Deleting and Searching in Binary Search Tree, Height Balanced Trees: AVL Trees, Insertion and Deletion in AVL Tree.

Suggested Readings:

1. R.B. Patel, "Expert Data Structures with C", Khanna Book Publishing Company, 2023 (AICTE Recommended Textbook)
2. Seymour Lipschutz, "Data Structures with C", Schaum's Outlines, Tata McGraw-Hill, 2011.
3. Yashavant Kanetkar,"Data Structures Through C",4th Edition, BPB Publications,2022.
4. Reema Thareja, "Data Structures Using C", Second Edition, Oxford University Press, 2014.
5. Ellis Horowitz, SartajSahni and Susan Anderson-Freed, "Fundamentals of Data Structures in C", Second Edition, Universities Press, 2007.

Useful Video Links:

Unit No.	Topics	Links
Unit-I	**Arrays**	https://youtu.be/INP2KnKZ5Tc?si=6givm9e8nsbc7yt8\
Unit-II	Linked Lists	https://youtu.be/sjVFxIJ92P0?si=F-qmIA-Asl4gT0t1
Unit-III	Stacks	https://youtu.be/zv0hUsIsHms?si=UpWAyyVMZG8O89nu
Unit-IV	**Graphs**	https://youtu.be/pcXxSM7caDI?si=U_Fk1RLSk_j-i_3r

Course Code	LC-BCA-106B				
Category	Core Courses				
Course Title	**Data Structure Lab**				
Scheme and Credits	L	T	P	Credits	**Semester-II**
	0	0	2	1	
Course Objectives	The objectives of this course are to • To understand the basic concepts of data structures and their significance in problem solving. • To develop programs for performing operations on arrays including insertion, deletion, searching, sorting, merging, and matrix operations. • To implement and perform operations on linear data structures such as Singly Linked List, Doubly Linked List, and Circular Linked List				
Assessment	10 Marks				
End Semester Examination	15 Marks				
Total	25 Marks				
Duration of Exam	3Hours				

Course Outcomes: After successful completion of this course, the students will be able to

Cos	Skills Demonstrated	RBT Level
CO1	**Apply** programming concepts to implement array operations, searching, sorting, and matrix operations.	Level-3 Apply
CO2	**Analyze** and implement linked list operations including singly, doubly, and circular linked lists.	Level-4 Analyze
CO3	**Evaluate** stack and queue implementations using arrays and linked lists for solving problems like postfix evaluation and polynomial addition.	Level-5 Evaluate
CO4	**Create** solutions using recursion and advanced data structures such as circular queues and binary search trees.	Level-6 Create

Exp. No	Contents
1.	Write a program for insertion and deletion operations in an array.
2.	Write a program to search for an element in an array using Linear Search and Binary Search.
3.	Write a program to sort an array using Bubble Sort, Selection Sort and Insertion Sort.
4.	Write a program to merge two arrays.
5.	Write a program to add and subtract two matrices.
6.	Write a program to multiply two matrices.
7.	Write a program to insert an element into a Singly Linked List: At the beginning At the end At a specified position
8.	Write a program to delete an element from a Singly Linked List: At the beginning At the end A specified element
9.	Write a program to perform the following operations in a Doubly Linked List: Create Search for an element
10.	Write a program to perform the following operations in a Circular Linked List: Create Search for an element
11.	Write a program to implement stack operations using an array.

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12.	Write a program to implement stack operations using a linked list.
13	Write a program to add two polynomials using a linked lists.
14	Write a program to evaluate a post fix expression using a stack.
15	Write a program to perform the following using recursion: Find the factorial of a number Find the GCD of two numbers Solve Towers of Hanoi problem
16	Write a program to perform the following using recursion: Find the factorial of a number Find the GCD of two numbers Solve Towers of Hanoi problem
17	Write a program to implements queue operations using an array.
18	Write a program to implement circular queue operations using an array.
19	Write a program to implement circular queue operations using a linked list.
20	Write a program to perform insertion operation in a binary search tree.

