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

Scheme of Studies and Examinations

M.Tech (Electrical Power Systems) – 3rd Semester

w.e.f. 2025-26

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Scheme (Marks)				Exam Duration in H
				Lecture (L)	Tutorial (T)	Practical (P)			Assessment	End Semester Examination		Total	
										Theory	Practical		
1	Mandatory Learning courses	MLC-01A	Research Methodology and IPR	3	0	0	3	3	40	60		100	3
2	Professional Elective Courses	Refer Table -IV	……	4	0	0	4	4	40	60		100	3
3	Multidisciplinary Open Elective Courses	Refer Table -V	……	3	0	0	3	3	40	60		100	3
4	Project Courses	PROJ-MTEPS-211A	Project	0	0	4	4	2	50		50	100	3
5	Seminar	SM-MTEPS-213A	Seminar-III	0	0	2	2	2	50			50	
6	Dissertation	DISS-MT-EPS-215A	Literature Survey (Dissertation stage 1)	0	0	4	4	2	100			100	
Total Credits								**16**				**550**	

Table IV (Professional Elective Courses)

Sr. No.	Course Code	Course
1	PEC-MTEPS-203A	Advanced Power System Protection
2	PEC-MTEPS-205A	Power Quality
3	PEC-MTEPS-207A	Digital Control System
4	PEC-MTEPS-209A	Demand side Energy Management

Multidisciplinary Open Elective-II Courses (Offered by Electrical Engineering Department)

Sr. No.	Course Code	Course Name	Offered by the Department
1	OEC-143A	MATLAB	Electrical Engineering
2	OEC-145A	Sources of Energy - II	Electrical Engineering

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

Scheme of Studies and Examination

M.Tech (Electrical Power Systems) – 4th Semester

w.e.f. 2025-26

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Scheme (Marks)				Exam Duration in H
				Lecture (L)	Tutorial (T)	Practical (P)			Assessment	End Semester Examination		Total	
										Theory	Practical		
1	Dissertation	DISS-MTEPS-202A	Dissertation and viva (Dissertation Stage 2)	-	-	-	-	20	250		500	750	
Total Credits								**20**				**750**	

Course Code	**MLC-01A**				
Category	Mandatory Learning Course				
Course Title	**Research Methodology and IPR**				
Scheme and Credits	L	T	P	**Credits**	**Semester-III**
	3	0	0	**3**	
Course Objectives	The objectives of this course are: • To enable students to identify and define research problems, formulate objectives and apply appropriate investigative approaches in research methodology. • To impart knowledge of data sources, data collection methods, data processing and the application of statistical tools for research analysis. • To develop awareness of research ethics, plagiarism issues and effective practices in technical writing, report preparation, and research documentation. • To provide a comprehensive understanding of intellectual property rights, patent procedures, technology transfer and international frameworks for innovation protection.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

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

COs	**Skills Demonstrated**	**RBT Level**
CO1	Describe research problems, objectives, and data sources based on fundamental research methodology principles.	Level 1: Remember
CO2	Explain intellectual property rights, patent procedures, and international frameworks for technology transfer and innovation protection.	Level 2: Understand
CO3	Apply research ethics to prepare plagiarism-free technical reports, research papers, and proposals using effective writing and presentation techniques.	Level 3: Apply
CO4	Analyze research data through classification and tabulation to extract meaningful patterns and conclusions using statistical tools and methods.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem, Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations.

Unit-II

Effective literature studies approaches, analysis, Plagiarism, Research ethics, Effective technical writing, how to write the report, Paper, Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee.

Unit-III

Sampling Methods, Need, Meaning & Type of Sample, Sources of Data, Primary and Secondary, Classification and Tabulation of Data Processing, Analysis and Interpretation of Data, Chi Square Test, significance of statistics in Socio-legal Research, Use of Computer in the Research field work and report writing.

Unit-IV

Nature of Intellectual Property, Patents, Designs, Trade and Copyright, Process of Patenting and Development: technological research, innovation, patenting, and development, International Scenario, International cooperation on Intellectual Property, Procedure for grants of patents, Patenting under PCT, Patent Rights, Scope of Patent Rights, Licensing and transfer of technology.

