

# Master of Science in Electrical Engineering

Minimum Duration : 4 Semesters, 2 Years  
 Maximum Duration : 8 Semesters, 4 Years  
 Minimum CGPA required to earn degree 2.50

Program Code 048  
 Number of Courses 9-12  
 Credit Hours 32-35

## Program Objectives:

The program objectives are to:

- ▶ Help graduates develop a more profound knowledge base of the particular subject at an advanced level.
- ▶ Equip graduates with the necessary tools to undergo simulation studies, research, optimize engineering designs and solutions.
- ▶ Assist and motivate graduates to become leaders, entrepreneurs, consultants, and successful engineers.
- ▶ Emphasize importance of continuous learning and skill development to function and survive in a competitive landscape.
- ▶ Make graduates understand the importance of team building, effective communication skills, and function efficiently as an individual and as a part of a team.
- ▶ Emphasize on upholding professional ethics.

## Eligibility

Candidates possessing the relevant bachelor of engineering degree, obtained after 16 years of education with 2.00 CGPA on the scale of 4.00 in semester system or at least 50% marks in annual system from recognized institute/university shall be eligible for admission.

Applicant need to pass GAT (General) to be conducted by NTS/ETEA/any Registered Testing Agency or University, with at least 50% cumulative score and to clear departmental interview at the time of Admission.

## Program Outcomes:

After completion of the MS program in Electrical Engineering, scholars will be able to:

- ▶ Apply knowledge of electrical engineering, mathematics and sciences fundamentals.
- ▶ Identify and formulate electrical engineering problem, and to find out their solutions.
- ▶ Technically communicate efficiently and clearly using oral, written and graphical form.

## Specializations Offered

Electronics and Communications

Power System

### Electronics and Communication

| Course Code          | Course Title                       | Cr. Hrs. 9 |
|----------------------|------------------------------------|------------|
| EE-635               | Wireless Networks                  | 3-0        |
| EE-626               | Solid State Electronics            | 3-0        |
| One of the following |                                    |            |
| EE-522               | Advanced Digital Signal Processing | 3-0        |
| EE-535               | Linear Systems and Control         | 3-0        |

SEMESTER ONE

### Power System

| Course Code          | Course Title                             | Cr. Hrs. 9 |
|----------------------|--|------------|
| EE-603               | High Voltage Engineering                 | 3-0        |
| EE-509               | Power System Engineering                 | 3-0        |
| One of the following |  |            |
| EE-535               | Advanced Linear Systems and Control      | 3-0        |
| EE-517               | Power Distribution, Control & Automation | 3-0        |

SEMESTER ONE

## Master of Science in Electrical Engineering

### Electronics and Communication

| Course Code | Course Title                              | Cr. Hrs. |
|-------------|---|----------|
| EE 631      | Advanced Electronic Devices               | 3-0      |
| XYZ         | Advanced Communication System             | 3-0      |
|             | One of the following                      |          |
| EE 619      | Radio Frequency and Microwave Engineering | 3-0      |
| EE 507      | Advanced Power Electronics                | 3-0      |

SEMESTER TWO

### Power System

| Course Code | Course Title                     | Cr. Hrs. |
|-------------|----------------------------------|----------|
| EE526       | Power System Protection          | 3-0      |
| EE537       | Power System Stability & Control | 3-0      |
|             | One of the following             |          |
| EE532       | Alternative Energy Resources     | 3-0      |
| EE 507      | Advanced Power Electronics       | 3-0      |

SEMESTER TWO

| Course Code | Course Title         | Cr. Hrs. |
|-------------|----------------------|----------|
| RES581      | Research Methodology | 2-0      |
|             | Elective I           | 3-0      |
|             | Elective II          | 3-0      |

SEMESTER THREE

| Course Code | Course Title         | Cr. Hrs. |
|-------------|----------------------|----------|
| RES581      | Research Methodology | 2-0      |
|             | Elective I           | 3-0      |
|             | Elective II          | 3-0      |

SEMESTER THREE

| Course Code | Course Title                  | Cr. Hrs. |
|-------------|-------------------------------|----------|
|             | Plan A: MS with Research Work | 6/9      |
| RES 690     | Research Thesis               | 0-6      |
|             | Plan B: MS with Course Work   |          |
|             | Elective III                  | 3-0      |
|             | Elective IV                   | 3-0      |
|             | Elective V                    | 3-0      |