Course Code	DSC-BCA-108B				
Category	Core Courses				
Course Title	Computer Architecture				
Scheme and Credits	L	T	P	Credits	Semester-II
	3	0	0	3	
Course Objectives	The objectives of this course are to • To develop understanding of digital systems, Boolean algebra, K-Maps, and number systems. • To develop ability to explain combinational and sequential circuits, registers, and counters. • To develop skills to apply CPU organization, instruction formats, and RISC/CISC concepts.				
Assessment	25 Marks				
End Semester Examination	50 Marks				
Total	75 Marks				
Duration of Exam	3Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Recall** digital signals, number systems, Boolean laws, K-Maps, and coding schemes.	Level-1 Remember
CO2	**Explain** combinational and sequential circuits, registers, and counters.	Level-2 Understand
CO3	**Apply** computer organization concepts, CPU operations, and RISC/CISC architectures.	Level-3 Apply
CO4	**Analyze** pipelining, I/O, and memory hierarchy for performance optimization.	Level-4 Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 5 parts of 2 marks each from all units and remaining 8 questions of 10 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT-I

Digital Principles: Definition for Digital signals, Digital logic, Digital computers, Von Neumann Architecture, Boolean Laws and Theorems, K-Map: Truth Tables to K-Map, 2, 3 and 4 variable K Map, K-Map Simplifications, Don't Care Conditions, SOP and POS. Number Systems: Decimal, Binary, Octal, Hexadecimal, Number System Conversions, Binary Arithmetic, Addition and subtraction of BCD, Octal Arithmetic, Hexadecimal Arithmetic, Binary Codes, Decimal Codes, Error detecting and correcting codes, ASCII, EBCDIC, Excess3 Code, The Gray Code.

UNIT-II

Combinational Circuits: Half Adder and Full Adder, Subtractor, Decoders, Encoder, Multiplexer, Demultiplexer Sequential Circuits: Flip-Flops- SR Flip- Flop, D Flip-Flop, J-K Flip-Flop, T Flip-Flop. **Register:** 4 bit register with parallel load, Shift Registers- Bidirectional shift register with parallel load Binary Counters-4 bit synchronous and Asynchronous binary counter.

UNIT-III

Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, InputOutput Interrupt, Complete Computer Description, Design of Basic Computer, Design of Accumulator logic. Central **Processing Unit:** Introduction, General Register Organization, Stack Organization, Instruction Formats,

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Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer(RISC), RISC Vs CISC.

UNIT-IV

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline. Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input-Output Processor(IOP). Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory, Virtual Memory, Memory Management Hardware.

Suggested Readings:

1. William Stallings- "Computer Organization and Architecture", Pearson/PHI, Sixth Edition,
2. Andrew S. Tanenbaum- "Structured Computer Organization", PHI /Pearson 4th Edition,
3. M.V .Subramanyam,"Switching Theory and Logic Design", Laxmi Publications (P) Ltd.
4. Ikvinderpal Singh, Computer Organization Architecture, Khanna Book Publishing.

Useful Video Links:

Unit No.	Topics	Links
Unit-I	Digital Principles	https://youtu.be/fwTRzApMCgs?si=wlxoAeEzcruVNhgW
Unit-II	Combinational Circuits	https://youtu.be/EK3Q3donQeQ?si=uC97pRJPA2Feozyo
Unit-III	Basic Computer Organization and Design	https://youtu.be/d5Xqhc5ho-w?si=GaPGn72aA6GPBZMO
Unit-IV	Pipeline and Vector Processing	https://youtu.be/S-mGaA-ZopM?si=intk2XLqeb-OBHcu