Suggested Readings

- Research Methodology: Methods and Techniques (4th ed.) by Kothari C. R., & Garg,G, New Age International Publishers.
- Research Methodology: A step-by-step Guide for Beginners (4th ed.) by Kumar, R, SAGE Publications India. ISBN: 978-9351501337
- Intellectual Property: The Law of Trademarks, Copyrights, Patents, and Trade Secrets (6th ed.) by Bouchoux, D.E, Cengage Learning.
- Intellectual Property Rights under WTO by T. Ramappa, S.Chand.
- Fundamentals of Intellectual Property Rights : For Students, Industrialist and Patent Lawyers by Ramakrishna B & Anil Kumar H.S., Notion Press.

Useful Video Links

Unit No.	Topic	Links
Unit-I	Sources of research problem	https://www.youtube.com/watch?v=v9X_gILr1w8
Unit-II	Effective literature studies	http://www.digimat.in/nptel/courses/video/109104135/L31.html
Unit-III	Sampling Methods	https://www.youtube.com/watch?v=qNqrHO3woyE
Unit-IV	Patent Rights	https://tkiet.digimat.in/nptel/courses/video/110106 081/L22.html

Course Code	**PEC-MTEPS-203A**				
Category	Professional Elective Courses				
Course Title	**Advanced Power System Protection**				
Scheme and Credits	L	T	P	**Credits**	**Semester-III**
	4	0	0	**4**	
Course Objectives	The objectives of this course are • To enable students to identify and define the operation of static and microprocessor-based relays in protection systems. • Equip students to design and apply overcurrent protection schemes. • To familiarise students with advanced protection methods for machines, transformers, and bus zones in Electrical Power Systems. • To provide a comprehensive understanding of distance protection techniques for transmission lines.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

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

COs	Skills Demonstrated	RBT Level
CO1	Identify the operation of static and microprocessor-based relays and their applications in electrical protection systems.	Level 1: Remember
CO2	Explain advanced protection methods for AC machines, transformers, and bus zones, including communication-based relay schemes.	Level 2: Understand
CO3	Implement distance protection techniques using impedance, reactance, and MHO relays for transmission line protection.	Level 3: Apply
CO4	Analyse and apply overcurrent protection schemes such as instantaneous, definite time, and directional relays.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Classification of Static Relays: Basic construction of static relays, Classification of protective schemes, Comparison of Static relays with electromagnetic relays, Amplitude comparator, Phase comparator, Principle of Duality.

Static over Current Relays: Instantaneous, Definite time, Inverse time, Directional, IDMT, Very inverse Time-Extremely inverse time over current relays, Time current characteristics of over current relays, applications.

Microprocessor based Protective Relays: Introduction-over current relays-Impedance relay-Directional relay-Reactance relay.

Unit-II

Distance Protection: Impedance Relay - Operating principle, relay Characteristic, Protective Schemes, Static Impedance Relay, Static reactance relay, static MHO relay, effect of arc resistance, effect of power surges, effect of

line length and source impedance on performance of distance relays, Quadrilateral relay, Elliptical relay, selection of distance relays.

Protection against over Voltages: Protection of transmission lines, stations, and substations against direct lightning strokes-protection against travelling waves-Insulation coordination.

Unit-III

Amplitude and Phase Comparators (2-inputs): Rectifier bridge circulating and opposed Voltage type, Averaging, phase splitting type, Sampling type of amplitude Comparison. Block spike type, Phase splitting type, Transistor integrating type, Rectifier bridge type, Vector product type Phase comparison.

Pilot Relaying Schemes: Wire pilot protection, circulating current scheme, balanced voltage scheme, translay scheme, half wave comparison scheme, Carrier current protection, phase comparison type-carrier aided distance protection, operational comparison of transfer trip and blocking schemes-optical fibre channels.

Unit-IV

AC Machines and Bus Zone Protection: Protection of Alternators: stator protection, rotor protection, over-voltage protection, over-speed protection, Transformer protection: earth faults in transformers, percentage differential protection, protection against magnetic inrush current-generator and transformer unit protection, Bus zone protection- differential current protection, high impedance relay scheme, frame leakage protection.

