

**REVISED CURRICULUM FOR MSC & PHD IN ELECTRICAL
ENGINEERING
(Entry – 2018 onward)**

1. The revised framework for the curriculum of the MSc program is as under:
 - i) The students need to take, at least, 9 courses and a Research Thesis.
 - ii) All the courses carry 3 credit hours and the Research Thesis carries 6 credit hours.
 - iii) There are 4 Core Courses for each specialization.
 - iv) Apart from the Specialization Core Courses, the course of Research Methodology is a compulsory course for all the specializations and treated as a pre-requisite for Research Thesis.
 - v) The students need to take 4 Elective Courses. The courses selection criteria is as under:
 - a. Student can take maximum of 02 courses from Mathematics Based Elective Courses Common to all Specializations.
 - b. Student will take rest of the elective courses from his/her Specialization Elective Courses.
 - c. If a student wants to take the elective course(s) other than his/her Specialization Elective Courses, a permission from the Chairman will be required to opt that/those course(s).
 - vi) The list of core and elective courses is attached in Annex – B.I.
2. The revised framework for the curriculum of the PhD program in Electrical Engineering is as under:
 - i) The students need to pass, at least, 6 courses and a Research Thesis to complete the degree requirements.
 - ii) All the courses carry 3 credit hours.
 - iii) There is 01 Core Course Common to All Specializations.
 - iv) Student need to pass at least 5 elective courses from:
 - a. Mathematics Based Elective Courses Common to all Specializations
 - b. Specialization Elective Courses
 - v) If a student wants to take the elective course(s) other than his/her Specialization Elective Courses, a permission from the Chairman will be required to opt that/those course(s).
 - vi) List of courses for core and elective courses is attached in Annex – B.II.

**LIST OF COURSES FOR MSC IN ELECTRICAL ENGINEERING
(4 SPECIALIZATIONS)**

1. Specialization in POWER	
CORE COURSES	
Course Code	Course Title
EE-5101	Power System Engineering
EE-5102	Electrical Machine Modeling
EE-5103	Power Distribution Engineering
EE-5104	Renewable Energy Systems
ELECTIVE COURSES	
Course Code	Course Title
EE-5105	Power System Operation
EE-5106	Power System Planning and Economics
EE-5107	Power System Stability and Control
EE-5108	Power System Reliability and Security
EE-5109	Power System Protection
EE-5110	Smart Grid
EE-5111	Modeling and Simulation of Power System Components
EE-5112	High Voltage Engineering
EE-5113	Power System Transients
EE-5114	Distribution System Economics
EE-5115	Distribution System Reliability
EE-5116	High Power Electronics
EE-5117	Artificial Intelligence Tools for Power System
EE-5118	Operational Research
EE-5119	Energy Conversion Systems
EE-5120	Special Topics in Power
RESEARCH THESIS	
EE-5001	Research Methodology*
EE-5100	Research Thesis

2. Specialization in ELECTRONICS	
CORE COURSES	
Course Code	Course Title
EE-5201	Semiconductor Materials and Technology
EE-5202	Integrated Circuit Design
EE-5203	Embedded Systems
EE-5204	VLSI Design
ELECTIVE COURSES	
Course Code	Course Title
EE-5205	Optical Communication
EE-5206	Photonic Networks
EE-5207	Advanced Digital Design
EE-5208	FPGA based System Design
EE-5209	VLSI Testing and Verification

EE-5210	Advanced Circuit Analysis and Filter Design
EE-5211	Micro-Electro-Mechanical Systems
EE-5212	Converter Design
EE-5213	Electro-Optics: Theory and Applications
EE-5214	Antenna Design
EE-5215	Microwave Circuit Design
EE-5216	Special Topics in Electronics
RESEARCH THESIS	
EE-5001	Research Methodology*
EE-5200	Research Thesis

3. Specialization in **DIGITAL TECHNIQUES**

CORE COURSES	
Course Code	Course Title
EE-5301	Digital Signal Processing
EE-5302	Digital Communication
EE-5303	Computer Networks
EE-5304	Embedded Systems
ELECTIVE COURSES	
Course Code	Course Title
EE-5305	Computer Vision
EE-5306	Biometric Technologies
EE-5307	Biomedical Image Processing
EE-5308	Satellite Communications
EE-5309	Wireless Communications
EE-5310	Optical Communications
EE-5311	Information Theory and Source Coding
EE-5312	Error Control Coding
EE-5313	Antenna and Propagation
EE-5314	Machine Learning
EE-5315	Special Topics in Digital Techniques
RESEARCH THESIS	
EE-5001	Research Methodology*
EE-5300	Research Thesis