Course Code	DSC-BCA-110B				
Category	Core Courses				
Course Title	**Operating Systems**				
Scheme and Credits	L	T	P	**Credits**	**Semester-II**
	3	0	0	**3**	
Course Objectives	The objectives of this course are to • To develop understanding of operating system concepts, structures, types, components, and services. • To develop ability to explain process management, multithreading, and CPU scheduling algorithms. • To develop skills to apply process synchronization techniques and handle deadlocks effectively.				
Assessment	25 Marks				
End Semester Examination	50 Marks				
Total	75 Marks				
Duration of Exam	3Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	**Skills Demonstrated**	RBT Level
CO1	**Recall** the basic concepts, components, services, types, and structures of operating systems.	Level-1 Remember
CO2	**Explain** process concepts, states, threads, and CPU scheduling algorithms including their benefits and performance evaluation.	Level-2 Understand
CO3	**Apply** process synchronization mechanisms and deadlock handling techniques to solve inter-process communication and critical section problems.	Level-3 Apply
CO4	**Analyze** memory management techniques, virtual memory, paging, segmentation, and I/O management including disk scheduling for efficient system performance.	Level-4 Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 5 parts of 2 marks each from all units and remaining 8 questions of 10 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT I:

Operating Systems Overview: Definition, Evaluation of O.S, Components & Services of OS, Structure, Architecture, types of Operating Systems, Batch Systems, Concepts of Multiprogramming and Time Sharing, Parallel, Distributed and real time Systems.

Operating Systems Structures: Operating system services and systems calls, system programs, operating system structure, operating systems generations.

UNIT II

Process Management: Process Definition, Process states, Process State transitions, Process Scheduling, Process Control Block, Threads, Concept of multithreads, Benefits of threads, Types of threads.

Process Scheduling: Definition, Scheduling objectives, Scheduling algorithms, CPU scheduling Preemptive and Non-preemptive Scheduling algorithms (FCFS, SJF and RR), Performance evaluation of the scheduling Algorithms

UNIT III

Process Synchronization: Introduction, Inter-process Communication, Race Conditions, Critical Section Problem, Mutual Exclusion, Semaphores, Monitors.
Deadlocks: System model, deadlock characterization, deadlock prevention, avoidance, Banker's algorithm, Deadlock detection, and recovery from deadlocks.

UNIT IV

Memory Management: Logical and Physical address map, Swapping, Memory allocation, MFT, MVT, Internal and External fragmentation and Compaction, Paging, Segmentation. **Virtual Memory:** Demand paging, Page Replacement algorithms, Allocation of frames, thrashing.
I/O Management: Principles of I/O Hardware: Disk structure, Disk scheduling algorithms.

Suggested Readings:

1. Ekta Walia, Operating Systems Concepts , Khanna Publishing House,2022(AICTE Recommended Textbook)
2. Abraham Silberschatz ,Peter Baer Galvin,Greg Gagne (2006),Operating System Principles, 7th edition OR Later edition, Wiley India Private Limited, New Delhi.
3. Stallings (2006), Operating Systems ,Internal sand Design Principles,5th edition, Pearson Education, India.
4. Andrew S Tanenbaum, Modern Operating Systems , Third Edition ,Prentice Hall India.
5. Sumitabha Das,UNIX Concepts and Applications, 4th Edition, Tata McGraw-Hill.

Useful Video Links:

Unit No.	Topics	Links
Unit-I	Operating Systems	https://youtu.be/a2B69vCtjOU?si=nyg_rs8mUCNq2PHD
Unit-II	Process Management	https://youtu.be/g_kLI2pkNC4?si=UsQ20Ekuya_6F2vI
Unit-III	Process Synchronization	https://youtu.be/JOaBNuXgqqw?si=Zd9q7pAF-tr2q4mZ
Unit-IV	Memory Management:	https://youtu.be/_pKbqFyG03s?si=V7buPm3hRq-j34KF

Course Code	LC-BCA-112B				
Category	Core Courses				
Course Title	**Operating System Lab**				
Scheme and Credits	L	T	P	Credits	**Semester-II**
	0	0	2	1	
Course Objectives	The objectives of this course are to • To develop understanding of CPU scheduling algorithms. • To develop ability to implement deadlock handling techniques. • To develop skills in process synchronization and inter-proces communication.				
Assessment	10 Marks				
End Semester Examination	15 Marks				
Total	25 Marks				
Duration of Exam	3Hours				

Course Outcomes: After successful completion of this course, the students will be able to