Suggested Readings

- Power System Protection: Static Relays. by T. S. Madhava Rao, McGraw-Hill, 1981.
- Power System Protection and Switchgear by Badri Ram & D.N. Vishwakarma, McGraw Hill Education.
- Power System Protection and Switchgear by B Ravindranath & M Chander, New Age International Publishers.
- Switch Gear Protections and Power Systems by Sunil S.Rao, Khanna Publishers.
- Power System Protection and Switchgear by S.M. Chaudhari, Tech Knowledge Publications.
- Fundamentals of Power System Protection by Y.G. Paithankar & S.R Bhide, PHI.
- Switchgear and Protection by M V Deshpande, McGraw Hill Education-Europe.

Useful Video Links

Unit No.	Topic	Links
Unit-I	Principle of Duality	https://www.youtube.com/watch?v=KhSZmFpBkSw
Unit-II	Protective Schemes	http://www.digimat.in/nptel/courses/video/108107167/L03.html
Unit-III	Phase comparison type-carrier aided distance protection	http://acl.digimat.in/nptel/courses/video/108107167/L09.html
Unit-IV	Protection of Alternators	http://digimat.in/nptel/courses/video/108107167/L01.html

Course Code	**PEC-MTEPS-205A**				
Category	Professional Elective Courses				
Course Title	**Power Quality**				
Scheme and Credits	L	T	P	**Credits**	**Semester-III**
	4	0	0	**4**	
Course Objectives	The objectives of this course are • To understand power and voltage quality issues. • To analyze voltage sags, interruptions, and protection techniques. • To examine harmonics, system response, and grounding issues. • To evaluate distributed generation and power quality monitoring.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
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 power quality issues such as voltage sags, harmonics, transients and their impact on electrical systems.	Level 1: Remember
CO2	Understand the methods and techniques for mitigating power quality disturbances, including protection devices and harmonic filters.	Level 2: Understand
CO3	Apply solutions to improve power quality, focusing on end-user level strategies and distributed generation integration.	Level 3: Apply
CO4	Analyse the effects of distributed generation on power quality and assess the performance of electrical systems using monitoring tools.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Power and Voltage Quality: General Power Quality terms, Introduction to Power Quality Problems, Power frequency variations, the power quality evaluation procedure, Voltage quality- Transients, long and short duration Voltage variations, Voltage imbalance, waveform distortion, Voltage Flicker.

Unit-II

Voltage Sags and Interruptions: Sources of sags and Interruptions, Estimating Voltage sag performance, Fundamental Principles of Protection, Solutions at the end-user level, Evaluating Ride-through Alternatives, Motor-Starting Sags.

Unit-III

Fundamentals of Harmonics: Harmonic distortion, Voltage versus Current distortion, Harmonic indexes, Harmonic sources from commercial loads, Harmonic sources from industrial loads, Locating Harmonic sources. System response characteristics. Effects of Harmonic Distortion. Wiring and Grounding: Resources, Definitions, Reasons for Grounding, Typical wiring and grounding problems, Solution to wiring and grounding problems.

Unit-IV

Distributed Generation and Power Quality: Resurgence of Distributed Generation (DG), DG Technologies, and Interface to the Utility System, Power Quality Issues, Operating Conflicts, and DG on distribution Networks, Siting DG distributed Generation, Interconnection standards.

Power Quality Monitoring: Monitoring Considerations, Historical Perspective of Power Quality Measurement Equipment. Assessment of Power Quality.

Suggested Readings

- Electrical Power Systems Quality: by Roger C. Dugan, Mark F. McGranaghan, Surya Santoso, H. Wayne Beaty, McGraw Hill.
- Power Quality by C. Sankaran, CRC Press.
- Power Quality by Bipin Singh and Simmi P. Burman, Katson Pub.
- Power Quality in Electrical Systems by Alexander Kusko, Tata McGraw Hill.
- Power Quality in Electrical Systems by Ms. J. Hanest Angel Priyadharshini, Mrs. K. Bhanuteja, Dr. Rajesh Thipparaju, Dr. P. Hemachandu, SIPH.
- Power Quality and Harmonics Management in Modern Power Systems by M. Rawa, Z. M. Ali, and S. H.E. Abdel Aleem, Eds‘. IntechOpen.

