



**GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT,
KABLANA (JHAJJAR)
An Autonomous Institute**

‘A’ GRADE ACCREDITED BY NAAC

**SCHEME OF EXAMINATIONS AND SYLLABI
OF
3-4 YEARS
BACHELOR OF COMPUTER APPLICATIONS
(BCA)
WITH EFFECT FROM THE
SESSION 2026-27**

**1st Semester onwards (Students Admitted in 2026-27)
&
3rd Semester onwards (Students Admitted in 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
CC	Core Courses
AEC	Ability Enhancement Courses
MDE	Multi-Disciplinary Elective Courses
VAC	Value Added Courses
SEC	Skill Enhancement Courses
DSE	Discipline Specific Elective
OE	Open Elective
LC	Lab Courses
INT	Summer Internship Report/ Capstone Project
RP	Project Report/Research Project/Dissertation

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:

- One Year:** Under Graduate Certificate in Computer Application
- Two Years:** Under Graduate Diploma in Computer Application
- Three years:** Bachelor in Computer Application(BCA)
- Four years:** Bachelor in Computer Application with Honours: BCA (Honours)/ BCA (Honours) with specialization in AIML/ BCA (Honours) with specialization in Data Science /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:

- BCA (Honours with Research):** Minimum 75% marks or equivalent CGPA in BCA Degree up to Sixth Semester.
- For BCA (Honours) :** BCA Degree Completion of 3-Year BCA Degree

Note: The students who are eligible for BCA (Honours with Research) shall have choice to pursue either BCA (Honours) or BCA (Honours with Research).

EXISTING CREDIT STRUCTURE EFFECTIVE FROM 2025-26

SEMESTER WISE CREDIT DISTRIBUTION:

SEMESTER WISE CREDIT DISTRIBUTION OF PROPOSED [BCA/BCA (HONOURS)/ BCA (HONOURS WITH RESEARCH)] PROGRAM:

Semester	Core Courses	Ability Enhancement 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 Enhancement 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*		

REVISED(1st YEAR ONLY) CREDIT STRUCTURE EFFECTIVE FROM 2026-27

SEMESTER WISE CREDIT DISTRIBUTION:

SEMESTER WISE CREDIT DISTRIBUTION OF PROPOSED [BCA/BCA (HONOURS)/ BCA (HONOURS WITH RESEARCH)] PROGRAM:

Semester	Core Courses	Ability Enhancement Courses	Multi-Disciplinary Elective Course	Value Added Courses	Skill Enhancement Courses	Discipline Specific Elective	Total
I	8	2	2	2	5	-	19
II	12	-	-	2	7	-	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							120
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 Enhancement courses	Discipline Specific Elective	Total
BCA	50	3	2	6	28	31	120
BCA (Honours)	55	3	5	6	40	51	160
BCA (Honours with Research)	82	3	2	6	28	39	160
3 Years BCA Program					Total Credits=120*		
4 Years BCA (Honours) and BCA (Honours with Research)					Total Credits=160*		

****Minor Variations are allowed as per the need of program.***

Note: Students can take extra credit course from their own department or from other 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/Seminar etc.

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)

Scheme of Studies and Examination
BCA –1st Semester
w.e.f 2026-27

Sr. No.	Category	Course Code	Course Title	Hours per Week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Assessment	End Semester Examination		Total
										Theory	Practical	
3 WEEKS COMPULSORY INDUCTION PROGRAM												
1	Core Courses	CC-BCA-101B	Mathematics Foundations to Computer Science - I	3	0	0	3	3	25	50	-	75
2	Core Courses	CC-BCA-103B	Computer Architecture	3	0	0	3	3	25	50	-	75
		LC-BCA-107B	Computer Architecture Lab	0	0	4	4	2	15	-	35	50
3	Skill Enhancement Courses	SEC-BCA-101B	Problem Solving Techniques	3	0	0	3	3	25	50	-	75
		LC-BCA-109B	Problem Solving Techniques Lab	0	0	4	4	2	15	-	35	50
4	Multidisciplinary Courses	-----	Refer Table No.-I (Multidisciplinary Courses-Indian Knowledge Systems)	2	0	0	2	2	15	35	-	50
5	Ability Enhancement Course	AEC-BCA-101B	General English	2	0	0	2	2	15	35	-	50
6	Value Added Courses	VAC-BCA-101B	Environmental Science and Sustainability	2	0	0	2	2	15	35	-	50
7	Additional Courses	AEC-BCA-103B	Foreign Language French	1	1	0	-	-	50*	-	-	50*
Total Credits								19				475

Scheme of Studies and Examination
BCA – 2nd Semester
w.e.f 2026-27

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Schedule (Marks)			
				L	T	P			Assessment	End Semester Examination		Total
										Theory	Practical	
1	Core Courses	CC-BCA-102B	Mathematics Foundations to Computer Science-II	3	0	0	3	3	25	50	-	75
2	Core Courses	CC-BCA-104B	Data Structures	3	0	0	3	3	25	50	-	75
		LC-BCA-108B	Data Structures Lab	0	0	4	4	2	15	-	35	50
3	Core Courses	CC-BCA-110B	Operating Systems	3	0	0	3	3	25	50	-	75
		LC-BCA-114B	Operating Systems Lab	0	0	2	2	1	10	-	15	25
4	Skill Enhancement Courses	SEC-BCA-102B	Object Oriented Programming using Java	3	0	0	3	3	25	50	-	75
		LC-BCA-118B	Object Oriented Programming using Java Lab	0	0	4	4	2	15	-	35	50
5	Skill Enhancement Courses	SEC-BCA-104B	Web Technologies	1	0	0	1	1	05	20	-	25
		LC-BCA-120B	Web Technologies Lab	0	0	2	2	1	10	-	15	25
6	Value Added Courses	VAC-BCA-102B	Indian Constitution	2	0	0	2	2	15	35	-	50
7	Additional Courses	AEC-BCA-102B	Indian Language Hindi	1	1	0	-	-	50*	-	-	50*
Total Credits								21				525

Semester-I

Table No. I (Multidisciplinary Courses-Indian Knowledge System)

S. No.	Category	Course Code	Course Name
1.	Multidisciplinary Courses	MDE-101B	Indian Knowledge Systems and Traditions
2.	Multidisciplinary Courses	MDE-103B	Indian Mathematics and Astronomy
3.	Multidisciplinary Courses	MDE-105B	Indian Vision for Human Society
4.	Multidisciplinary Courses	MDE-107B	Indian Culture and Civilization
5.	Multidisciplinary Courses	MDE-109B	Indian Science, Engineering and Technology
6.	Multidisciplinary Courses	MDE-111B	Indian Town Planning and Architecture
7.	Multidisciplinary Courses	MDE-113B	Indian Health, Wellness and Psychology

Note:

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 Institute, 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 Institute schedule.

Assessment Criteria

1. The duration of all the end-term theory examinations shall be 3 hours.
2. The Criteria for awarding the formative assessment for BCA throughout the program:
 - a) Sessional Examination: 50 %
 - b) Assignments/ Presentations/ Seminars and Class Participation: 30%
 - c) Attendance: 20%(Less than 65% - 0 marks; Up to 70% - 2 marks; up to 75% - 3 marks; up to 80% - 4 marks; above 80% - 5 marks)
3. The panel of examiners for end-semester theory and practical 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 assessment criteria for **Lab Courses** will be as follows:

Evaluation Scheme for Practical/Lab Examination: 25Marks

		Marks Distribution
Program 1	Flowchart/Algorithm	01
	Writing Program	01
	Execution and Program Format	02
Program 2	Flowchart/Algorithm	01
	Writing Program	01
	Execution and Program Format	02
Viva Voce		07
Practical File*		05
Attendance*		05
Total		25

*Marks to be provided by Internal Teacher.

Evaluation Scheme for Practical/Lab Examination: 50Marks

		Marks Distribution
Program 1	Flowchart/Algorithm	02
	Writing Program	03
	Execution and Program Format	05
Program 2	Flowchart/Algorithm	02
	Writing Program	03
	Execution and Program Format	05
Viva Voce		15
Practical File*		10
Attendance*		05
Total		50

*Marks to be provided by Internal Teacher.

5. An 'Additional Course' is a non-credit Ability-Enhancement Course that is undertaken for learning purposes only. If completed, the 'Additional Course' may be recorded. The **Additional Course (Ability Enhancement Course)** is included as a qualifying paper and the students will be required to qualify the same otherwise the final result will not be declared and degree will not be awarded. The marks in this qualifying paper will not be included in determining the percentage of marks obtained for the award of degree. However, these marks will be shown in the detailed marks certificate of the students.

For one credit theory and one credit tutorial (1:1:0)

	Marks Distribution
Written test (2X5)	10
Peer discussion/Debate /Extempore speech(2X10)	20
Role play	05
Essay/Article/Report writing	10
Attendance	05
Total	50

Course code	CC-BCA-101B				
Category	Core Course				
Course title	Mathematics Foundation to Computer Science - I				
Scheme and Credits	L	T	P	Credits	Semester-I
	3	0	0	3	
Course Objectives:	The objectives of this course are ● Enable a strong foundation in sets, relations, functions, counting techniques, recurrence relations, and graph theory for solving discrete mathematical problems. ● Build proficiency in matrix algebra and its applications, including solving systems of equations and understanding eigen values and related concepts.				
Assessment	25 Marks				
End Semester Examination	50 Marks				
Total	75 Marks				
Duration of Exam	03 Hours				

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

CO	Skill Demonstrated	Level
CO1	Define fundamental concepts of sets, relations, functions, counting techniques, graph theory, and matrix algebra.	Level-1 Remember
CO2	Explain properties and representations of relations, functions, graphs, recurrence relations, and matrices.	Level-2 Understand
CO3	Apply appropriate methods to solve problems involving set operations, counting techniques, recurrence relations, graph traversal, and matrix operations.	Level-3 Apply
CO4	Analyze mathematical structures such as equivalence relations, graph properties, recurrence solutions, and systems of linear equations using matrices and eigen concepts.	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

Set, Relation and Function:

Set, Set Operations, Properties of Set operations, Subset, Venn Diagrams, Cartesian Products. Relations on a Set, Properties of Relations, Representing Relations using matrices and digraphs, Types of Relations, Equivalence Relation, Equivalence relation and partition on set, Closures of Relations, Warshall's algorithm. Functions, properties of functions (domain, range), composition of functions, surjective (onto), injective (one-to-one) and bijective functions, inverse of functions. Some useful functions for Computer Science: Exponential and Logarithmic functions, Polynomial functions, Ceiling and Floor functions.

UNIT – II

Counting and Recurrence Relation:

Basics of counting, Pigeonhole principle, permutation, combination, Binomial coefficients, Binomial theorem. Recurrence relations, modelling recurrence relations with examples, like Fibonacci numbers, the tower of Hanoi problem. Solving linear recurrence relation with constant coefficients using characteristic equation roots method.

