Master of Engineering

Core Course in (Offered/other) Research Specializations

Fall 2022/Winter 2023/Not offered this year

Communications; Signal & Image Processing
At least four of the following courses:
1) ECE 502 – Probability and Random Process for Electrical Engineering
2) ECE 540 – Detection and Estimation
3) ECE 541 B1 – Digital Signal Processing
4) ECE 577 – Antenna Theory and Design
5) ECE 582 – Information Theory and Channel Coding
6) ECE 583 – Digital Communications
7) ECE 644 – Digital Image and Video Processing
8) ECE 684 – Wireless Communication Systems
9) ECE 686 – Wireless Communication Network
10) ECE 740 A02 – Biomedical Image Analysis
11) ECE 740 B03 – Deep Learning in Computer Vision

Software Engineering & Intelligent Systems
At least four of the following courses:
1) ECE 522 – Software Construction, Verification and Evaluation
2) ECE 624 – Fuzzy Set in Human Centric Computing
3) ECE 625 – Data Analysis and Knowledge Discovery
4) ECE 626 – Advanced Neural Networks
5) ECE 627 – Intelligent Web
6) ECE 710 B01 – Wearable Device, IoT, Data Analysis
7) ECE 720 A02 – Metaheuristic Optimization
8) ECE 720 X50 – Machine Learning System Engineering
9) ECE 740 A01 – Computer and Robot Vision
10) ECE 740 B03 – Deep Learning in Computer Vision

Integrated Circuits and Systems; Solid State Electronics; Computer Engineering
At least four of the following courses:
1) ECE 511 – Advanced Digital Circuit and System Design
2) ECE 512 – Digital System Testing and Design
3) ECE 547 – Fundamentals of Solid-State Devices
4) ECE 551 – Design CMOS Analog Integer Circuit
5) ECE 553 – Digital Integrated Circuit Design
6) ECE 558 – Microfabrication & Nanofabrication Topics I
7) ECE 559 – Microfabrication and Nanofabrication Topics II
8) ECE 570 – Computational Electromagnetics
9) ECE 578 – Microwave and Millimeter-wave Circuits
10) ECE 644 B1 – Digital Image and Video Processing (only for Computer Engineering stream)
11) ECE 646 B1 – Organic Electronics
12) ECE 650 – Radio Frequency Integrated Circuits
13) ECE 710 B01 – Wearable Device, IoT, Data Analysis
14) ECE 720 A02 – Metaheuristic Optimization
15) ECE 750 B02 – Devices for Sensing Applications
16) ECE 750 B03 – Nanobiotechnological Systems
**Energy Systems**

At least four of the following courses:

1. **ECE 511** – Advanced Digital Circuit and System Design
2. **ECE 530 B1** – Power Qual/Dist Analysis
3. **ECE 531** – Industrial Drives (Students who have taken ECE 432 are not allowed to take ECE 531)
4. **ECE 560** – Modern Control Theory
5. **ECE 561** – Nonlinear Control Systems
6. **ECE 570** – Computational Electromagnetics
7. **ECE 631** – High-Voltage DC (HVDC) Systems
8. **ECE 633** – Modeling and Simulation of Electromagnetics Transient in Electrical Circuit
9. **ECE 635** – Power Converter Renewable Energy System
10. **ECE 636** – Voltage Source Converters
11. ECE 730 800 – Smart Grid Fundamentals
12. ECE 730 A01 – Power Converter System Design

**Control Systems**

At least four of the following courses:

1. **ECE 560** – Modern Control Theory
2. **ECE 561** – Nonlinear Control Systems
3. **ECE 660** – Optimization in Dynamic Control and Estimation
4. **ECE 664** – Nonlinear Control Design with Application
5. **ECE 665** – Multivariable Robust Control
6. **ECE 740 A01** – Computer and Robot Vision
7. **ECE 760 B02** – Robotics: Modeling, Learning and Control
8. **CH E 662** – Process Identification
9. **CH E 694** – Optimal Control

**Electromagnetics & Microwaves**

1. **ECE 570** – Computational Electromagnetics
2. **ECE 576** – Advanced Engineering Electromagnetics
3. **ECE 577** – Antenna Theory and Design
4. **ECE 578** – Microwave and Millimeter-wave Circuits

**Biomedical Engineering**

1. **ECE 644 B1** – Digital Image and Video Processing
2. **ECE 691** – Biomedical Optics
3. **ECE 692** – Ultrasound Imaging
4. **ECE 710 B01** – Wearable Device, IoT, Data Analysis
5. **ECE 740 A02** – Biomedical Image Analysis
6. **ECE 740 B03** – Deep Learning in Computer Vision

**Photonics & Plasmas; Microsystems & Nanodevices**

1. **ECE 558** – Microfabrication & Nanofabrication Topics I
2. **ECE 559** – Microfabrication & Nanofabrication Topics II
3. **ECE 571** – Optical and Quantum Electronics
4. **ECE 572** – Nonlinear Optics
5. **ECE 673** – Laser Applications
6. **ECE 675** – Plasma Engineering
7. **ECE 770 A01** – Laser-plasma Interactions
8. **ECE 770 B01** – Nanoscale Optics
9. **ECE 770 B03** – Optics for Microsystems