Useful Video Links

Unit No.	Topic	Links
Unit-I	Power Quality Problems	https://www.youtube.com/watch?v=o5ksmUHnMRs
Unit-II	Sources of sags	http://www.digimat.in/nptel/courses/video/108105104/L26.html
Unit-III	Harmonic distortion.	https://www.youtube.com/watch?v=2VMrBBuWqSA
Unit-IV	DG Technologies.	https://jkccollege.digimat.in/nptel/courses/video/108108034/L02.html

Course Code	**PEC-MTEPS-207A**				
Category	Professional Elective Courses				
Course Title	**Digital Control System**				
Scheme and Credits	L	T	P	**Credits**	**Semester-III**
	4	0	0	**4**	
Course Objectives	The objectives of this course are • To enable students to understand discrete-time control system concepts and signal processing. • To impart knowledge about Z-transform and state-space methods for analysis and design. • To provide a comprehensive understanding of digital controller implementation using microprocessors and DSPs. • To impart knowledge of state-space representation and analysis of discrete-time systems, focusing on controllability, observability, pole placement, and state observer design, enabling students to design advanced digital control systems using modern control techniques.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

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

COs	Skills Demonstrated	RBT Level
CO1	Recall the fundamentals of digital control systems and signal processing.	Level 1: Remember
CO2	Understand the state-space models of discrete systems, and design controllers and observers using pole placement and other modern control techniques.	Level 2: Understand
CO3	Apply Z-transform techniques for system modeling and stability analysis.	Level 3: Apply
CO4	Analyze the implementation of control systems using microprocessors and digital signal processors, considering practical issues like finite word length and quantization effects.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Discrete Data and Digital Control Systems: Basic elements, advantages and disadvantages, examples, - Impulse sampling and data hold – transfer functions of Zero order hold and first order hold. Reconstructing original signals from sampled signals – sampling theorem, ideal low pass filter, frequency response characteristics of the zero-order hold. Transient response specifications, steady state error analysis. Design based on frequency response method, Analytical design method.

Unit-II

Z-Transform Techniques: The Z-transform, Z transforms of some elementary functions, important properties and theorems of the Z-transform, inverse Z-transform, S-transform method for solving difference equations, the pulse transfer function, realization of digital controllers. Mapping between the s-plane and the z-plane, the Jury stability test, stability analysis by use of the bilinear transformation and Routh stability criterion. Liapunov stability analysis of discrete time systems.

Unit-III

State Space Model: Concept of the state space method, State space representations of discrete-time Systems, solving discrete-time state space equations. Discretisation of continuous-time state-space equations. Controllability, Observability, Principle of Duality, Design via pole placement, necessary and sufficient condition. Ackerman's formula, Dead Beat response, State observers – necessary and sufficient condition for state observation, full order state observer, minimum order state observer.

Unit-IV

Microprocessor and DSP Control: Microprocessor control of control systems, single-boar controllers with custom-designed, DMC – 105 board, digital signal processors, TMS 320 DSMTEPS, development system and support tools, Effects of finite word length and quantization on controllability and closed loop pole placement. Effect of quantization, least upper bound on quantization error.

Suggested Readings

- Control System Engineering by I.J. Nagrath & M. Gopal, New Age International Publishers.
- Control System Engineering by Norman S. Nise, Wiley.
- Linear Control System (with MATLAB Applicatons) by B.S. Manke, Khanna Publishers.
- Digital Control Engineering by M Gopal, New Age International Publishers.
- Discrete-time Control Systems by K.Ogata (2nd ed.), Pearson Education Asia.
- Digital Control Systems by B.C.Kuo, Oxford University Press.
- Digital Control Systems by Constantine H. Houpis & Gary B. Lamont, McGraw Hill.