UNIT – III

Elementary Graph Theory:

Basic terminologies of graphs, connected and disconnected graphs, subgraph, paths and cycles, complete graphs, digraphs, weighted graphs, Euler and Hamiltonian graphs. Trees, properties of trees, concept of spanning tree. Planar graphs. Definitions and basic results on the topics mentioned.

UNIT – IV

Matrix Algebra:

Types of matrices, algebra of matrices–addition, subtraction, and multiplication of matrices, determinant of a matrix, symmetric and skew-symmetric matrices, orthogonal matrix, rank of a matrix, inverse of a matrix, applications of matrices to solve system of linear equations, Eigen values and Eigen vectors, Caley-Hamilton theorem.

Reference Books

1. Garg, Reena, Engineering Mathematics, Khanna Book Publishing Company, 2024. (AICTE Recommended Textbook)
2. Garg, Reena, Advanced Engineering Mathematics, Khanna Book Publishing Company, 2023.
3. Kolman B., Busby R. and Ross S., Discrete Mathematical Structures, 6th Edition, Pearson Education, 2015.
4. Deo Narsingh, Graph Theory with Application to Engineering and Computer Science, Prentice Hall, India, 1979.
5. Vasishtha A. R. and Vasishtha A. K., Matrices, Krishna Prakashan, 2022. Reference Books
6. Grimaldi Ralph P. and Ramana B. V., Discrete and Combinatorial Mathematics: An Applied Introduction, Fifth Edition, Pearson Education, 2007.
7. Rosen Kenneth H. and Krithivasan Kamala, Discrete Mathematics and its Applications, McGraw Hill, India, 2019.
8. West Douglas B., Introduction to Graph Theory, Second Edition, Pearson Education, 2015

Video Links

Topics	Links
Set, Relation and Function	https://nptel.ac.in/courses/106103205
Counting and Recurrence Relation	https://nptel.ac.in/courses/111101115
Elementary Graph Theory	https://nptel.ac.in/courses/111101115
Matrix Algebra	https://nptel.ac.in/courses/111101115

Course Code	CC-BCA-103B				
Category	Core Courses				
Course Title	Computer Architecture				
Scheme and Credits	L	T	P	Credits	Semester-I
	3	0	0	3	
Course Objectives	The objectives of this course are • Understand fundamental concepts of digital electronics, number systems, and logic circuits. • Design and implement combinational and sequential circuits using standard methods and components. • Analyze the operation of computer organization, memory systems, and input-output mechanisms.				
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	Define concepts of digital logic, number systems, combinational and sequential circuits, and computer organization.	Level-1 Remember
CO2	Explain Boolean simplification methods, arithmetic operations, and the functioning of registers, counters, and CPU organization.	Level-2 Understand
CO3	Apply logic design techniques to construct combinational/sequential circuits and perform number system conversions and arithmetic operations.	Level-3 Apply
CO4	Analyze pipelining, memory hierarchy, input-output organization, and overall computer 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

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, Input Output Interrupt, Complete Computer Description, Design of Basic Computer, Design of Accumulator logic. Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, 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.

Reference Books

- Donald P Leach, Albert Paul Malvino, Goutam Saha- “Digital Principles & Applications” , Tata McGraw Hill Education Private Limited,2011Edition.
- M. Morris Mano- “Computer System Architecture”, Pearson/Phi, Third Edition.
- William Stallings- “Computer Organization and Architecture”, Pearson/PHI, Sixth Edition,
- Andrew S. Tanenbaum- “Structured Computer Organization”, PHI /Pearson 4th Edition,
- M. V . Subramanyam, “Switching Theory and Logic Design”, Laxmi Publications (P) Ltd.
- Ikvinderpal Singh, Computer Organization Architecture, Khanna Book Publishing.

Video Links

Topics	Links
Number Systems	https://nptel.ac.in/courses/106102157
Decoders	https://nptel.ac.in/courses/106102229
Computer Organization and Design	https://nptel.ac.in/courses/106102062
Pipeline and Vector Processing	https://nptel.ac.in/courses/106102157

Course Code	LC-BCA-107B				
Category	Core Courses				
Course Title	Computer Architecture Lab				
Scheme and Credits	L	T	P	Credits	Semester-I
	0	0	4	2	
Course Objectives	The objectives of this course are • Understand the operation of basic logic gates, flip-flops, counters, and combinational and sequential circuits. • Design, implement, and verify digital circuits such as adders, subtractors, multiplexers, encoders, registers, and shift registers. • Develop practical skills in computer hardware identification, system configuration, troubleshooting, and software installation.				
Assessment	15Marks				
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	Apply logic gates, flip-flops, K-Map simplification, and number system concepts to verify digital circuits.	Level-3 Apply
CO2	Analyze the behavior of combinational and sequential circuits along with computer hardware components and system operations.	Level-4 Analyze
CO3	Evaluate the correctness and performance of digital circuit designs and computer system configurations through testing and troubleshooting.	Level-5 Evaluate
CO4	Create and implement digital circuits and basic computer system setups including adders, counters, registers, and PC assembly.	Level-6 Create

List of Experiments:

EXP. No.	Experiments
1.	Verify logic behavior of AND, OR, NAND, NOR, EX-OR, EX-NOR, Invert and Buffer gates.
2.	To study and verify NAND as a Universal Gate.
3.	To verify De- Morgan's theorem for 2 variables.
4.	Design and test of an S-R flip-flop using NAND/NOR gate.
5.	Convert BCD to Excess-3 code using NAND gate.
6.	To Convert Binary to Grey Code.
7.	Verification of Truth Tables of J-K Flip-Flop using NAND/NOR gate.
8.	Realize Decoder and Encoder circuit using Basic Gates.
9.	Design and implement the 4:1 MUX using gates.
10.	Design and verify operation of half adder and full adder.
11.	Design and Implement a 4 bit shift register using Flip flops.
12.	Design and Implement a 4 bit synchronous counter.
13.	Design and verify 4 bit asynchronous counter.

14.	Identify and Troubleshoot the problems of RAM, SMPS and motherboard.
15.	To Study mother board layout of a system.
16.	Demonstrate the assembly of a PC.
17.	Install and configure windows OS.

At least 12 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.

Course Code	SEC-BCA-101B				
Category	Skill Enhancement Courses				
Course Title	Problem Solving Techniques				
Scheme and Credits	L	T	P	Credits	Semester-I
	3	0	0	3	
Course Objectives	The objectives of this course are • To develop problem-solving skills using algorithms, flowcharts, and structured approaches. • To understand and implement programming concepts using C language, including control structures, data types, and arrays. • To design modular programs using functions and recursion for solving numerical and computational problems.				
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	Recall the concepts of problem solving, algorithms, C programming fundamentals, number-based programming, and modular programming.	Level-1 Remember
CO2	Explain problem-solving techniques, C programming constructs, number-based programming, functions, arrays, and modular programming concepts.	Level-2 Understand
CO3	Apply algorithms, C programming constructs, functions, arrays, recursion, searching, sorting, and string handling to solve computational problems.	Level-3 Apply
CO4	Analyze algorithms with C programs to evaluate logic, correctness, efficiency, and debugging of solutions to computational problems.	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

Problem Solving: Problem solving concepts, problem analysis, computational problems, algorithms, algorithm efficiency and correctness, problem-solving steps, input/output specification, input validation, pre/post conditions, and role of data structures.

UNIT – II

Programming Fundamentals and C Basics: Structured programming (sequence, selection, iteration), algorithms, pseudo code, flowcharts, pattern and series problems, data representation, introduction to C language, data types, operators, input/output, control statements, program development, testing, and coding practices.

UNIT – III

Number-Based Programming: Programming on numbers (palindrome, prime, Armstrong, perfect, factorial, number conversion, etc.), statistical operations using loops, and C language constructs including else-if ladder, switch, increment/decrement, break, and continue.

UNIT – IV

Functions and Arrays: Modular programming, recursion, functions, one- and two-dimensional arrays, searching, any one sorting algorithm, matrix operations, string handling, operators, precedence, associativity and debugging.

Reference Books

- Venkatesh, Nagaraju Y, Practical C Programming for Problem Solving, Khanna Book Publishing Company, 2024.
- AICTE's Programming for Problem Solving (with Lab Manual), Khanna Book Publishing Company, 2024.
- Harvey Deitel and Paul Deitel, C How to Program, 9th edition, Pearson India, 2015.
- R G Dromey, How to Solve It by Computer.
- Brian W. Kernighan and Dennis Ritchie, The C Programming Language, 2nd edition, Pearson, 2015.
- Jeri Hanly and Elliot Koffman, Problem Solving and Program Design in C, 8th edition, Pearson, 2015.

Video Links

Topics	Links
Problem Solving	https://nptel.ac.in/courses/106104074
C Language	https://nptel.ac.in/courses/106105171
Structured Programming Concepts	https://nptel.ac.in/courses/106104074
Two-Dimensional Array	https://nptel.ac.in/courses/106105171

Course Code	LC-BCA-109B				
Category	Skill Enhancement Courses				
Course Title	Problem Solving Techniques Lab				
Scheme and Credits	L	T	P	Credits	Semester-I
	0	0	4	2	
Course Objectives	The objectives of this course are • To understand fundamental programming concepts including variables, data types, control structures, loops, and functions for solving basic computational problems. • To understand algorithmic approaches for solving mathematical problems, pattern generation, and number-based computations using iterative techniques. • To understand modular programming and recursion techniques for designing efficient solutions to problems involving arrays, strings, matrices, and numerical operations.				
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	Apply problem-solving techniques, algorithms, and C programming concepts to solve computational problems.	Level-3 Apply
CO2	Analyze algorithms and C programs using control structures, functions, arrays, and debugging techniques.	Level-4 Analyze
CO3	Evaluate algorithms and C program solutions based on correctness, efficiency, and coding practices.	Level-5 Evaluate
CO4	Develop modular and efficient C programs using appropriate programming techniques to solve real-world problems.	Level-6 Create

List of Experiments:

EXP. No.	Experiments
1.	Develop an algorithm and draw a flowchart to find the largest of three numbers.
2.	Develop an algorithm, pseudo code, and flowchart to calculate the sum and average of N numbers.
3.	Write a C program to perform basic arithmetic operations using different operators.
4.	Write a C program to find whether a given year is a leap year using if-else statements.
5.	Write a C program to display the multiplication table of a given number using loops.
6.	Write a C program to generate the following patterns using nested loops: • Right triangle • Inverted triangle • Pyramid
7.	Write a C program to check whether a given number is Prime.
8.	Write a C program to check whether a given number is Palindrome.

9.	Write a C program to check whether a given number is an Armstrong number.
10.	Write a C program to find the factorial of a number and generate the Fibonacci series.
11.	Write a menu-driven C program using switch statement to perform: • Decimal to Binary conversion • Binary to Decimal conversion • Check Perfect Number
12.	Write a C program using user-defined functions to perform arithmetic operations (Addition, Subtraction, Multiplication, Division).
13.	Write a C program to perform searching on an array using Linear Search.
14.	Write a C program to sort an array using Bubble Sort.
15.	Write a C program to perform matrix addition and multiplication using two-dimensional arrays.