Cos	Skills Demonstrated	RBT Level
CO1	**Apply** C programming to implement CPU scheduling algorithms such as FCFS, SJF, and Round Robin.	Level-3 Apply
CO2	**Analyze** process synchronization.and deadlock handling using problems like Producer–Consumer, Dining Philosophers, and Banker's Algorithm.	Level-4 Analyze
CO3	**Evaluate** memory management techniques including paging, segmentation, and contiguous allocation methods (First Fit, Best Fit).	Level-5 Evaluate
CO4	**Create** solutions for operating system concepts such as IPC using pipes, page replacement (FIFO), and file allocation methods.	Level-6 Create

Exp. No.	Contents
1	Write C program to simulate the FCFS CPU Scheduling algorithm.
2	Write C program to simulate the SJF CPU Scheduling algorithm
3	Write C program to simulate the Round Robin CPU Scheduling algorithm.
4	Write a C program to simulate Bankers Algorithm for Deadlock Avoidance.
5	Write a C program to simulate Bankers Algorithm for Deadlock Avoidance
6	Write a C program to implement the Producer–Consumer problem using semaphores.
7	Write a C program to illustrate the IPC mechanism using Pipes.
8	Write a C program to simulate Paging memory management technique
9	Write a C program to simulate Segmentation memory management technique.
10	Write a C program to simulate Segmentation memory management technique.
11	Write a C program to simulate the Best Fit contiguous memory allocation technique.
12	Write a C program to simulate the First Fit contiguous memory allocation technique
13	Write a C program to simulate the concept of Dining-Philosophers problem.
14	Write a C program to implement FIFO page replacement technique
15	Write a C program to write a C program for implementing sequential file allocation method.

Course Code	SEC-BCA-114B				
Category	Skill Enhancement Courses				
Course Title	**Object Oriented Programming using Java**				
Scheme and Credits	L	T	P	**Credits**	**Semester-II**
	3	0	0	3	
Course Objectives	The objectives of this course are to • To introduce the object oriented programming system concepts • To introduce syntax and semantics of Java programming language • To develop modular programs using Java • To setup JDK environment to create, debug and run Java programs				
Assessment	25 Marks				
End Semester Examination	50 Marks				
Total	75 Marks				
Duration of Exam	3Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Recall** the basic concepts, benefits, applications of OOP, and features of Java, including Java program structure and environment.	Level-1 Remember
CO2	**Explain** Java data types, variables, operators, expressions, control statements, and looping mechanisms.	Level-2 Understand
CO3	**Apply** object-oriented concepts to design classes, methods, inheritance, polymorphism, and handle arrays, strings, and vectors in Java programs.	Level-3 Apply
CO4	**Analyze** and implement Java packages and exception handling mechanisms to create modular and robust programs.	Level-4 Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 5 parts of 2 marks each from all units and remaining 8 questions of 10 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT I

Fundamentals of Object Oriented Programming: Basic Concepts of Object Oriented Programming (OOP), Benefits and Applications of OOP.

Java Evolution: Java Features, Difference between Java, C and C++, Java and Internet, Java Environment.

Overview of Java Language: Introduction to Simple Java Program, Use of Comments and Math function, Application of two classes, Java Program Structure, Java Tokens and statements, Implementing Java program And JVM, Command Line Arguments.

UNIT II

Constants, Variables and Data Types: Constants, Variables, Data Types, Declaration of Variables, Giving values to Variables, Symbolic Constants, Type casting.

Operators & Expressions: Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment & Decrement operators, conditional operators, Bitwise operators, Arithmetic Expressions, Evaluation of Expressions, Type Conversions in Expressions, Operator Precedence & Associativity.

Decision Making, Branching & Looping: Decision Making with Control Statements, Looping statements, Jump in loops, Labelled loops.

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UNIT III

Classes, Objects and Methods: Defining Class, Methods Declaration, Constructors, Methods Overloading, Overriding Methods, Inheritance

Arrays, Strings and Vectors: 1D arrays, Creating an Array, 2D arrays, Strings, Vectors, Wrapper Classes, Enumerated Types

Inheritance: Defining, extending classes, and Implementing Interfaces. Multiple inheritance and polymorphism.