Useful Video Links

Unit No.	Topic	Links
Unit-I	Transfer functions of Zero	https://www.youtube.com/watch?v=jgAqhjoQ5A8
Unit-II	Z transforms	https://www.youtube.com/watch?v=pTTTOuUps7I
Unit-III	State space representations of discrete-time Systems	https://m.youtube.com/watch?v=Tj8dVeswiyk
Unit-IV	Microprocessor control of control systems	http://digimat.in/nptel/courses/video/108105102/L59.html

Course Code	**PEC-MTEPS-209A**				
Category	Professional Elective Courses				
Course Title	**Demand Side Energy Management**				
Scheme and Credits	L	T	P	**Credits**	**Semester-III**
	4	0	0	**4**	
Course Objectives	The objectives of this course are • To enable students to learn energy audit techniques and economic evaluation methods. • To impart knowledge of energy conservation strategies in industries and utilities. • To provide a comprehensive understanding of designing and optimize energy-efficient lighting, HVAC, and water heating systems.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
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 energy audit methods and economic evaluation techniques, such as cost-benefit analysis, payback periods, and NPV.	Level 1: Remember
CO2	Explain energy-efficient lighting systems, including the use of LED technology and lamp selection for optimized energy usage.	Level 2: Understand
CO3	Apply energy-saving strategies in electrical systems and industrial settings, focusing on load management and power factor improvement.	Level 3: Apply
CO4	Analyze the energy-efficient solutions for heating, ventilation, air-conditioning, and water heating, along with energy storage systems.	Level 4: Analyze

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2 marks each from all units and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Energy Audit: Definitions, need, concepts, types of energy audit, energy index, cost index, pie charts, Sankey diagrams.

Energy Economics: Introduction, Cost benefit risk analysis-Payback Period-Straight line depreciation-Sinking fund depreciation, Reducing balance depreciation, Net present value method-Internal rate of return method, Profitability index for benefit cost ratio.

Unit-II

Energy Conservation in Electric utilities and Industry: Energy and load management devices-Conservation strategies; conservation in electric utilities and industry: Introduction-Energy conservation in utilities by improving load factor- Utility voltage regulation-Energy conservation in Industries-Power factor improvement.

Energy–efficient Electric Motors (EEMs): Energy efficient motors-construction and technical features-case studies of EEMs concerning cost effectiveness-performance characteristics; Economics of EEMs and system life cycle-direct savings and payback analysis-efficiency factor or efficiency evaluation factor

Unit-III

Energy Audit of Lighting Systems: Fundamentals of Lighting, Different Lighting Systems, Ballasts, Fixtures (Luminaries), Reflectors, Lenses and Louvres, Lighting Control Systems, Lighting System Audit, Energy Saving Opportunities.

Energy Audit Applied to Buildings: Energy Saving Measures in New Buildings, Water Audit, Method of Audit, and General Energy Savings Tips Applicable to New as well as Existing Buildings.

Unit-IV

Space Heating, Ventilation, Air-Conditioning (HVAC) and Water Heating: Introduction-Heating of buildings, Transfer of Heat-Space heating methods, Ventilation and air-conditioning, Insulation, Cooling load, Electric water heating systems, Energy conservation methods.

Co-generation and Storage: Combined cycle cogeneration, energy storage: pumped hydro schemes, compressed air energy storage (CAES), storage batteries, superconducting magnetic energy storage (SMES).

Suggested Readings:

- Energy Management Hand book by Wayne C.Turner, John Wiley and sons publications.
- Electric Energy Utilization and Conservation by S C Tripathy, Tata McGraw-Hill Publishing Company Ltd. New Delhi.
- Energy efficient electric motors selection and application by John C. Andreas, Marcel Dekker Inc.
- Hand book on Energy Audit and Management by Amit kumar Tyagi, Published by TERI (Tata Energy Research Institute).
- Energy Management by Paul W.O' Callaghan, McGraw Hill Book Company.
- Energy conversion systems by Rakesh Das Begamudre, New Age International Publishers.
- Energy Management by W.R. Murphy & G.Mckey, Butterworths.
- Energy Management by Umesh Rathore, Katson Books.

Useful Video Links:

Unit No.	Topic	Links
Unit-I	Energy audit	https://www.youtube.com/watch?v=kEP6S6RGstE
Unit-II	Load management	http://www.digimat.in/nptel/courses/video/109106407/L13.html
Unit-III	Replacement of existing systems-priorities	https://nptel.ac.in/courses
Unit-IV	Transfer of Heat-Space heating methods	http://www.digimat.in/nptel/courses/video/112101097/L04.html