At least 12 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.

Course Code	MDE-101B				
Category	Multidisciplinary Courses				
Course Title	Indian Knowledge Systems and Traditions				
Scheme and Credits	L	T	P	Credits	Semester-I
	2	0	0	2	
Course Objectives	The objectives of this course are: • To understand the fundamental concepts of Indian Knowledge Systems, Indian culture, civilization, and ancient scientific traditions. • To understand the significance of traditional Indian creative practices, arts, architecture, music, dance, and craftsmanship. • To understand the relevance and application of Indian Knowledge Systems and creative practices in modern society and sustainable development.				
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	List the concepts of Indian Knowledge System, Indian culture and civilization, ancient Indian sciences, architecture, and philosophical systems	Level-1Remember
CO2	Explain the principles and significance of Indian creative practices, traditional arts, crafts, music, dance, painting, and engineering techniques.	Level-2Understand
CO3	Apply traditional Indian knowledge and creative practices in activities related to art, design, performance, craftsmanship, and cultural expression.	Level-3Apply
CO4	Analyze the relevance and contributions of Indian Knowledge Systems and creative practices to modern society, culture, science, and sustainable living.	Level-3Apply

Note:

1. Examiner will set nine questions in total. Question one will be compulsory. Question one will have 7 parts of 1 mark 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.
2. Any eight of total sessions assigned for Literary activity from Unit-I and Unit-II.
3. Twenty Lectures with at least Five different topics of total session under Creative activity from Unit-III and Unit-IV.

Unit-I

Introduction to IKS: Indian Knowledge System, Indian Culture & Civilization, Ancient Indian Chemistry, Ancient Indian Metallurgy, Ancient Indian Mathematics, Ancient Indian Astronomy, Indian Astronomical Instruments.

Unit-II

Indian Knowledge System (Upveda: Ayurveda, Gandharveda)
Indian Knowledge System (Vedangas: Shiksha, Kalpa, Vyakrana, Jyotisha, Nirukta, Chandas)
Indian Architecture: I-Sthapatya-Veda, II: Temples, III: Town & Planning
Indian Philosophical System

Unit-III

Introduction to Creative Practices: Dhaturvada: art of metallurgy, Akara jnana: art of mineralogy, Vastuvidya: art of engineering, Yantramatrika: art of mechanics, Takshana: art of carpentry, Chalitakayoga: art of practicing as a builder of shrines, Raupyaratnapariksha: art of testing silver and jewels, Maniraga jnana: art of tinging jewels, Sucivayakarma: art of needleworks and weaving, Vadya vidya: art of playing on musical instruments, Geet vidya : art of singing, Nritya vidya: art of dancing

Unit-IV

Creative Practices: Natya vidya: art of theatricals, Alekhyia vidya: art of painting, Viseshakacchedya vidya: art of painting the face and body with color, Udakavadya: art of playing on music in water, Manasi kavyakriya: art of composing verse, Bhushanayojana: art of applying or setting ornaments, Citrasakapupabhakshyavikarakriya: art of preparing varieties of delicious food, Dasanavasanangaraga: art of applying preparations for cleansing the teeth, cloths and painting the body, Utsadana: art of healing or cleaning a person with perfumes, Vastragopana: art of concealment of cloths, Balakakridanaka: art of using children's toys, Tandulakusumabalivikara: art of preparing offerings from rice and flowers, Pushpastarana: art of making a covering of flowers for a bed.

Suggested Readings:

- Textbook on IKS by Prof. B Mahadevan, IIM Bengaluru
- Kapur K and Singh A.K (Eds) 2005). Indian Knowledge Systems, Vol. 1. Indian Institute of Advanced Study, Shimla. Tatvabodh of sankaracharya, Central chinmay mission trust, Bombay, 1995.
- The Cultural Heritage of India. Vol.I. Kolkata: Ramakrishna Mission Publication, 1972.
- Nair, Shantha N. Echoes of Ancient Indian Wisdom. New Delhi: Hindology Books, 2008.
- Dr. R. C. Majumdar, H. C. Raychaudhuri and Kalikinkar Datta: An Advanced History of India (Second Edition) published by Macmillan & Co., Limited, London, 1953.
- Rao, N. 1970. The Four Values in Indian Philosophy and Culture. Mysore: University of Mysore.
- Avari, B. 2016. India: The Ancient Past: A History of the Indian Subcontinent from c. 7000 BCE to CE 1200. London: Routledge.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Indian Knowledge Systems	https://www.youtube.com/playlist?list=PLRfu94TCePTtVPR-kC4RpIGIwo7-ViCGP
Unit-II	Indian philosophy, Vedas, Vedangas, traditions, and IKS basics	https://www.youtube.com/watch?v=3H16y-XfMMc
Unit-III	Introduction to Creative Practices	https://www.anaadi.org/iksprimer?utm_source

Course Code	MDE-103B				
Category	Multidisciplinary Courses				
Course Title	Indian Mathematics and Astronomy				
Scheme and Credits	L	T	P	Credits	Semester-I
	2	0	0	2	
Course Objectives	The objectives of this course are: - To understand the foundations of ancient Indian mathematics, astronomy, and numeral systems. - To understand the principles of Vedic mathematical methods, astronomical calculations, and ancient scientific texts. - To understand the significance of ancient Indian astronomical instruments, time systems, and scientific contributions.				
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	List the contributions of ancient Indian mathematicians, astronomers, numeral systems, and foundational concepts of Indian mathematics and astronomy.	Level-1Remember
CO2	Explain the principles of Vedic mathematics, Sulvasutras, algebraic methods, trigonometry, calendrical studies, and astronomical systems described in ancient Indian texts.	Level-2Understand
CO3	Apply ancient Indian mathematical and astronomical methods related to calculations, planetary motions, time systems, eclipses, and observational techniques.	Level-3Apply
CO4	Apply ancient Indian mathematical and astronomical methods related to calculations, planetary motions, time systems, eclipses, and observational techniques.	Level-3Apply

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 7 parts of 1 mark 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-I

The Introduction to Ancient Mathematics & Astronomy

Introduction to Brief introduction of inception of Mathematics & Astronomy from vedic periods. Details of different authors who has given mathematical & astronomical sutra (e.g. aryabhatta, bhaskara, brahmagupta, varamahira, budhyana, yajanvkya, panini, pingala, bharat muni, sripati, mahaviracharya, madhava, Nilakantha somyaji, jyeshthadeva, bhaskara-II, shridhara).

Periodical enlisting of Mathematical & Astrological achievement in India. Evolution of Indian Numerals (Brahmi (1st century), Gupta (4th century) & Devanagri Script (11th century)

Unit-II

Ancient Mathematics –I

Veda & Sulvasutras (Pythagoras theorem, Square root & Squaring Circle) (baudhayana sulbhasutra, apastamba sulbhasutra, katyayana sulbhasutra, manava sulbhasutra, maitrayana sulbhasutra, varahasulbhasutra, vadhula sulbhasutra, Pingala's chandasutras, sunya, yaat-tavat, Aryabhata (Aryabhata, Asanna, ardha-jya, kuttaka),

bhaskara (trigonometry, shridhara, mahavira), Bhaskara Acharya (Sidhantashiromani), Varamahira panchasiddhantika.

Unit-III

Ancient Mathematics –II

Brahmagupta (vargaprakrati, bhramasphuta siddhanta, bhavana), ayatavrtta, ganitasarasamgraha, lilavathi, ganesadaivajna, randavantika, suryasiddhanta, grahalaghava, sadratnamala, mandavrtta, sigrharta, Bijaganita, Bakshali manuscript, Golavada, Madhyamanayanaprakara, Mahajyanayanaprakara (Method of Computing Great Sines), Lagnaprakarana, Venvaroha, Sphutacandrapti, Aganita-grahacara, Chandravakyani (Table of Moon-mnemonics)

Unit-IV

Ancient Astronomy –I

Parahita system of astronomy and drk system of astronomy, Manda samskara, sigrha samskara. Vedanga Jyotisha (astronomical calculations, calendrical studies, and establishes rules for empirical observation), Aryabhatiya (earth rotation, shining of moon), Brahmasphutasiddhanta (motion of planets), varahmihira (pancasiddhantika), Mahabhashkariya, lahubhashkariya & aryabhatiya bhashya (Planetary longitudes, heliacal rising and setting of the planets, conjunctions among the planets and stars, solar and lunar eclipses, and the phases of the Moon), Sisyadhiveddhida (grahadyaya, goladyaya), siddhantasiromani, karanakutuhala (planetary positions, conjunctions, eclipses, cosmography), siddhantasekhara, yantra-kirnavali, Sphutanirnaya, Uparagakriyakrama.

Ancient Astronomy –II

Positional astronomy (sun, planets, moon, coordinate systems, precision of the equinox and its effects, eclipses, comets and meteors), Mahayuga & Kalpa system Yuga system, ayanas, months, tithis and seasons, time units, sun and moon's motion, planet position, ayanachalana, zero-precision year, katapayaadi system, Indian nakshatra system, astronomy Instruments for naked eye astronomy (vedic observatories). The principal and application of Samrat Yantra, Jai Prakash Yantra, Disha Yantra, Rama Yantra, Chakra Yantra, Rashiwalya Yantra, Dingash Yantra, Utaansh Yantra

Suggested Readings:

- Textbook on IKS by Prof. B Mahadevan, IIM Bengaluru.
- R P Kulkarni, Glimpse of Indian Engineering and Technology (Ancient & Medieval period, Munshiram Manoharlal Publishers Pvt. Ltd. 2018)
- AK Pathak, Science and Technology in India, Anshika prakashan pratapgarh, 2016
- NVP, Unithiri, Indian Scientific Traditions (Professor K.N. Neelakantan Elayath Felicitation Volume), publication division univeristy of Calicut, 2006
- Dharmpal, Indian science and technology in the eighteen century, rashtrottahana sahitya, 1983
- S Biswal, B L ray, vedic Science and technology, DK Print world, 2009
- A Kolachana, Studies in Indian Mathematics and Astronomy, Hindustan Book agency
- S B Rao, Indian Mathematics and Astronomy: Some Landmarks (Revised Third Edition), Bhartiya Vidhya Bhavan, 2012,
- GG Josheph, Indian Mathematics: Engaging with the World from Ancient to Modern Times, speaking Tiger, 2016
- BS Yadav, Ancient Indian Leaps into Mathematics, brikausher publication, 2010
- DP Chatopadhyaya, Ravinder kumar, Mathematics, Astronomy, and Biology in Indian Tradition: Some Conceptual Preliminaries (Phispc Monograph Series on History of Philosophy, Science and Culture in India, No 3), Munshiram manoharlal publication, 1995
- BV subbarayappa, The Tradition of Astronomy in India: History of Science, Philosophy and Culture in Indian Civilization Vol. IV, Part 4: Jyotishastra (History of Science, Philosophy & Culture in Indian Civilization), centre for studies in civilization, 2008
- GE Clark, The Aryabhatiya of Aryabhata: An Ancient Indian Work on Mathematics and Astronomy, Kesinger publication, 2010
- Anonyms, Hindu Astronomy: Anuradha, Bharani, Hindu Chronology, Hindu Calendar, Indian Astronomy, Kerala School of Astronomy and Mathematics, Jyoti, Book LLC, 2011