UNIT IV

Packages: Basics of packages, System packages, Creating and accessing packages ,Creating user defined packages, Adding class to a package.

Exception Handling : Using the main keywords of exception handling :try, catch, throw, throws and finally; Nested try, Multiple catch statements, Creating user defined exception

Suggested Readings:

1. Balaguruswamy E. (2023). Programming with JAVA: A Primer.7th edition. India: McGraw Hill Education
2. Schildt, H. (2022). Java: The Complete Reference. 12th edition. McGraw- Hill Education.
3. Arunesh Goyal,The Essentials of JAVA, Khanna Book Publishing Company Private Limited, 2012.
4. Tanweer Alam , Core JAVA, Khanna Book Publishing Company Private Limited, 2015.
5. Y.Daniel Liang, Introduction to Java Programming,7th Edition, Pearson, 2008.
6. S.Malhotra and S.Choudhary,Programming in Java, 2nd Edition, Oxford University Press, 2014.

Useful Video Links:

Unit No.	Topics	Links
Unit-I	Object Oriented Programming	https://youtu.be/K3g4srbkUNM?si=T6ZFXp78zbROTUKZ
Unit-III	Classes, Objects and Methods	https://youtu.be/GKLL2q6UkHQ?si=Lrx99qYCSIgCTnoT
Unit-IV	Packages	https://youtu.be/TwU3cv1FFis?si=DkfTsgxVnKxrYFU

Course Code	LC-BCA-116B				
Category	Skill Enhancement Courses				
Course Title	**Object Oriented Programming using Java Lab**				
Scheme and Credits	L	T	P	**Credits**	**Semester-II**
	0	0	4	**2**	
Course Objectives	The objectives of this course are to • To develop understanding of basic Java programming concepts, syntax, and command line arguments. • To develop ability to implement control structures, recursion, arrays, and matrix operations in Java programs. • To develop skills in object-oriented programming including classes, objects, inheritance, polymorphism, and interfaces.				
Assessment	15 Marks				
End Semester Examination	35 Marks				
Total	50 Marks				
Duration of Exam	3Hours				

Course Outcomes: After successful completion of this course, the students will be able to

Cos	Skills Demonstrated	RBT Level
CO1	**Apply** Java programming concepts to implement basic programs using command line arguments, arrays, strings, recursion, and matrix operations.	Level-3 Apply
CO2	**Analyze** object-oriented programming concepts by implementing classes, objects, inheritance, polymorphism, and interfaces in Java.	Level-4 Analyze
CO3	**Evaluate** Java programs using packages, file handling, and string processing to manage and organize data effectively..	Level-5 Evaluate
CO4	**Create** robust Java applications using exception handling and user-defined exceptions to manage runtime errors.	Level-6 Create

Exp. No.	Contents
1	Write a program to read two numbers from user and print their product
2	Write a program to print the square of an umber passed through command line arguments
3	Write a program to send the name and surname of a student through command line arguments and print a welcome message for the student
4	Write a java program to find the largest number out of n natural numbers.
5	Write a java program to find the Fibonacci series & Factorial of a number using recursive and non recursive functions
6	Write a java program to multiply two given matrices
7	Write a Java program for sorting a given list of names in ascending order
8	Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome
9	Write a java program to read n number of values in an array and display it in reverse order
10	Create a JAVA class called Student with the following details as variables with in it. USN, NAME, BRANCH, PHONE, PERCENTAGE Write a JAVA program to create n Student objects and print the USN, Name, Branch, Phone, and percentage of these objects with suitable headings.
11	Write a Java program that displays the number of characters, lines and words in a text
12	Write a Java program to create a class called Shape with methods called get Perimeter() and get