Course Code	**PROJ-MTEPS-211A**				
Category	Project Courses				
Course Title	**Project**				
Scheme and Credits	L	T	P	**Credits**	**Semester-III**
	0	0	4	**2**	
Course Objectives	The objectives of this course are to • Identify suitable research topics in Electric Power Systems Engineering for independent investigation. • Understand research methodologies, documentation, and referencing aligned with existing literature. • Develop technical writing skills using appropriate tools, formats, and referencing techniques. • Analyze, interpret, and synthesize research findings within a defined research scope or topic.				
Assessment	50 Marks				
End Semester Examination	50 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

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

COs	Skills Demonstrated	RBT Level
CO1	Describe complex engineering problems relevant to project work based on domain knowledge and real-world challenges.	Level 1: Remember
CO2	Explain the workflow, technical background, and tools required for planning and executing engineering projects.	Level 2: understand
CO3	Apply appropriate methods, tools, and techniques to carry out project development and prepare technical documentation.	Level 3: Apply
CO4	Analyze the key stages of project development to ensure systematic execution and identify performance issues.	Level 4: Analyze
CO5	Evaluate alternative approaches and select suitable methodologies to achieve optimal and feasible project outcomes.	Level 5: Evaluate
CO6	Design innovative and practical engineering solutions to address societal and industrial needs.	Level 6: Design

Project Guidelines:

- Students shall undertake projects individually or in small teams (2–4 members).
- Projects must be approved by the department project committee before commencement.
- Regular progress reviews will be conducted throughout the semester.
- A final report with less than 10% plagiarism, a working prototype, and oral presentation are required for evaluation.

Course Code	**SM-MTEPS-213A**				
Category	Seminar				
Course Title	**Seminar-III**				
Scheme and Credits	L	T	P	**Credits**	**Semester-III**
	0	0	2	**2**	
Course Objectives	The objectives of this course are to • Develop students' ability to effectively present research topics and findings by effective communication. • Improve problem-solving and critical thinking skills of the students. • Expose students to the latest trends and advancements by reviewing and discussing contemporary research.				
Assessment	50 Marks				
End Semester Examination	--				
Total Marks	50				
Duration of Exam	03 Hours				

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

COs	Skills Demonstrated	RBT Level
CO1	Identify the trends and advancements in the related field.	Level 1: Remember
CO2	Understand research literature with in-depth reviews of key studies and methodologies.	Level 2: Understand
CO3	Interpret problem identification, formulation, and propose a solution.	Level 3: Apply
CO4	Analyze and synthesise research findings to the agreed area of research carried out and impact on society, economy and environment.	Level 4: Analyze
CO5	Evaluate a sound technical knowledge of their research field.	Level 5: Evaluate

Overview:
This course is designed to help M. Tech students develop research presentation skills. The focus is on selecting a topic or research paper relevant to their specialization, conducting an in-depth review, and effectively presenting the research findings.

General Guidelines:

Topic Selection	Each student is required to choose the research topic based on published review paper(s) or literature related to their relevant field. The same topic cannot be selected by multiple students.
Approval Process	The selected paper or topic must be approved by the faculty members/committee appointed by the Head of Department.
Presentation Guidelines	Each student will have 30-40 minutes for their presentation, followed by 5 minutes for Q&A.
Evaluation	The presentation will be evaluated by a committee constituted by the Head of Department. The evaluation will be based on:

Parameters for the Evaluation of Seminar

Sr. No.	Parameters	Marks Allotted	Relevant COs
1	Clarity of the topic	10	CO1
2	Literature Survey	10	CO2
3	Content Relevancy	10	CO3
4	Presentation Skills	10	CO4
5	Q&A Response	10	CO5

Course Code	**DISS-MTEPS-215A**				
Category	Dissertation				
Course Title	**Literature Survey (Dissertation Stage-I)**				
Scheme and Credits	L	T	P	**Credits**	**Semester-III**
	0	0	4	**2**	
Course Objectives	The objectives of this course are to • Introduce students to identifying in relevant research topics in Electrical Engineering. • Explain the research process, including literature review, documentation, and structured writing. • Develop proficiency in using research tools, reference management, and academic writing techniques. • Enhance ability to analyze, synthesize, and present research findings in a chosen domain.				
Assessment	100 Marks				
End Semester Examination	-				
Total Marks	100				
Duration of Exam	03 Hours				