- KV Sharma. Ganita yuktibhasa (Analytical Exposition of the Rationales of Indian Mathematics and Astronomy, Kindle, 2021
- R Mercier, Studies on the Transmission of Medieval Mathematical Astronomy (Variorum Collected Studies), routledge publication, 2004.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Astronomy in Ancient, Medieval and Early Telescopic Era of India	https://www.youtube.com/watch?v=GZn8DtXVzkk
Unit-II	Arya bhata: A True Gem of Indian Mathematics and Astronomy	https://www.youtube.com/watch?v=LI6mzQvNRRs
Unit-III	Brahma sphuta siddhanta of Brahma gupta	https://www.youtube.com/watch?v=3bNFEJNY4Ds
Unit-IV	Pre Siddhantic Astronomy	https://www.youtube.com/watch?v=BURiuOGylS4

Course Code	MDE-105B				
Category	Multidisciplinary Courses				
Course Title	Indian Vision for Human Society				
Scheme and Credits	L	T	P	Credits	Semester-I
	2	0	0	2	
Course Objectives	The objectives of this course are: • To help the learner to understand the concept of “Vasudhaiva Kutumbkam” and its realization process as a base for the development of vision for a humane society. • To help to identify the universality in humans and its coexistence in existence. • To introduce the sense of responsibility, duties, and participation of individuals for establishment of a fearless society. • To understand the apparently rational, verifiable, and universal solution from the ancient Indian knowledge system for the holistic development of physical, mental, and spiritual wellbeing of one and all, at the level of individual, society, nation, and ultimately the whole world.				
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	Remember core concepts related to human existence, consciousness, and social harmony.	Level-1Remember
CO2	Understand the aims of human life and the ethical foundations of individual and societal well-being	Level-2Understand
CO3	Apply philosophical and ethical principles to personal conduct and social interactions.	Level-3Apply
CO4	Apply integrated knowledge to promote harmony, balance, and purposeful living in society.	Level-3Apply

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 7 parts of 1 mark 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-I

The world view & Vision of Human Society:- The concept of non-duality of Prakriti (Jad) and Purush (Chetana), human as coexistence of Jad & Chetan, Pancha-mahabhutas, the root of sorrow and suffering, freedom from sorrow, salvation, eternal peace truth (Vyaharika Satya), ultimate truth. The acceptance of various systems of philosophy for realization of truth and complementariness in society in ancient Indian system.

Unit-II

Aspiration and Purpose of Individual and Human Society: - Aims of Human life; at individual level and societal level. At societal level; Four Purusarthas Dharma, Artha, Kama, Moksha. Individual level; Abhyudaya (progress), Nihisreyasa (perfection) Pravrtti, Nivrtti. Dharma; Dharma

sutras (Gautama, apastamba, baudhayana, vasistha). Dharma-Shastra; (manusmriti, naradamrti, visnumrti, yajnavalkya smriti) sociology, different stages of life like studenthood, householdership, retirement and renunciation, rites and duties, judicial matters, and personal laws (Aachara, Vyavahara, Prayaschitta). Artha; Kautliya Arthashastra, Kamandakiya Nitisaara, Brihaspati Sutra, Sukra Niti, Moksha: Human liberation (Ignorance to Knowledge).

Unit-III

Program for Ensuring Human Purpose: at Individual and Societal level :- Fundamental concept of Nitishastra: Satyanishtha Aur Abhiruchi (Ethics, Integrity & aptitude). The true nature of self; Shiksha Valli, Bhrihu Valli (concept of Atman-Brahman (self, soul). The true constitution of Human: Ananda Valli (Annamaya Kosha, Pranamaya Kosha, Manomaya Kosha, Vijnanamaya Kosha, Anandamaya Kosha). The four states of consciousness (Waking state, Dreaming state, Deep Sleep State, Turiya the fourth state), Consciousness (seven limbs and nineteen mouths), Prajna, Awareness. The Life Force Prana (Praana-Apaana-Vyaana-Udaana- Samaana). Differentiating Vidya and Avidya, human bondages, Higher and Lower Knowledge (Para Vidhya & Apra Vidhya). Concept of Sattva, Rajas, Tamas and need of balancing the same, Patanjali yog sutra; Yama, Niyama, Asanas, pranayams, pratyahara, dharna, dhyana, Samadhi, Sixteen category of padartha, pramans (pratyaksh, anumana, upamana, shabda). Saadhana chatustayam (viveka, vairagya, mumukshatavam, shadsampathi (sama, dama, uparama, titiksha, shradha, samadhana), Understanding Nitya karma, Naimittika Karma, Kamya karma, prayaschitta karma, Nishidha Karma. Meditation and Progressive meditation (Narada's education), Ativadin to self-knowledge, Jyan yog, Karma yog, sanyas yog in the aspect of harmonious practice in society.

Unit-IV

Practices for Ensuring Human Purpose – III: Practice in philosophy, architecture, grammar, mathematics, astronomy, metrics, sociology, economy and polity, ethics, geography, logic, military science, weaponry, agriculture, mining, trade and commerce, metallurgy, shipbuilding, medicine, poetics, biology, and veterinary science.

Suggested Readings:

- Textbook on IKS by Prof. B. Mahadevan, IIM Bengaluru.
- Maharaj Swami Chidatmanjee, *Ancient Indian Society*, Anmol Publication Pvt. Ltd., India.
- S. C. Manerjee, *Society in Ancient India: Evolution since the Vedic Times Based on Sanskrit, Pali, Prakrit and Other Classical Sources: No. 1 (Reconstructing Indian History and Culture)*, DK Printing, India.
- Rao, N. (1970). *The Four Values in Indian Philosophy and Culture*. Mysore: University of Mysore.
- Chakraborti, K. (2001). *Religious Process: The Puranas and the Making of Regional Tradition*. Delhi: OUP.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Introduction to Indian Philosophy	https://www.youtube.com/watch?v=ddJg3gzYEB8
Unit-II	Indian Philosophy(Orthodox & Heterodox Systems)	https://www.nptelprep.in/courses/109106059/videos
Unit-III	Indian Knowledge Systems	https://www.youtube.com/playlist?list=PLRfu94TCePTtVPR-kC4RpIGIwo7-ViCGP
Unit-IV	Philosophy & Consciousness (Sankhya/Yoga Focus)	https://archive.nptel.ac.in/courses/109/106/109106059/

Course Code	MDE-107B				
Category	Multidisciplinary Courses				
Course Title	Indian Culture and Civilization				
Scheme and Credits	L	T	P	Credits	Semester-I
	2	0	0	2	
Course Objectives	The objectives of this course are: • To introduce the fundamentals of Ancient Indian Education to understand the pattern and purpose of studying Vedas, Vedangas, Upangas, Upaveda, Purana&Itihasa. • To help students to trace, identify, and develop the ancient knowledge systems. • To help to understand the apparently rational, verifiable, and universal solution from the ancient Indian knowledge system for the holistic development of physical, mental, and spiritual wellbeing. • To build in the learners a deep-rooted pride in Indian knowledge, committed to universal human rights, well-being, and sustainable development.				
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	Remember core ideas and texts of Indian knowledge traditions.	Level-1 Remember
CO2	Understand philosophical and scientific foundations of knowledge systems.	Level-2 Understand
CO3	Apply traditional concepts to interpret science, language, and culture.	Level-3 Apply
CO4	Apply integrated knowledge to real-life and managerial contexts.	Level-3 Apply

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 7 parts of 1 mark 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-I

Introduction to IKS: Caturdaśa Vidyāsthānam, 64 Kalas, ShilpaŚāstra, Four Vedas, Vedāṅga, Indian Philosophical Systems, Vedic Schools of Philosophy (Sāṃkhya and Yoga, Nyaya and Vaiśeṣika, Pūrva-Mīmāṃsā and Vedānta), Non-Vedic schools of Philosophical Systems (Cārvāka, Buddhist, Jain), Puranas (Maha-puranas, Upa-Puranas and Sthala-Puranas), Itihasa (Ramayana, Mahabharata), NitiSastras, Subhasitas

Unit-II

Foundation concept for Science & Technology: Linguistics & Phonetics in Sanskrit (panini's), Computational concepts in Astadhyayi Importance of Verbs, Role of Sanskrit in Natural Language Processing, Number System and Units of Measurement, concept of zero and its importance, Large numbers & their representation, Place Value of Numerals, Decimal System, Measurements for time, distance and weight, Unique approaches to represent numbers (BhūtaSāṃkhya System, Kaṭapayādi

System), Pingala and the Binary system, Knowledge Pyramid, Prameya – A Vaiśeṣikan approach to physical reality, constituents of the physical reality, Pramāṇa, Samśaya.

Unit-III

Indian Mathematics & Astronomy in IKS: Indian Mathematics, Great Mathematicians and their contributions, Arithmetic Operations, Geometry (Sulba Sutras, Aryabhatiya-bhasya), value of Trigonometry, Algebra, Chandah Sastra of Pingala, Indian Astronomy, celestial coordinate system, Elements of the Indian Calendar Aryabhatiya and the Siddhantic Tradition Pancanga – The Indian Calendar System Astronomical Instruments (Yantras) JantarMantar or Raja Jai Singh Sawal.