SEMESTER FOUR

| Course Code | Course Title                  | Cr. Hrs. |
|-------------|-------------------------------|----------|
|             | Plan A: MS with Research Work | 6/9      |
| RES 690     | Research Thesis               | 0-6      |
|             | Plan B: MS with Course Work   |          |
|             | Elective III                  | 3-0      |
|             | Elective IV                   | 3-0      |
|             | Elective V                    | 3-0      |

SEMESTER FOUR

### ELECTIVES

#### Electronics and Communication

| Course Code | Course Title                                  | Cr. Hrs. |
|-------------|---|----------|
| EE 601      | Digital Speech Processing                     | 3-0      |
| EE 637      | Optimization Techniques in Engineering        | 3-0      |
| EE 515      | Artificial Intelligence                       | 3-0      |
| EE 605      | Digital Video Systems                         | 3-0      |
| EE 619      | Advanced Data Communication                   | 3-0      |
| EE 624      | Advanced Communication Networks               | 3-0      |
| EE 630      | Biometric Systems                             | 3-0      |
| EE 642      | Computational Photonics                       | 3-0      |
| EE 644      | Optical Properties of Nanostructure Materials | 3-0      |

#### Power System

| Course Code | Course Title                           | Cr. Hrs. |
|-------------|--|----------|
| EE 514      | Power System Planning & Design         | 3-0      |
| EE 637      | Optimization Techniques in Engineering | 3-0      |
| EE 607      | Power Quality                          | 3-0      |
| EE 613      | Flexible AC Transmission               | 3-0      |
| EE 615      | Power System Transients                | 3-0      |
| EE 623      | Advanced Topics in Power Engineering   | 3-0      |
| EE 560      | Energy Management                      | 3-0      |
| EE 604      | Distributed Energy Generation          | 3-0      |
| EE 550      | Solar Cell Technology                  | 3-0      |

**Electronics and Communication**

| Course Code | Course Title   | Cr. Hrs. |
|-------------|--|----------|
| EE 650      | Solar Cell Technology                                    | 3-0      |
| EE 652      | Advanced Nanomaterials for Renewable Energy Applications | 3-0      |
| EE 654      | Performance, Modeling and Simulation                     | 3-0      |
| EE 609      | Computer Vision  | 3-0      |
| EE 611      | Pattern Recognition                                      | 3-0      |
| EE 539      | Theory of Lasers   | 3-0      |
| EE 621      | Antenna and Wave Propagation                             | 3-0      |
| EE 544      | Neural Networks  | 3-0      |
| EE 536      | Advanced Engineering Electromagnetics                    | 3-0      |
| EE 639      | Advanced Mobile Communication                            | 3-0      |
| EE 643      | Digital Communication                                    | 3-0      |
| EE 645      | Digital Control Systems                                  | 3-0      |
| EE 563      | Advanced Optical Communication                           | 3-0      |
| EE 540      | Stochastic Processes                                     | 3-0      |
| EE 541      | Multimedia Systems and Communication                     | 3-0      |
| EE 622      | Optics, Vision and Cameras                               | 3-0      |
| EE 628      | Nano-Electronics   | 3-0      |
| EE 632      | Optoelectronics and Photonics                            | 3-0      |
| EE 515      | Artificial Intelligence                                  | 3-0      |
| EE 538      | Digital Image Processing                                 | 3-0      |
| EE 523      | Nanotechnology and Energy                                | 3-0      |
| EE 650      | Advanced Communication Systems                           | 3-0      |
| EE 653      | Software Defined Networking                              | 3-0      |
| EE 655      | Network Design and Management                            | 3-0      |
| EE 657      | Switching Technologies for Data Centers                  | 3-0      |
| EE 659      | Data Centers and Renewable Energy                        | 3-0      |

**Power System**

| Course Code | Course Title   | Cr. Hrs. |
|-------------|--|----------|
| EE 652      | Advanced Nanomaterials for Renewable Energy Applications | 3-0      |
| EE 654      | Performance, Modeling and Simulation                     | 3-0      |
| EE 633      | Power System Reliability                                 | 3-0      |
| EE 641      | Modeling & Simulation of Power System Components         | 3-0      |
| EE 647      | Dielectric & Electrical Insulation Materials             | 3-0      |
| EE 515      | Artificial Intelligence                                  | 3-0      |
| EE 627      | HVDC Transmission  | 3-0      |
| EE 629      | Variable Speed Drive                                     | 3-0      |
| EE 645      | Digital Control Systems.                                 | 3-0      |
| EE 518      | Advanced Power Systems Distribution                      | 3-0      |
| EE 519      | Electrical Machine Design                                | 3-0      |
| EE 523      | Nanotechnology and Energy                                | 3-0      |
| EE 534      | Photoactive Materials & Their Characterization           | 3-0      |