

## **MS in Electronic Engineering**

### **Program Overview:**

Technological advancements have brought a revolution in all fields of life. Nowadays, the whole world is revolving around the concept of automation, and for this purpose, Electronic Engineering plays a pivotal role. Electronics is a growing field with a lot of applications in our daily life in which the smart autonomous system is an example applicable everywhere.

Students choose Master of Science in Electronic Engineering (MSEE) for a variety of reasons, like, but not limited to, find their careers in rewarding areas like artificial intelligence (AI) in automation, electronic systems development and management, research and development in national and international industrial and governmental laboratories. Since Electronic Engineering has transformed almost all relevant disciplines, many of our graduates use their knowledge and skills to prepare themselves for a career in disciplines such as AI in the medical field, AI in security systems, and AI in defense systems, etc. Currently, the demand for Electronic Engineering graduates is very high and is expected to grow even more as the technology of automation is accelerating.

### **Areas of Research:**

- Advanced Digital Systems
- Electronic System Design
- IC Design
- VLSI Design
- Electronics Circuit Design
- Flore planning
- Neural Networks
- Artificial Intelligence
- Machine Learning,
- Image Processing and Computer Vision
- Natural Language Processing,
- Microprocessor System Design
- Embedded systems
- Mechatronics
- Robotics (Smart Robots)
- Self-driving vehicles
- Electric Vehicles
- Unmanned Air Vehicles (UAVs)
- MEMS Sensor Design
- Industrial Electronics
- PLC's and FPGA

- Advanced Opto-Electronics
- Photonics
- Nanotechnology
- Advanced topics in Semiconductor
- Computational Electromagnetics
- Machine Design
- Dynamics and Motion Control
- Mechanics of Materials
- Renewable Energy Systems (Solar and Thermal Energy Systems)
- Power Electronics and system protection
- Amplifier Design (RF and IF Amplifiers)
- Linear and Non-Linear Control Systems
- Advanced Digital and Analog Control Systems
- Advanced Instrumentation Systems
- Electronic Textiles
- Communications and Signal Processing
- Advanced Digital Communication
- Digital Signal Processing
- Antenna Design
- Microwave Engineering
- Satellite Communication
- Broadband Communication Networks
- Wireless Sensor Networks
- Network Security
- Internet of Things
- Cluster and Cloud Computing
- Quantum computing
- Geological Information Systems
- Computer graphics
- Human/computer interaction

For more information, please refer to the list of faculty members for their research field on the department website.

**Admission Requirement:**

16 years of education or equivalent e.g. BE/BS in Electronic/ Electrical/ Computer/ Telecom Engineering from any HEC recognized university with at least 60% Marks (Annual System) or CGPA  $\geq$  2.5 out of 4 (Semester System).

GAT general with at least 50% marks or GAT subject with at least 60% marks or HAT for the admission /scholarship in the specific program of study.

For more information on application deadlines, tests and other admission requirements, please visit the admissions section of the Graduate Studies Office.

**Program Requirement:**

The minimum and maximum duration of the MSEE program is 1.5 and 4 years. Students must meet the following requirements for graduation:

- A minimum of 24 credit hours course work with a minimum CGPA of 2.5 out of 4.0,
- Successful defense of synopsis/ research proposal and its approval from Advanced Studies and Research Board (AS&RB),
- A minimum of 6 credit hours research work/ thesis, and
- Thesis defense and viva.

**Program Structure of MS in Electronic Engineering:**

#	Course Codes	Course Title	Credit Hours
<b>FIRST SEMESTER</b>			
1		Research Methodology	3 + 0
2		<b>Computational Methods</b>	3 + 0
3		<b>Frontiers of ICT</b>	3 + 0
<b>SECOND SEMESTER</b>			
1		Elective Course -I	3 + 0
2		Elective Course -II	3 + 0
3		Elective Course -III	3 + 0
<b>THIRD SEMESTER</b>			
1		Elective Course -IV	3 + 0
2		Elective Course -IV	3 + 0
<b>FOURTH SEMESTER</b>			
1		Thesis	6+0
<b>TOTAL</b>			<b>6</b>
<b>Total Courses</b>			<b>24</b>