Unit-IV

Indian Science & Technology in IKS: Indian S & T Heritage, sixty-four art forms and occupational skills (64 Kalas) Metals and Metalworking technology (Copper, Gold, Zinc, Mercury, Lead and Silver), Iron & Steel, Dyes and Painting Technology), Town & Planning Architecture in India, Temple Architecture, Vastu Sastra,

Humanities & Social Sciences in IKS: Health, Wellness & Psychology, Ayurveda Sleep and Food, Role of water in wellbeing Yoga way of life Indian approach to Psychology, the Triguna System Body-Mind-Intellect- Consciousness Complex. Governance, Public Administration & Management reference to Ramayana, Artha Sastra, Kautilyan State

Suggested Readings:

- Textbook on IKS by Prof. B. Mahadevan, IIM Bengaluru.
- Kapur, K. and Singh, A. K. (Eds.) (2005). *Indian Knowledge Systems*, Vol. 1. Indian Institute of Advanced Study, Shimla. *Tatvabodh* of Shankaracharya, Central Chinmaya Mission Trust, Bombay, 1995.
- Nair, Shantha N. *Echoes of Ancient Indian Wisdom*. New Delhi: Hindology Books, 2008.
- S. K. Das, *The Education System of Ancient Hindus*, Gyan Publication House, India.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Introduction to Indian Knowledge Systems (Philosophy & Culture)	https://www.youtube.com/watch?v=5f0phlOdYvU
Unit-II	Ayurveda & Traditional Medicine in Indian Knowledge Systems	https://www.youtube.com/watch?v=xORzinU4oC8
Unit-III	Indian Contributions to Mathematics (Ancient Mathematics & Systems)	https://www.youtube.com/watch?v=T0gCkyKVQUg
Unit-IV	Indian Astronomy & Calendar Systems	https://www.youtube.com/watch?v=JpZBaHsQ2Ws

Course Code	MDE-109B				
Category	Multidisciplinary Courses				
Course Title	Indian Science, Engineering and Technology				
Scheme and Credits	L	T	P	Credits	Semester-I
	2	0	0	2	
Course Objectives	The objectives of this course are • To familiarize learners with major sequential development in Indian science, engineering and technology. • To review & strengthen the ancient discovery and research in physics, chemistry, maths, metallurgy, astronomy, architecture, textile, transport, agriculture and Ayurveda etc. • To help students to trace, identify and develop the ancient knowledge systems to make meaningful contribution to development of science today.				
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	Recall key ideas, historical contributions of traditional knowledge systems.	Level-1 Remember
CO2	Understand the principles, cultural knowledge creation and practice.	Level-2 Understand
CO3	Apply traditional scientific concepts to explain natural phenomena, health, and technology.	Level-3 Apply
CO4	Apply integrated knowledge to relate traditional practices with contemporary life and sustainability.	Level-3 Apply

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 7 parts of 1 mark 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-I

Indian Traditional Knowledge; Science and Practices: Introduction to the Science and way of doing science and research in India, Ancient Science in Intra & Inter Culture Dialogue & coevolution. Traditional agricultural practices, Traditional water-harvesting practices, Traditional Livestock and veterinary Sciences Traditional Houses & villages, Traditional Forecasting, Traditional Ayurveda & plant-based medicine, Traditional writing Technology

Unit-II

Ancient Indian Science (Physics, Chemistry, Maths): Physics in India: Vaisheshika Darshan atomic theory & law of motion, theory of Panchmahabhoota, BrihathShathaka (divisions of time, unit of distance), Bhaskaracharya (theory of gravity, Surya Siddhanta&Siddhanta Shiromani), Lilavati (Gurutvakarshan Shakti).

Chemistry in India: Vatsyayana, Nagarjuna, Khanda, Al-Biruni, Vagbhaṭa – building of the Ras-shala (laboratory), working arrangements of Ras-shala, material and equipment, YaśodharaBhaṭṭa – process of distillation, apparatus, saranasamskara, saranataila.

Mathematics in India: Baudhayana's Sulbasutras, Aryabhaṭa, Bhaskaracharya-I, Severus Sebokht, Syria, Brahmagupta, Bhaskaracharya-II, Jyēṣṭhadeva.

Unit-III

Ancient Indian Science (Metallurgy, Astronomy, Architecture): Metallurgy in India: Suvarṇa (gold) and its different types, properties; Rajata (silver); Tamra (copper); Loha (iron); Vanga (tin); Naga / Sisa (lead); Pittala (brass).

Astronomy in India: VedangaJyotiṣ; Aryabhata Siddhanta; Mahabhaskriya; Laghubhaskriya; VatesvaraSiddhanta; Sisyaḍhivṛddhida; Grahashraya; Goladhyaya; Karana Kutuhala (Aryabhata, Varahamihira, Brahmagupta, Vatesvara, Bhaskara, Paramesvara, NilakanthaSomayaji, Jyēṣṭhadeva, Shankara Varman).

Architecture in India: Nagara (northern style), Vesara (mixed style), and Dravida (southern style); Indian vernacular architecture; temple style; cave architecture; rock-cut architecture; Kalinga architecture; Chandela architecture; Rajput architecture; Jain architecture; Sikh architecture; Maratha architecture; Indo-Islamic architecture; Indo-Saracenic revival architecture; Greco-Buddhist style.

Unit-IV

Ancient Indian Science (Textile, Agriculture, Transport): Textile Technology in India: Cotton (natural cellulose fiber), silk, wool (natural protein fibers), bast and leaf fibres; mṛdihudhautadhupaitambaram (meaning a practice of fumigating the fabric with incense smoke before use as a part of the finishing process); Sitadhautavasana-yugala (bleached white – a finishing process); suchastah, sutradharah (needle and thread – tools for stitching); dyeing, washing, spinning, and weaving technology.

Agriculture in India: KrishiSuktas, Krishi-parashara, Brihatsamhita; types of crops; manures; types of land – devamatruka, nadimatruka; use of animals in warfare; animal husbandry; animals for medicines.

Ancient Transport in India

Ancient Indian Science (Ayurveda & Yoga): Ayurveda for Life, Health, and Well-being: Introduction to Ayurveda; understanding the human body and PanchaMahaBhuta; the communication between body & mind; health regimen for well-being; introduction to Yoga (Raja Yoga, Ashtanga Yoga, Jnana Yoga); understanding of Indian psychological concepts; consciousness; Tridosha&Triguna.

Suggested Readings:

- Textbook on IKS by Prof. B Mahadevan, IIM Bengaluru.
- Kapur K and Singh A. K (Eds) 2005). Indian Knowledge Systems, Vol. 1. Indian Institute of Advanced Study, Shimla. Tatva Bodh of Shankaracharya, Central Chinmay mission trust, Bombay, 1995.
- Nair, Shantha N. Echoes of Ancient Indian Wisdom. New Delhi: Hindology Books, 2008.
- SK Das, The education system of Ancient Hindus, Gyan publication house, India
- Dharmapal, Indian science and technology in the eighteen century, rashtrottahanasahitya, 1983

Useful VideoLinks:

Unit No	Topics	Links
Unit-I	Indian Traditional Knowledge & Research Culture	https://archive.nptel.ac.in/courses/121/106/121106003/
Unit-II	Ancient Indian Science (Physics, Chemistry, Maths)	https://www.youtube.com/watch?v=T0gCkyKVQUg
Unit-III	Ancient Indian Science (Metallurgy, Astronomy, Architecture)	https://www.youtube.com/watch?v=r5KTrbJlKAA

Course Code	MDE-111B				
Category	Multidisciplinary Courses				
Course Title	Indian Town Planning and Architecture				
Scheme and Credits	L	T	P	Credits	Semester-I
	2	0	0	2	
Course Objectives	The objectives of this course are • To develop the knowledge and analysis on the understanding of eco-friendly, robust and scientific planning and architecture system of ancient India. • To understand the importance of functional, aesthetic, psychological, culture and socio religious concept of ancient India architecture. • To help the learners to trace, identify and develop the approach, process and material used in town and planning, construction and architecture. • To understand the various eco-friendly technology accepted in ancient civilization				
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	Recall the concepts related to human settlements and architectural traditions.	Level-1Remember
CO2	Understand how culture, environment, and human needs influence-built forms.	Level-2Understand
CO3	Apply principles of form, space, materials in architectural examples.	Level-3Apply
CO4	Apply analytical understanding to compare regional and period-based architectural practices.	Level-3Apply

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 7 parts of 1 mark 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-I

The Introduction to ancient Architecture: Introduction to relationship between Man, Nature, Culture and city forms. Study of determinants (Natural and man-made) influencing location, growth & pattern of human settlements including types of settlements growth (Organic and planned) and settlement forms. Architecture as satisfying human needs: functional, aesthetic and psychological outline of components and aspects of architectural form-site, structure, skin, materials, services, use, circulation, expression, character, experience. Understanding of the causative forces - the cultures, history, socio religious practices and institution, political and economic conditions, issues of land, climate and technology, Historical and Primitive Architecture.

Unit-II

Ancient Architecture as Expression of Art & Design: Relationship between Art and Design with man, space and environment. Expression in Art and Architecture – concept of space, sense of enclosure openness, robustness, dynamism, spatial geometry, Eco-friendliness. Architecture through use of elements of visual arts such as point, line, plane, form, space, colour, texture, light, solids and voids,

shadow and shade etc. Understanding of effect of scale, proportions, order, material effects such as textures, patterns, light, sound, temperature etc. in architectural spaces.

Allied visual and performing arts and its relationship to build environments using colour theory, symbolism, glass painting, scriptural writing, clay moulding, and stone carving. Important Indian architecture as per elements space & form: specific geometry form (sphere, cube, pyramid, cylinder and cone and its sections as well as their derivatives) Space: build form space, open space, Internal and External space, Continuous spaces Centralized, Linear, Radial Clustered, Grid space Different type of Materials used for construction in Ancient Indian architecture. Clay products: Classification of bricks, Fire Brick, Fly Ash Bricks, Tiles, Terracotta, Earthenware, Porcelain, Stoneware. Stones: Uses of Stones, Qualities of Good Building Stones, Dressing, Common Building Stones of India. Glass: Different glass Forms and their Suitability, Timber: Different Forms and their Suitability Metals: Ferrous & Nonferrous Metals and Alloys, and, their Suitability, limitations, precautions Paints and Varnishes: Different types and their Suitability, limitations, precautions

Unit-III

Ancient Architecture Principle & Planning: Design: Principles of designing – Composition of Plan. Inception and development of the early Hindu temple form with reference to Vedic and Buddhist planning principles and design elements; Development of regional styles and manifestations thereof; Evolution of temple complexes and temple towns; planning: Residence- site selection, site orientation- aspect, prospect, grouping, circulation, privacy, furniture requirements, services and other factors. Vastushastra and its importance in building interrelationship with human, nature and cosmos Town Planning: Town plans of Harappa, Mohenjo-Daro, Pataliputra, and Delhi. Vastushastra and its application in city layout.

Unit-IV

Ancient Architecture-I: The settlement planning pattern, elements, associated forms, typical Vedic village, towns (Dandaka, Nandyavartha etc.), typology of Shelters and civic buildings of ancient architecture in reference to following civilization: Indus Valley, Aryan/Vedic Civilisation, Buddhist Architecture, Indo Aryan & Dravidian Architecture. Role of Shilpasastras and Arthashastra in settlement planning. Important architecture: Great baths, Development of fortification, walled towns, structures developed e.g.: Stupas, Viharas, Chaityas, Stambhas, Torana, sacredrailingetc. Study of worshipping places with especial reference to Indo Aryan / Nagarastyle & Dravidian style (Chola, Chalukya, Pallava, Satavahana, Hoysala, Vijayanagar etc.), design of shikharas&gopuram, rock-cut and structural examples of temples.

Ancient Architecture-II: Evolution of Hindu Temples in different period: Gupta, Aihole, Badami, Pattadakal, Mahabalipuram, Indo Aryan Style in Orrisa, Khajuraho, Gujarat, Rajasthan. Dravidian Style in Chola, Chalukyan, Pandya, Pallava, Hoysala Style, Revival of Hindu architecture of South India at Vijaynagara and Madurai Tradition Indian villages & House: Regional house construction, interior & importance e.g. Rajasthani house, bhungas of Kutch, nalukettu of Kerala, Ikraofassam, manduvalogili or illu of Andra Pradesh, Wadas of Maharashtra, Mudhouses of Madhya Pradesh, kathkuni of Himachal Pradesh, khanjagharaoforisha, Taq and dhajjidiwari of Kashmir etc. Scientific achievements though ancient architect: JantarMantar, Musical Pillars of Vitthal temple, Sundial of Konark temple, construction of eight shivatemple in straight line from Kedarnath to Rameshwaram at longitude 79°E 41'54", Veerbhadra temple with 70 hanging pillars, Ellora caves excavating the mountain, Jaipur plan pink city etc.