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	Area (). Create a subclass called Circle that overrides the get Perimeter () and get Area() methods to calculate the area and perimeter of a circle.
13	Write a Java program to create a class Employee with a method called calculate Salary().Create two subclasses Manager and Programmer. In each subclass, override the calculate Salary() method to calculate and return the salary based on their specific roles
14	Write a Java program using an interface called 'Bank' having function 'rate_ of_ interest ()'. Implement this interface to create two separate bank classes 'SBI 'and 'PNB 'to print different rates of interest. Include additional member variables, constructors also in classes 'SBI' and 'PNB'.
15	Write a Java package program for the class book and the import the data from the package and display the result.
16	Write a Java program for finding the cube of a number using a package for various data types and then import it in another class and display the results
17	Write a Java program for demonstrating the divide by zero exception handling
18	Write a Java program that reads a list of integers from the user and throws an exception if any numbers are duplicates
19	Create an exception subclass Under Age, which prints "Under Age" along with the age value when an object of Under Age class is printed in the catch statement. Write a class exception Demo in which the method test () throws Under Age exception if the variable age passed to it as argument is less than 18. Write main () method also to show working of the program

Course Code	VAC-114B				
Category	Value Added Courses				
Course Title	**Indian Constitution**				
Scheme and Credits	L	T	P	**Credits**	**Semester-II**
	2	0	0	2	
Course Objectives	The objectives of this course are to • To develop understanding of the Indian Constitution, Fundamental Rights, Duties, and State Policy Principles. • To develop knowledge of the Union Government, including the President, Prime Minister, Council of Ministers, and Parliament. • To develop understanding of the State Government, including the Governor, Chief Minister, Council of Ministers, and Secretariat.				
Assessment	65 Marks				
End Semester Examination	35 Marks				
Total	100 Marks				
Duration of Exam	3Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated	RBT Level
CO1	**Recall** key principles, frameworks, and historical developments related to economic and constitutional governance.	Level-1 Remember
CO2	**Explain** the relationship between legal provisions and their impact on economic and societal structures..	Level-2 Understand
CO3	**Apply** constitutional and legal concepts in contemporary economic and regulatory scenarios..	Level-3 Apply
CO4	**Apply** constitutional and legal concepts to assess policy decisions and legal frameworks in complex economic context.	Level-4 Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 7 parts of 1 marks each from all units and remaining 8 questions of 7 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit

Unit 1

The Constitution-Introduction:

The History of the Making of the Indian Constitution, Preamble and the Basic Structure, and its interpretation, Fundamental Rights and Duties and their interpretation, State Policy Principles.

Unit 2

Union Government:

Structure of the Indian Union,,President–Role and Power,Prime Minister and Council of Ministers, LokSabha and RajyaSabha.

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Unit 3

State Government:

Governor–Role and Power,Chief Minister and Council of Ministers, State Secretariat.

Unit4

Local Administration and Election Commission:

District Administration, Municipal Corporation, Zila Panchayat, Election Commission:

a. Role and Functioning
b. Chief Election Commissioner
c. State Election Commission

Suggested Readings:

1. Ethics and Politics of the Indian Constitution by Rajeev Bhargava, Oxford University Press, New Delhi, 2008
2. The Constitution of India by B.L. Fadia Sahitya Bhawan; New edition (2017)
3. Introduction to the Constitution of India by DDBasuLexisNexis;Twenty-Third,2018 edition

Cases

- Rustom Cavasjee Cooperv. Union of India, (1970) 1SCC248
- State of Rajasthan v. Mohan Lal Vyas, AIR 1971 SC 2068 (confirmation of a private monopoly, not a violation of fundamental right) .
- MithileshGargv.UnionofIndia,(1992)1SCC168:AIR1992SC221(Righttocarryon business, not breached when it is liberalised)
- Chintamanrao v. The State of Madhya Pradesh, AIR 1951 SC 118 (scope of reasonable restrictions in relation to trade and occupation)
- Cooverjee B. Bharucha v. Excise Commissioner, Ajmer, AIR 1954 SC 220 (the reasonablenessoftherestrictionimposedmaydependuponthenatureofthebusinessand prevailing conditions including public health and morality)
- T.B.Ibrahimv.RegionalTransportAuthority.Tanjore,AIR1953SC79
- HarmanSinghv.RTA,Calcutta,AIR1954SC190
- Dwarka Prasad Laxmi Narainv. State of U.P., AIR1954SC224
- State of Bombay v. R.M.D. Chamarbaugwala, AIR1957SC699
- Parbhani Transport Coop. Society Ltd. v. Regional Transport Authority, Aurangabad, AIR 1960 SC 801
- State of Bombayv. R.M.D. Chamarbaugwala,(1957)S.C.R.874,
- G.K. Krishnan vs State of TamilNadu, 1975SCC(1)375
- Automobile Transport (Rajasthan Ltd. Vs State of Rajasthan, AIR1962SC1406