**LIST OF ELECTIVE COURSES FOR MS ELECTRONIC ENGINEERING:**

<b>S.No</b>	<b>Course title</b>	<b>Credit hours</b>
<b>I.</b>	<b>AI and Robotics</b>	
1	AI and Robotics	3+0
2	Reinforcement Learning	3+0
3	Deep Learning	3+0
4	Machine Learning	3+0
5	Advanced Robotics	3+0
6	Computer Vision	3+0
7	Stochastic Processes	3+0
8	Digital Image Processing	3+0
9	AI in Self-Driving Cars	3+0
10	Advanced Robotic Systems	3+0
11	Mathematics for Machine Learning	3+0
12	Neural Networks	3+0
13	Advanced Topics in Robotics	3+0
14	Mechatronics and Robotics	3+0
15	Unmanned Air Vehicles (UAVs)	3+0
<b>II.</b>	<b>Nano Photonic Materials and Devices</b>	
1	Advanced Opto-Electronics	3+0
2	Opto-Electronics Devices	3+0
3	MEMS Sensor Design	3+0
4	Advanced Topics in Opto-Electronics	3+0
5	Semiconductor Device Theory	3+0
6	Semiconductor Device Physics	3+0
7	Semiconductor Processing	3+0
8	Photonics	3+0
9	Nanotechnology	3+0

10	Computational Mathematics	3+0
11	Computational Electromagnetics	3+0
<b>III.</b>	<b>Electronic System Design</b>	
1	Electric Vehicles and Storage Technologies	3+0
2	Amplifier Design	3+0
3	RF and IF Amplifiers	3+0
4	Non-Linear Control Systems	3+0
5	Microprocessor System Design	3+0
6	Electronics Circuit Design	3+0
7	IC Design	3+0
8	Oscillators	3+0
9	Advanced Industrial Electronics	3+0
10	Advanced VLSI Design	3+0
11	Advanced Instrumentation Systems	3+0
12	Advanced Integrated Electronics	3+0
13	Advanced Topics in Embedded Systems	3+0
14	Advanced Digital Systems	3+0
<b>IV.</b>	<b>Industrial Electronics</b>	
1	Advanced Computer Vision	3+0
2	Non-Linear Control Systems	3+0
3	Advanced Digital Control Systems	3+0
4	Advanced Analog Control Systems	3+0
5	Advanced Topics in Control Systems	3+0
6	Linear System Theory	3+0
7	Dynamics and Motion Control	3+0
8	Embedded Systems for Mechatronics	3+0
9	Advanced Modeling and Simulation in Mechatronics	3+0
10	Statistical Estimation	3+0
11	Mathematical Optimization	3+0
12	Advanced Mathematical Methods	3+0
13	Engineering Dynamics	3+0
14	Mechanics of Materials	3+0
15	Automated Manufacturing System	3+0
16	Electronic Textiles	3+0
17	Smart Medical Textiles	3+0
18	Advanced Topics in E-Textiles	3+0
19	Advanced Power Electronics	3+0
20	Electric Drives	3+0
21	Switched-Mode Convertors Analysis Design	3+0
22	Advanced Topics in Power Electronics	3+0
23	Renewable Energy Systems	3+0

24	Solar and Thermal Energy Systems	3+0
25	Power System Protection	3+0
26	Advanced Topics in Energy Systems	3+0
27	Engineering Management	3+0
28	Project Management	3+0
<b>V.</b>	<b>Communications and Signal Processing</b>	
1	Advanced Digital Communication Techniques	3+0
2	Advanced Digital Signal Processing	3+0
3	Geological Information Systems	3+0
4	Stochastic Processes	3+0
5	Advanced Topics in Signal Processing	3+0
6	Advanced Digital Communication	3+0
7	Antenna Design	3+0
8	Multiple Antenna Systems	3+0
9	Microwave Engineering	3+0
10	Satellite Communication	3+0
11	Broadband Communication Networks	3+0
12	Wireless Sensor Networks	3+0
13	Network Security	3+0
14	Internet of Things	3+0
15	Cluster and Cloud Computing	3+0
16	Advanced Wireless Communication	3+0

**Contact Information:**

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