Suggested Readings:

- Textbook on IKS by Prof. B Mahadevan, IIM Bengaluru.
- Kapur K and Singh A. K (Eds) 2005). Indian Knowledge Systems, Vol. 1. Indian Institute of Advanced Study, Shimla. Tatva Bodh of Shankaracharya, Central Chinmay mission trust, Bombay, 1995.
- Nair, Shantha N. Echoes of Ancient Indian Wisdom. New Delhi: Hindology Books, 2008.
- Dr. V. Ganapati Sthapati, Building Architecture of Sthapatya Veda
- BinodeBehariDutt, Town planning in ancient India, Life Span Publishers & Distributors
- NR Dave, A Study of The Hindu Science of Architecture and its Practice with Special Reference to Raja Vallabha, Bharti Vaidya Bhavan, 2011
- M W Meister, South India Lower DravidaDesa - Encyclopaedia of Indian Temple Architecture (Set of 2 Books)- An Old and Rare Books, American Institute of Indian Studies, 1999
- D N Shukla Civil Architecture in Ancient India (Part-I) Meharchand Lakshmi Das publication, 2016.

Useful Video Links:

Unit No	Topics	Links
Unit-I	Early Architecture & Human Settlements	https://www.youtube.com/watch?v=zq8t_XnJhTQ
Unit-II	Buddhist, Early Temple & Built Forms	https://www.youtube.com/watch?v=zq8t_XnJhTQ
Unit-III	Temple Evolution & Material/Spatial Concepts	https://www.youtube.com/watch?v=7Bx9UYSIIDk
Unit-IV	Historical Examples & Site Planning	https://www.nptelprep.in/courses/124106009/videos?

Course Code	MDE-113B				
Category	Multidisciplinary Courses				
Course Title	Indian Health, Wellness and Psychology				
Scheme and Credits	L	T	P	Credits	Semester-I
	2	0	0	2	
Course Objectives	The objectives of this course are • To Understand the fundamental principles of Indian health systems such as Ayurveda and yoga which are useful in maintaining the health of a healthy person. • Understand traditional way of cleansing the body regularly, strengthening body with Yogic exercises, maintaining the internal balance to prevent diseases • To understand our unique Mind Body Constitution and choosing the right lifestyle suitable to maintain the internal balance. • Understanding mind and its dynamics through knowledge of Ayurveda and Yoga and using the knowledge to maintain harmony between body and mind to achieve perfect mental health.				
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	Recall fundamental concepts related to human constitution, health maintenance, and mind–body interrelationships.	Level-1 Remember
CO2	Explain how internal balance, lifestyle practices, and mental factors influence overall wellbeing and immunity.	Level-2 Understand
CO3	Apply principles of daily and seasonal routines, diet, and self-care practices to promote physical and mental health	Level-3 Apply
CO4	Apply integrative mind–body principles to enhance resilience, self-awareness, and holistic health in everyday life.	Level-3 Apply

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 7 parts of 1 mark 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-I

Understanding human body: Introduction to Ayurveda, the Knowledge of Life, Health and treatment aspects in Ayurveda, Influence of Panchamaha Bhuta on Internal environment of Human being, understanding composition of Human body through the concept of Dosha Dhatu Mala, Understanding Prakruthi, the Mind – Body Constitution.

Unit-II

Understanding the communication between body & Mind: Establishing communication between body and mind by understanding the language of body. Understanding the concept of Agni, Koshta, Sara and Ojas and their relevance in enhancing our immunity to protect from various infections. Looking at the world through the lenses of Dravya, Guna and Karma Applying the principle of Samanya and Vishesha in every aspect of life to achieve perfect health.

Unit-III

Introduction to Health Regimen: Understanding Swasthavritta, the healthy regimen to maintain state of wellbeing Dinacharya, the Daily regimen including Daily detoxification, exercise, Intake of Food, Water, Air and Sunlight, work and ergonomics, Rest and sleep hygiene. Ritucharya, the seasonal regimen, Sadvritta and the concept of social wellbeing, understanding trividhaupastambhas, three pillars to health, Concept of Shadrasa in choosing appropriate nourishment to the body and mind.

Unit-IV

Introduction to Yoga: Definition, Meaning and objectives of Yoga, Relevance of yoga in modern age. Brief Introduction of Hatha yoga, Raja yoga, Karma yoga, Gyana Yoga, Bhaktiyoga Understanding eight steps of Ashtanga yoga, Understanding Shatkriyas, the six cleansing procedures of Yoga

Introduction to Indian Psychology: Concept of Manas in Ayurveda and understanding Mind Body harmony, Triguna based Psychology in Ayurveda and Yoga, Influence of Tri dosha on Mind, Mind body intellect and consciousness complex, Understanding Consciousness and solution to issues within Human Mind.

Suggested Readings:

- Dr Deepak Chopra, Perfect Health--Revised and Updated: The Complete Mind Body Guide, Harmony publication, 2001
- Vasant lad, Ayurveda, the Science of Self-healing: A Practical Guide: Science of Self- healing, lotus press, 1984
- BKS Iyengar, Light on Yoga: The Classic Guide to Yoga by the World's Foremost Authority, thronson publication, 2006
- SwamySatyanandaSaraswati, Asana, Pranayama, Mudra and Bandha, Bihar School of Yoga, 2002

Useful Video Links:

Unit No	Topics	Links
Unit-I	Introductory Concepts & Roots of the Tradition	https://www.youtube.com/watch?reload=9&v=16-q-V9lG5w&embeds_referring_euri=https%3A%2F%2F
Unit-II	Human Body, Constitution & Balance	https://www.youtube.com/watch?v=ty9ZfluxOFk&embeds_referring_euri
Unit-III	Healthy Living & Well-Being (Daily/Seasonal Regimen)	https://www.youtube.com/watch?v=9AJseqmcrfQ

Course Code	AEC-BCA-101B				
Category	Ability Enhancement Course				
Course Title	General English				
Scheme and Credits	L	T	P	Credits	Semester-I
	2	0	0	2	
Course Objectives	The objectives of this course are 1. To provide learning environment to practice listening, speaking, reading and writing skills. 2. To assist the students to carry on the tasks and activities through guided instructions and materials. 3. To effectively integrate English language learning with employability skills and training. 4. To provide hands-on experience through case-studies, mini-projects, group and individual presentations.				
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 fundamental concepts of vocabulary, grammar, and language structures used in effective communication.	Level-1Remember
CO2	Explain principles of writing and speaking skills, including sentence construction, paragraph development, and oral communication techniques.	Level-2Understand
CO3	Apply writing and oral communication skills to construct correct sentences, develop coherent paragraphs, and communicate effectively in written form.	Level-3Apply
CO4	Apply oral and written communication techniques to improve clarity, accuracy, and effectiveness in academic and professional situations.	Level-3Apply

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 7 parts of 1 mark 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 - I

Vocabulary Building: -The concept of Word Formation, Root words from foreign languages and their use in English, Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives, Synonyms, antonyms, and standard abbreviations.

UNIT – II

Basic Writing Skills: - Sentence Structures, Use of phrases and clauses in sentences, Importance of proper punctuation, Creating coherence, Organizing principles of paragraphs in documents, Techniques for writing precisely.

UNIT – III

Identifying Common Errors in Writing and Nature and Style of Sensible Writing: - Subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles, Prepositions, Redundancies.

Sensible Writing: - Describing, Defining, Classifying, providing examples or evidence, writing introduction and conclusion, Writing Practices, Comprehension, Precise Writing and Essay Writing.

UNIT – IV

Oral Communication: - Listening Comprehension, Pronunciation, Intonation, Stress and Rhythm, Common Everyday Situations: Conversations and Dialogues, Communication at the Workplace, Interviews, and Formal Presentations.

Reference Books

- Effective Communication Skills, Kul Bhushan Kumar, Khanna Book Publishing,
- Practical English Usage, Michael Swan. OUP.
- Remedial English Grammar, F.T. Wood. Macmillan.
- On Writing Well, William Zinsser. Harper Resource Book.
- Study Writing, Liz Hamp-Lyons and Ben Heasley, Cambridge University Press.
- Communication Skills, Sanjay Kumar and PushpLata, Oxford University Press.
- Exercises in Spoken English, Parts. I-III, CIEFL, Hyderabad, Oxford University Press.
- English Phonetics for Indian Students by T Balasubramanian, Triunity Press, Bengaluru
- English Grammar in Use by Murphy, Raymond, Cambridge University Press, Cambridge

Video Links

Unit No	Topics	Links
Unit-I	Synonyms	https://youtu.be/mgLlPJkxmFU?si=UJpRjVm3tZi8iYm6
Unit-II	Techniques for writing precisely	https://nptel.ac.in/courses/109107172
Unit-III	Subject-verb agreement	https://nptel.ac.in/courses/109106116
Unit-IV	Communication at Workplace	http://digimat.in/nptel/courses/video/109107394/L12.html

Course Code	VAC-BCA-101B				
Category	Value Added Courses				
Course Title	Environmental Science and Sustainability				
Scheme and Credits	L	T	P	Credits	Semester-I
	2	0	0	2	
Course Objectives	The objectives of this course are 1. To familiarize students with basic environmental concepts, their relevance to business operations and forthcoming sustainability challenges. 2. To equip students to make decisions that considers environmental consequences. 3. To enable future business graduates to become environmentally sensitive and responsible managers.				
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 environment, sustainability, natural resources, ecosystems, biodiversity, pollution, and environmental legislation.	Level-1Remember
CO2	Describe environmental challenges, ecosystem dynamics, biodiversity conservation, pollution control measures, waste management practices, and sustainable development initiatives.	Level-2Understand
CO3	Apply sustainable practices, resource conservation methods, pollution control measures, disaster management approaches, and environmental ethics in business and societal contexts.	Level-3Apply
CO4	Apply environmental laws, sustainability principles, and responsible business practices to address environmental and social issues for sustainable development.	Level-3Apply

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 7 parts of 1 mark 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- I

Understanding Environment, Natural Resources and Sustainability

Fundamental environmental concepts and their relevance to business operations; Components and segments of the environment, the man-environment relationship, and historical environmental movements. Concept of sustainability; Classification of natural resources, issues related to their overutilization, and strategies for their conservation. Sustainable practices in managing resources, including deforestation, water conservation, energy security, and food security issues. The conservation and equitable use of resources, considering both intergenerational and intergenerational equity, and the importance of public awareness and education.