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Useful Video Links:

Unit No.	Topics	Links
Unit-I	The Constitution-Introduction	https://youtu.be/0DbQ_Eq8wJ0?si=oqdHYKQ5sdOk4Foc
Unit-II	Union Government	https://youtu.be/qZd39cdEJgA?si=_b4eGMR8JAN_3KL9
Unit-III	State Government	https://youtu.be/qZd39cdEJgA?si=1qfpidO28RjbvVE4
Unit-IV	Local Administration and Election Commission	https://youtu.be/a0_FuX41GzU?si=MFnYp0e5xbOy0trh

Course code	AEC-106B				
Category	Additional Courses				
Course title	Hindi				
Scheme and Credits	L	T	P	Credits	Semester-II
	1	1	0	2	
Course Objectives	The objectives of this course are • विद्यार्थियों को हिन्दी भाषा के महत्त्व एवं गुणवत्ता से सुविज्ञ करवाकर हिन्दी की ओर उन्मुख करना। • विद्यार्थियों को हिन्दी भाषा की वैज्ञानिकता के विषय में बतलाकर इसके गौरव से सुपरिचित करवाना। • हिन्दी भाषा के माध्यम से नवयुवक-नवयुवतियों को राष्ट्रीयता के पुनीत भावों की ओर उन्मुख करना।				

Course Outcomes: After studying this course, the students will be able to

CO	Skills Demonstrated	RBT Level
CO1	लिपि भाषा और साहित्य के बुनियादी सिद्धांतों का अवलोकन करें।	Level-1 Remember
CO2	भाषा की संरचनाए अर्थ और अभिव्यक्ति के पहलुओं की समझ विकसित करें।	Level-2 Understand
CO3	भाषाई और साहित्यिक सिद्धांतों को वास्तविक जीवन में लागू करने की क्षमता प्राप्त करें।	Level-3 Apply
CO4	भाषा, लिपि और साहित्य के विभिन्न पहलुओं का विश्लेषण करके जटिल साहित्यिक और सांस्कृतिक मुद्दों को समझें।।	Level 4 Analyze

Unit No-I

लिपि का मानकीकरण, मानक वर्णमाला, देवनागरी अंकमाला, अनुस्वार और विसर्ग, अनुनासिक, वर्तनी की शुद्धता के लिए ध्यान देने योग्य बातें, वर्तनी संबंधी अशुद्धियों के कारण, वर्तनी संबंधी अशुद्धियों को दूर करने के उपाय।

Unit-II

सृजनात्मक साहित्य का अर्थ, परिभाषा और स्वरूपः आलोचनात्मक साहित्य का अर्थ, परिभाषा और स्वरूपः सृजनात्मक साहित्य का भाषा विकास में महत्त्व, निबंध लेखन, कहानी लेखन, काव्य लेखन।

Unit-III

अनुवाद अर्थ, परिभाषा और स्वरूप व अनुवाद का महत्त्व, अनुवादक के गुण, अनुवाद के प्रकार, अनुवाद में कंप्यूटर का योगदान, सीरियलों का हिंदी अनुवाद, बैंकिंग साहित्य का अनुवाद, डबिंग क्षेत्र में अनुवाद, लिप्यंतरण, हिंदी साहित्य का अन्य भाषाओं में अनुवाद, अनुवाद क्षेत्र में रोजगार।