4. Specialization in **CONTROL**

CORE COURSES	
Course Code	Course Title
EE-5401	Control System Design
EE-5402	State Space Control
EE-5403	Linear Multivariable Control
EE-5404	Optimal Control
ELECTIVE COURSES	
Course Code	Course Title
EE-5405	Robust Control
EE-5406	System Modeling and Identification
EE-5407	Stochastic Control
EE-5408	Adaptive Control Systems

EE-5409	Robot Motion Planning and Control
EE-5410	Systems Biology
EE-5411	Special Topics in Control
RESEARCH THESIS	
EE-5001	Research Methodology*
EE-5400	Research Thesis

MATHEMATICS BASED ELECTIVE COURSES (COMMON TO ALL SPECIALIZATIONS)	
Student can take max. 2 courses	
Course Code	Course Title
EE-5002	Advanced Engineering Mathematics
EE-5003	Random Variables and Stochastic Processes
EE-5004	Numerical Techniques
EE-5005	Engineering Optimization

* Research Methodology is a compulsory course for all the specializations and treated as a pre-requisite for Research Thesis.

**LIST OF COURSES FOR PHD IN ELECTRICAL ENGINEERING
(4 SPECIALIZATIONS)**

CORE COURSES (COMMON TO ALL SPECIALIZATIONS)	
Course Code	Course Title
EE-6001	Statistics in Research

1. Specialization in POWER	
ELECTIVE COURSES	
Course Code	Course Title
EE-6101	Power Systems Operation and Control
EE-6102	Power System Planning and Reliability
EE-6103	Power Distribution Control and Automation
EE-6104	Energy Systems Modeling
EE-6105	Electric Power Quality
EE-6106	Smart Grid Design and Applications
EE-6107	Power Delivery Systems
EE-6108	Advanced Energy Systems
EE-6109	Power System Management and Electricity Markets
EE-6110	Small Scale Multi-generation Systems
EE-6111	Electrical Load Management, Forecasting & Control
EE-6112	Modeling and Control of Distributed Generation
EE-6113	Dynamics and Control of Electrical Machine Drives
EE-6114	Power System Protection
EE-6115	Evolutionary Computation
EE-6116	Advanced Engineering Mathematics
EE-6117	Modeling and Simulation
EE-6118	Advanced Topics in Power
RESEARCH THESIS	
EE-6100	Research Thesis

2. Specialization in ELECTRONICS	
ELECTIVE COURSES	
Course Code	Course Title
EE-6201	Optoelectronics Devices
EE-6202	Semiconductor Device Fabrication
EE-6203	Electronic Device Modeling & Simulation
EE-6204	System on Chip (SoC) Design
EE-6205	Advanced VLSI Design
EE-6206	Advanced Power Electronics
EE-6207	Advanced Analogue IC Design
EE-6208	RF Integrated Circuits
EE-6209	Mixed Signal Circuit Design
EE-6210	Advanced Microwave and Millimeter-Wave ICs
EE-6211	NEMS and MEMS Design
EE-6212	Advanced Topics in Electronics

RESEARCH THESIS	
EE-6200	Research Thesis

3. Specialization in DIGITAL TECHNIQUES	
ELECTIVE COURSES	
Course Code	Course Title
EE-6301	Information Theory and Source Coding
EE-6302	Random Signals
EE-6303	Advanced Digital Speech Processing
EE-6304	Digital Image and Video Processing
EE-6305	Advanced Computer Architecture
EE-6306	Wireless and Personal Communications
EE-6307	Multimedia Systems and Communication
EE-6308	Multirate Signal Processing
EE-6309	Advanced Topics in Digital Techniques
RESEARCH THESIS	
EE-6300	Research Thesis

4. Specialization in CONTROL	
ELECTIVE COURSES	
Course Code	Course Title
EE-6401	Hybrid Control Systems
EE-6402	Multi-agent Systems and Cooperative Control
EE-6403	Network Control Systems
EE-6404	Algebraic Graph Theory
EE-6405	Functional Analysis
EE-6406	Linear Systems Theory
EE-6407	Control of Distributed parameter Systems
EE-6408	Nonlinear Control Systems
EE-6409	Theory of Automation
EE-6410	Convex Optimization
EE-6411	Geometric Control
EE-6412	Recursive Estimation
EE-6413	Advanced Topics in Control
RESEARCH THESIS	
EE-6400	Research Thesis

OTHER ELECTIVE COURSES (COMMON TO ALL SPECIALIZATIONS)	
Course Code	Course Title
EE-6002	Special Topics in Engineering Mathematics
EE-6003	Research Methodology