UNIT – II

Ecosystems, Biodiversity, and Sustainable Practices

Various natural ecosystems, learning about their structure, functions, and ecological characteristics. The importance of biodiversity, the threats it faces, and the methods used for its conservation. Ecosystem resilience, homeostasis, and carrying capacity, emphasizing the need for sustainable ecosystem management. Strategies for in situ and ex situ conservation, nature reserves, and the significance of India as a mega diverse nation.

UNIT – III

Environmental Pollution, Waste Management, and Sustainable Development

Various types of environmental pollution, including air, water, noise, soil, and marine pollution, and their impacts on businesses and communities. Causes of pollution, such as global climate change, ozone layer depletion, the greenhouse effect, and acid rain, with a particular focus on pollution episodes in India. Importance of adopting cleaner technologies; Solid waste management; Natural and man-made disasters, their management, and the role of businesses in mitigating disaster impacts.

UNIT – IV

Social Issues, Legislation, and Practical Applications

Dynamic interactions between society and the environment, with a focus on sustainable development and environmental ethics. Role of businesses in achieving sustainable development goals and promoting responsible consumption. Overview of key environmental legislation and the judiciary's role in environmental protection, including the Water (Prevention and Control of Pollution) Act of 1974, the Environment (Protection) Act of 1986, and the Air (Prevention and Control of Pollution) Act of 1981. Environmental justice, environmental refugees, and the resettlement and rehabilitation of affected populations; Ecological economics, human population growth, and demographic changes in India.

Reference Books

- Environmental Studies, Poonia, M.P., Khanna Book Publishing Co.
- Textbook of Environmental Studies, Bharucha, E., Orient Blackswan Private Ltd.
- Text Book of Environmental Studies, Dave, D., & Katewa, S. S., Cengage Learning India Pvt Ltd.
- Environmental studies: from crisis to cure, Rajagopalan, R., Oxford University Press.
- Living in the Environment, Miller, G.T. & Spoolman S., Cengage Learning India Pvt Ltd.
- Fundamentals of environmental studies, Basu, M., & Xavier Savarimuthu, S. J., Cambridge University Press.
- Sustainable Development: Environment, Energy and Water Resources, Roy, M. G., Ane Books.
- Environmental Studies by BB Chawdhary, CL Chaturvedi, Mahavir Publication Company, New Delhi

Useful Video Links:

Unit No	Topics	Links
Unit-I	Natural Resource Management	https://nptel.ac.in/courses/126103022
Unit-II	Ecosystem and it's Components	https://nptel.ac.in/courses/105105826
Unit-III	Environmental Pollution	https://archive.nptel.ac.in/courses/123/105/123105001/
Unit-IV	Principles of Sustainable Development	https://nptel.ac.in/courses/109105203

Course code	AEC-BCA-103B				
Category	Additional Course				
Course title	French				
Scheme and Credits	L	T	P	Credits	Semester-I
	1	1	0	-	
Course Objectives:	The objectives of this course are • To understand foundational language skills necessary for basic communication, including introducing themselves and others, describing places, and talking about their surroundings. • To focus on enhancing students' ability to express personal likes, interests, and other simple ideas, ensuring their ability to engage in basic communicative transactions. • To achieve a partial A1 level by the end of the semester according to the Common European Framework, which will enable them to handle simple communication in everyday situations.				
Assessment	50 Marks				
End Semester Examination	-				
Total	50 Marks				
Remarks	An ‘Additional Course’ is a non-credit Ability-Enhancement Course that is undertaken for learning purposes only. If completed, the ‘Additional Course’ may be recorded. The Additional Course (Ability Enhancement Course) is included as a qualifying paper and the students will be required to qualify the same otherwise the final result will not be declared and degree will not be awarded. The marks in this qualifying paper will not be included in determining the percentage of marks obtained for the award of degree. However, these marks will be shown in the detailed marks certificate of the students.				

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

CO	Skill Demonstrated	Level
CO1	Define key concepts related to reading, listening, speaking, and writing in English, focusing on everyday communication.	Level-1 Remember
CO2	Explain basic communication techniques for understanding texts, listening to simple conversations and expressing oneself in writing.	Level-2 Understand
CO3	Apply reading skills to use simple texts (e.g., notices, short passages, emails) and extract relevant information to answer questions or complete given tasks.	Level-3 Apply
CO4	Apply listening skills to understand simple conversations or audio messages and respond appropriately by completing activities such as answering questions or writing brief personal messages.	Level-3 Apply

Unit-I

Reading: Reading Simple Texts Related to One's Immediate Environment such as Notices, Posters, Catalogs, Fliers, Personal Messages or Emails and Answering Questions on them.

Unit-II

Listening: Understanding familiar Words and very Basic Phrases about Oneself, One's Family, and Immediate Concrete Surroundings, such as Very Brief Announcements in Public Spaces, Short, Simple Formal/Informal Conversation, Questions and Instructions When Speakers are Speaking at a Slower Pace.

Unit-III

Writing: Guided Writing will Include activities such as, Filling a Form, Writing Simple Phrases (Postcards, Messages, Invitations etc) on everyday Topics.

Unit-IV

Monologue: Describing and Presenting oneself, One's Immediate Environment and the People S/He Knows Using Simple Phrases and Sentences.

Dialogue: Taking part in a Conversation and Interaction in a Simple way provided the other Person is Prepared to Repeat or to Rephrase more Slowly and help Formulate what S/he is trying to say asking simple Questions on familiar Topics or Matters related to one's Immediate Environment. Making simple Purchases in Shops or Obtaining Services that one Requires.

Suggested Readings:

- Mon Posseport by Preeti Bhutani, Unisec Publication, Delhi
- Kizirian, V. M, Daill, E., Berthet, A., Hugot, C., Waendendries, M. Alter Ego + 1. Paris: Hachette.
- Berthet, A., Daill, E., Hugot, C., Waendendries, M. Alter Ego+ 1, Cahier d'activités. Paris: Hachette.
- Hachette, Y., Mérieux, R. Latitudes 1, (Livre de l'élève & Cahier d'exercices). Paris: Didier.
- Cocton, M-N., Dupleix, D., Heu, E., Kasazian, E., Ripaud, D. Saison 1, (Livre de l'élève & Cahier d'exercices). Paris: Didier.
- Denyer, M., Garmendia, A., Lions-Olivieri, M-L. Version Originale 1, Livre de l'élève. Paris: Editions Maisons des Langues.
- Magne, M., Lions-Olivieri, M-L. Version Originale 1, Cahier d'exercices. Paris: Editions Maisons des Langues.

Useful Video Links:

Unit No	Topics	Links
Unit-I	French Absolute Beginners Guide	https://www.youtube.com/watch?v=Sk6YQynZ1h8
Unit-II	French Listening Practice - 50 Everyday French Sentences	https://www.youtube.com/watch?v=Aofb0XEJlks
Unit-III	Learn how to write French with me	https://www.youtube.com/watch?v=9iUiei9YMck
Unit-IV	Slow and Easy French Conversation Practice	https://www.youtube.com/watch?v=ReVCwcHwnZI

Course Code	CC-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, definitions, formulas, and methods related to logic, algebraic structures, numerical methods and optimization techniques.	Level 1: Remember
CO2	Explain logical reasoning, algebraic systems, numerical computation methods and linear programming concepts for solving mathematical problem.	Level 2: Understand
CO3	Solve mathematical and computational problems using proof techniques, algebraic operations, numerical methods and optimization techniques.	Level 3: Apply
CO4	Analyze logical statements, algebraic structures, numerical solutions and optimization models for real world problems.	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

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.

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.
- TahaHamdy 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, Macmillan 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-1I	Semi-group, Monoid, Group	https://www.youtube.com/watch?v=ihQyZ7bJcRE
	Subgroup, Cyclic group.	https://www.youtube.com/watch?v=wx676fYedZ0
UNIT-1II	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-1V	Graphical method for solving LPs with two variables, Simplex method, Duality	https://youtu.be/2EvC1v1FI2k?si=8d1deI63m8vJeB_M
	Linear form, method for finding feasible solution, MODI method for finding optimum solution.	https://youtu.be/Ow3XWYnPgSM?si=E01KqUcTKzr6w1fy https://youtu.be/NqXFWCHlbII?si=z-qfuKLGvg1AUXBi

Course Code	CC-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	Define the concepts, classifications, representations, operations, and applications of arrays, linked lists, stacks, queues, hashing, trees, graphs, and algorithms.	Level-1 Remember
CO2	Explain the working principles, memory representation, traversal methods, searching, sorting, recursion, hashing, and tree and graph operations in data structures.	Level-2 Understand
CO3	Apply algorithms and operations related to arrays, linked lists, stacks, queues, hashing techniques, recursion, trees, and graph traversal.	Level-3 Apply
CO4	Analyze the performance, complexity, and suitability of data structures and algorithms using appropriate searching, sorting, hashing, recursion, tree, and graph techniques.	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, and 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, and Runtime Stack, Applications of Recursion: Factorial of Number, GCD, Fibonacci Series and Towers of Hanoi.

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, Sartaj Sahni 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=UpWYyyVMZG8O89nu
Unit-IV	Graphs	https://youtu.be/pcXxSM7caDI?si=U_Fk1RLSk_j-i_3r

Course Code	LC-BCA-108B				
Category	Core Courses				
Course Title	Data Structure Lab				
Scheme and Credits	L	T	P	Credits	Semester-II
	0	0	4	2	
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	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 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

List of Experiments:

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: a. At the beginning b. At the end c. At a specified position
8.	Write a program to delete an element from a Singly Linked List: a. At the beginning b. At the end c. A specified element
9.	Write a program to perform the following operations in a Doubly Linked List: a. Create b. Search for an element
10.	Write a program to perform the following operations in a Circular Linked List: a. Create b. Search for an element
11.	Write a program to implement stack operations using an array.

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: a. Find the factorial of a number. b. Find the GCD of two numbers. c. Solve Towers of Hanoi problem.
16	Write a program to implements queue operations using an array.
17	Write a program to implement circular queue operations using an array.
18	Write a program to implement circular queue operations using a linked list.
19	Write a program to perform insertion operation in a binary search tree.

At least 12 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.

Course Code	CC-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, and 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. EktaWalia, 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. SumitabhaDas,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/IOaBNuXgqqw?si=Zd9q7pAF-tr2q4mZ
Unit-IV	Memory Management	https://youtu.be/_pKbqFyG03s?si=V7buPm3hRq-j34KF

Course Code	LC-BCA-114B				
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-process 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

List of Experiments:

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 implement the Producer–Consumer problem using semaphores.
6	Write a C program to illustrate the IPC mechanism using Pipes.
7	Write a C program to simulate Paging memory management technique
8	Write a C program to simulate Segmentation memory management technique.
9	Write a C program to simulate the Best Fit contiguous memory allocation technique.
10	Write a C program to simulate the First Fit contiguous memory allocation technique.
11	Write a C program to simulate the concept of Dining-Philosophers problem.
12	Write a C program to implement FIFO page replacement technique
13	Write a C program that demonstrates the implementation of the sequential file allocation method

At least 12 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.

Course Code	SEC-BCA-102B				
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.