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

COs	Skills Demonstrated	RBT Level
CO1	Identify the research topic/area relevant to the field of Electric Power systems to carry out independent research.	Level 1: Remember
CO2	Understand the research process, literature review, result formulation and writing conclusions concerning existing literature.	Level 2: Understand
CO3	Apply appropriate tools, references and writing skills for effective report writing related to research work.	Level 3: Apply
CO4	Analyze and synthesize research findings to the agreed area of research carried out.	Level 4: Analyze
CO5	Evaluate the research methods and available knowledge to propose appropriate solutions to the specific research problem.	Level 5: Evaluate
CO6	Design engineering solutions by developing improved results, properly documenting them in a thesis or report, and publishing them in journals or conferences.	Level 6: Create

Note: Each student will undertake their dissertation under the supervision of one or more supervisors. The dissertation topic must be approved by a committee constituted by the Head of the concerned Department.

Students are required to deliver two seminar presentations: the first, at the beginning of Dissertation Stage-I, to outline the scope of the work and finalize the topic; the second, towards the end of the semester, to present the progress and work completed during the semester.

The committee will evaluate both presentations and award sessional marks out of 100. Students who fail to secure the minimum passing marks must improve their grade before proceeding to the 4th semester. Failure to do so will require the student to repeat Dissertation Phase-I in the next regular 3rd semester.

Course Code	**DISS-MTEPS-202A**				
Category	Dissertation				
Course Title	**Dissertation Stage-II**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	0	0	4	**2**	
Course Objectives	The objectives of this course are to • Introduce research fundamentals and help to identify the relevant topics in Electrical Engineering. • Understand structure of research methodology, literature review, and documentation of results and conclusions. • Develop skills in using research tools, technical writing, referencing, and report formatting. • Analyze, evaluate, and present research findings through effective report or thesis preparation.				
Assessment	250 Marks				
End Semester Examination	500 Marks				
Total Marks	750				
Duration of Exam	03 Hours				

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

COs	Skills Demonstrated	RBT Level
CO1	Identify the research topic/area relevant to the field of Electric Power Systems to carry out independent research.	Level 1: Remember
CO2	Understand the research process, literature review, result formulation and writing conclusions with reference to existing literature.	Level 2: Understand
CO3	Apply appropriate tools, references and writing skills for effective report writing related to research work.	Level 3: Apply
CO4	Analyze and synthesize research findings to the agreed area of research carried out.	Level 4: Analyze
CO5	Evaluate the research methods and available knowledge to propose appropriate solutions to the specific research problem.	Level 5: Evaluate
CO6	Design engineering solutions by developing improved results, properly documenting them in a thesis or report, and publishing them in journals or conferences.	Level 6: Create

Dissertation Stage-II Guidelines:

Dissertation Stage-1 will continue as the final dissertation in the 4th semester. Sessional marks, out of 250, will be awarded by an internal committee constituted by the Head of the Department. The assessment will be based on presentations, reports, and related materials submitted to the committee. Failure to appear before the committee will result in disqualification from submitting the dissertation.

If a student scores less than 40% in the sessional assessment, they must revise and resubmit the dissertation after incorporating all required corrections and improvements. The revised dissertation will be evaluated in the next academic session.

At the end of the semester, each student is required to submit three soft-bound copies of their Master's dissertation to the office of the Head of the Department. One copy will be retained for departmental records, one will be provided

to the supervisor, and one will be sent by mail to the external examiner, following their appointment and notification from the university.

The dissertation will be evaluated by a committee consisting of the Head of the Department, the dissertation supervisor(s), and one external examiner. The external examiner will be appointed by the Chairman of the Board of Studies. If the appointed examiner is unable to attend, the Director of the Institute, upon the recommendation of the Head of the Department, is authorized to appoint a substitute examiner from another institution or the parent institute.

Students must defend their dissertation through a presentation before the evaluation committee, which will assign marks accordingly.

Note:

- The scheme for awarding grades will be provided by the department to the examiner(s).
- The plagiarism of the dissertation report must be below 10%; otherwise, the report will not be accepted.
- Each student must publish at least one research paper related to their dissertation work in a reputed journal, IEEE conference, or SCOPUS/SCI-indexed journal before the final submission of Dissertation Stage-2.
- The student must follow the guidelines for the Dissertation report format as per Annexure I.