Unit-IV

पत्र प्रस्तुतीकरण का अर्थ, पत्र प्रस्तुतीकरण और नवीन शोधात्मक वैचारिकता, पत्र प्रस्तुतीकरण और शिक्षक की भूमिका, प्रस्तोता का मनोबल, वक्तृत्व कला का विकास, शोधात्मक अभिरुचि का विकास

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प्रेरणास्पद पुस्तकें:

- शुद्ध लेखन और हिन्दी का मानक रूप – डॉ० हरिश्चन्द्र वर्मा, विद्या भारती, संस्कृति शिक्षा संस्थान, कुरुक्षेत्र (हरियाणा)।
- बृहत् हिन्दी कोश – सम्पा० कालिका प्रसाद, राजवल्लभ सहाय, मुकुन्दीलाल श्रीवास्तव, ज्ञान मण्डल लिमिटेड, वाराणसी।
- परिशोध – मुख्य सम्पादक: डॉ० लक्ष्मी नारायण शर्मा, मानव-मूल्य विशेषांक, 1993।
- भारतीय जीवन मूल्य – डॉ० धर्मपाल मैनी, भारतीय संस्कृति संस्थान, गुड़गाँव।
- बृहत् प्रशासन शब्दावली (हिन्दी-अंग्रेजी) – वैज्ञानिक तथा तकनीकी शब्दावली आयोग, नई दिल्ली-110006।
- बृहत् प्रशासन शब्दावली (अंग्रेजी-हिन्दी) – वैज्ञानिक तथा तकनीकी शब्दावली आयोग, नई दिल्ली-110006।
- बृहत् पारिभाषिक शब्द-संग्रह (मानविकी), खंड-1 – वैज्ञानिक तथा तकनीकी शब्दावली आयोग, केन्द्रीय हिन्दी निदेशालय, शिक्षा तथा समाज कल्याण मंत्रालय, भारत सरकार।
- प्रयोजन मूलक अनुवाद – डॉ० सुरेश सिंघल, मोनिका प्रकाशन, दिल्ली-110053।
- अनुवाद सिद्धान्त एवं व्यवहार – डॉ० सुरेश सिंघल, अभिनव प्रकाशन, दिल्ली-6।

Useful Video links:

Unit No	Topics	Links
Unit-I	लिपि का मानकीकरण	https://www.youtube.com/watch?v=g1jcWLojnj4&t=2s
Unit-II	सृजनात्मक साहित्य का अर्थ	https://www.youtube.com/watch?v=aUOgArzWtTU
Unit-III	अनुवाद	https://www.youtube.com/watch?v=B1-xF-WBDXI
Unit-IV	प्रस्तुतीकरण का अर्थ	https://www.youtube.com/watch?v=NkXI3lgDkrw

Annexure 4.11 e

Table –III (Pool of Foundation Elective Course defined by the Institute)

Foundation Elective Courses

SN	Course Code	Course Name	Offered by Department
1	FEC-158A	Basics of Accounting	Management Department
2	FEC-160A	Basics of E-commerce	Management Department
3	FEC-162A	Elements of Banking	Management Department
4	FEC-164A	Computer Fundamentals	Computer Science and Engineering
5	FEC-168A	Communication and Soft Skills	Applied Science and Humanities (English)
6	FEC-170A	Entrepreneurship Development	Management Department
7	FEC-172A	Electronics Engineering	Electronics and Communication Engineering

After discussion, the Board noted and approved the course codes

Table –III (Pool of Foundation Elective Course defined by the Institute)

Foundation Elective Courses

SN	Course Code	Course Name	Offered by Department
1	FEC-158A	Basics of Accounting	Management Department
2	FEC-160A	Basics of E-commerce	Management Department
3	FEC-162A	Elements of Banking	Management Department
4	FEC-164A	Computer Fundamentals	Computer Science and Engineering
5	FEC-166A	Communication and Soft Skills	Applied Science and Humanities (English)
6	FEC-168A	Entrepreneurship Development	Management Department
7	FEC-170A	Electronics Engineering	Electronics and Communication Engineering