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. AruneshGoyal, The Essentials of JAVA, Khanna Book Publishing Company Private Limited, 2012.
4. TanweerAlam, 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-118B				
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

List of Experiments:

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 a number 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 named Student that includes the following attributes: USN, Name, Branch, Phone, and Percentage. Then, write a Java program to create n Student objects and display their USN, Name, Branch, Phone, and Percentage with appropriate 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 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

At least 12 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.

Course Code	SEC-BCA-104B				
Category	Skill Enhancement Courses				
Course Title	Web Technologies				
Scheme and Credits	L	T	P	Credits	Semester-II
	1	0	0	1	
Course Objectives	The objectives of this course are • To understand the fundamental concepts of web technologies including HTML, CSS, and Bootstrap for web page design. • To understand client-side scripting using JavaScript for dynamic content creation and form validation. • To understand advanced web technologies such as AJAX, XML, and JSON for developing interactive web applications.				
Assessment	05 Marks				
End Semester Examination	20 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	Define the fundamental concepts of web technologies including HTML, CSS, JavaScript, XML, and JSON.	Level-1 Remember
CO2	Explain the structure, styling, and scripting techniques used in web development along with client-server concepts.	Level-2 Understand
CO3	Apply web development tools and technologies such as HTML forms, CSS styling, Bootstrap, and JavaScript functions to build interactive web pages.	Level-3 Apply
CO4	Analyze the functionality of web applications using AJAX, XML, and JavaScript-based validation and event handling techniques.	Level-4 Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 4 parts of 1 mark each from all units and remaining 8 questions of 4 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 HTML, history of HTML, Objective, basic Structures of HTML, Header Tags, body tags, Paragraph Tags. Tags for FORM Creation, TABLE, FORM, TEXTAREA, SELECT, IMG, IFRAME
FIELDSET, ANCHOR. Lists in HTML, Introduction to DIV tag, NAVBAR Design.

UNIT – II

Introduction to CSS, types, Selectors, and Responsiveness of a web page. Introduction to Bootstrap, downloads/linking, using classes of Bootstrap, understanding the Grid System in Bootstrap. Introduction to www, Protocols and Programs, Applications and development tools, web browsers, DNS, Web hosting Provider, Setting up of Windows/Linux/Unix web servers, Web hosting in cloud, Types of Web Hosting.

UNIT – III

Introduction to JavaScript: Functions and Events, Document Object model traversing using JavaScript. Output System in JavaScript i.e. Alert, throughput, Input box, Console. Variables and Arrays in JavaScript. Date and String handling in JavaScript.

UNIT – IV

Manipulating CSS through JavaScript: Form Validation like Required validator, length validator, Pattern validator. Advanced JavaScript, Combining HTML, CSS and JavaScript events and buttons, controlling your browser. Introduction to AJAX, Purpose, advantages and disadvantages, AJAX based Web applications and alternatives of AJAX.

Introduction to XML: uses, Key concepts, DTD 8 schemas, XSL, XSLT, and XSL Elements and transforming with XSLT. Introduction to XHTML. JSON: Introduction to JSON, Keys and Values, Types of Values, Arrays, Objects.

Reference Books

- Laura Lemay, Mastering HTML, CSS & Java Script Web Publishing, BPB Publications, 2016
- Thomas A. Powell, The Complete Reference HTML & CSS, Fifth Edition, 2017 Reference Books
- Silvio Moreto, Bootstrap 4 By Example, ebook, 2016.
- Tanweer Alam, Web Technologies, Khanna Book Publishing, 2011.

Course Code	LC-BCA-120B				
Category	Skill Enhancement Courses				
Course Title	Web Technologies Lab				
Scheme and Credits	L	T	P	Credits	Semester-II
	0	0	2	1	
Course Objectives	The objectives of this course are: • To understand the fundamentals of web development using HTML, CSS, JavaScript, XML, and related technologies for designing structured web pages. • To understand the application of client-side scripting, form validations, and dynamic content handling using JavaScript and AJAX. • To understand the concepts of data representation and transformation using XML, DTD, XSD, XSL, and JSON in web applications.				
Assessment	10 Marks				
End Semester Examination	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	Apply HTML, CSS, and JavaScript concepts to design and develop structured and interactive web pages.	Level-3 Apply
CO2	Analyze web page layouts, styling techniques, and client-side scripting for dynamic web application behavior.	Level-4 Analyze
CO3	Evaluate web technologies such as AJAX, XML, JSON, and validation methods for effective web development solutions.	Level-5 Evaluate
CO4	Create responsive and dynamic web applications using HTML, CSS, JavaScript, and supporting web technologies.	Level-6 Create

List of Experiments:

Exp. No.	Contents
1	Create your class time table using table tag.
2	Design a Webpage for your college containing description of courses, department, faculties, library etc. using list tags, href tags, and anchor tags.
3	Create web page using Frame with rows and columns where we will have header frame, left frame, right frame, and status bar frame. On clicking in the left frame, information should be displayed in right frame.
4	Create Your Resume using HTML, use text, link, size, color and lists.
5	Create a Web Page of a super market using (internal CSS).
6	Use Inline CSS to format your resume that you have created.
7	Use External CSS to format your time table created.
8	Use all the CSS (inline, internal and external) to format college web page that you have created.
9	Write a HTML Program to create your college website using for mobile device.
10	Write an HTML/JavaScript page to create login page with validations.
11	Develop a Simple calculator for addition, subtraction, multiplication and division operation using JavaScript.

12	Use Regular Expressions for validations in Login Page using JavaScript.
13	Write a Program to retrieve data from a text file and displaying it using AJAX.
14	Create XML file to store Student Information like Register Number, Name, Mobile Number, DOB, and Email-Id.
15	Create XSL file to convert XML file to XHTML file.

At least 12 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.

Course Code	VAC-BCA-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: - To understand the historical background, Preamble, Basic Structure, Fundamental Rights, Fundamental Duties, and Directive Principles of the Constitution of India. - To understand the structure, powers, and functions of the Union and State Governments. - To analyze the roles and functions of local administration and constitutional authorities in democratic governance. - To recognize the significance of the Election Commission and the constitutional framework in ensuring free, fair, and effective governance.				
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	Recall the history, Preamble, Basic Structure, Fundamental Rights, Fundamental Duties, and Directive Principles of the Constitution of India.	Level-1 Remember
CO2	Explain the structure, powers, and functions of the Union Government and the State Government.	Level-2 Understand
CO3	Apply the principles of constitutional governance in the functioning of the Union, State, and Local Administration.	Level-3 Apply
CO4	Analyze the role of constitutional institutions, including the Union Government, State Government, Local Administration, and the Election Commission, in strengthening Indian democracy.	Level-4 Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 7 parts of 1 mark 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 -I

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 -II

Union Government:

Structure of the Indian Union, President–Role and Power, Prime Minister and Council of Ministers, Lok Sabha and Rajya Sabha.

Unit- III

State Government:

Governor–Role and Power, Chief Minister and Council of Ministers, State Secretariat.

Unit -IV

Local Administration and Election Commission:

District Administration, Municipal Corporation, ZilaPanchayat, Election Commission:Role and Functioning; Chief Election Commissioner; State Election Commission

Suggested Readings:

- Ethics and Politics of the Indian Constitution by Rajeev Bhargava, Oxford University Press, New Delhi, 2008
- The Constitution of India by B.L. FadiaSahityaBhawan; New edition (2017)
- Introduction to the Constitution of India by DDBasuLexisNexis;Twenty-Third,2018 edition
- Cases
- RustomCavasjeeCooperv. 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 LaxmiNarainv. 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

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=b4cGMR8JAN_3KL9
Unit-III	State Government	https://youtu.be/qZd39cdEJgA?si=1qfpidO28RjbnVE4
Unit-IV	Local Administration and Election Commission	https://youtu.be/a0_FuX41GzU?si=MFnYp0e5xbOy0trh

Course code	AEC-BCA-102B				
Category	Additional Courses				
Course title	Hindi				
Scheme and Credits	L	T	P	Credits	Semester-II
	1	1	0		
Course Objectives	The objectives of this course are • विद्यार्थियोंको हिन्दी भाषा के महत्त्व एवं गुणवत्ता से सुविज्ञ करवाकर हिन्दी की ओर उन्मुख करना। • विद्यार्थियोंको 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।				
Assessment	50 Marks				
End Semester Examination	-				
Total	50 Marks				
Remarks	An ‘Additional Course’ is a non-credit Ability-Enhancement Course that is undertaken for learning purposes only. If completed, the ‘Additional Course’ may be recorded. The Additional Course (Ability Enhancement Course) is included as a qualifying paper and the students will be required to qualify the same otherwise the final result will not be declared and degree will not be awarded. The marks in this qualifying paper will not be included in determining the percentage of marks obtained for the award of degree. However, these marks will be shown in the detailed marks certificate of the students.				

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 संरचनाएँ 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 -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 स्वरूप: आलोचनात्मक साहित्य का अर्थ, परिभाषा और स्वरूप: सृजनात्मक साहित्य का भाषाविकास में महत्व, निबंध लेखन, कहानी लेखन, काव्य लेखन।

Unit-III

अनुवाद अर्थ, परिभाषा और स्वरूप व अनुवाद का महत्त्व, अनुवाद के गुण, अनुवाद के प्रकार, अनुवाद में कंप्यूटर का योगदान, सीरियलों का हिंदी अनुवाद, बैकिंग 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 पुस्तकें:

- शुद्ध लेखन और हिन्दी का मानक रूप—डॉ० हरिश्चन्द्र वर्मा, विद्या भारती, संस्कृति शिक्षा संस्थान, कुरुक्षेत्र (हरियाणा)।
- बृहत् हिन्दी कोश— सम्पा० कालिका प्रसाद, राजवल्ली भस्माय, मुकुन्दी लाल श्रीवास्तव, ज्ञानमण्डल लिमिटेड, वाराणसी।
- परिशोध— मुख्य सम्पादक: डॉ० लक्ष्मी नारायण शर्मा, मानव-मूल्य विशेषांक, 1993।
- भारतीय जीवन मूल्य— डॉ० धर्मपाल मैनी, भारतीय संस्कृति संस्थान, गुड़गाँव।
- बृहत्प्रशासन शब्दावली (हिन्दी-अंग्रेजी) — वैज्ञानिक तथा तकनीकी शब्दावली आयोग, नई दिल्ली-110006।
- बृहत्प्रशासन शब्दावली (अंग्रेजी-हिन्दी) — वैज्ञानिक तथा तकनीकी शब्दावली आयोग, नई दिल्ली-110006।
- बृहत्पारिभाषिक शब्द-संग्रह (मानविकी), खंड-1
वैज्ञानिक तथा तकनीकी शब्दावली आयोग, केन्द्रीय हिन्दी निदेशालय, शिक्षा तथा समाज कल्याण मंत्रालय, भारत सरकार।
- प्रयोजनमूलक 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	लिपिकामानकीकरण	https://www.youtube.com/watch?v=g1jcWLojn4&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