Master of Engineering
Core Course in Identified Research Areas

Fall 2020/Winter 2021

Biomedical Engineering
At least four of the following courses:

1) BME 553 – Rehabilitation Engineering: Assisted Movement After Injury
2) BME 513 – Imaging Methods in Medicine
3) ECE 644 B1 – Digital Image and Video Processing
4) ECE 692 – Ultrasound Imaging
5) ECE 710 B2 – Advanced Topics in Computer Engineering: Wearable Tech, IoT, Data Analysis
6) ECE 740 A1 – Deep Learning in Computer Vision
7) RADDI 514 – Image Processing and Analysis in Diagnostic Imaging

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 582 – Information Theory and Channel Coding
4) ECE 583 – Digital Communications
5) ECE 644 – Digital Image and Video Processing
6) ECE 684 – Wireless Communication Systems
7) ECE 686 – Wireless Communication Network
8) ECE 740 A1 – Deep Learning in Computer Vision
9) ECE 740 B1 – Advanced Topics in Signal and Image Processing

Integrated Circuits and Systems; Solid State Electronics; Computer Engineering
At least four of the following courses:

1) ECE 511 – Digital ASIC Design
2) ECE 547 – Fundamentals of Solid State Devices
3) ECE 551 – Design CMOS Analog Integer Circuit
4) ECE 553 – Digital Integrated Circuit Design
5) ECE 558 – Microfabrication & Nanofabrication Topics I
6) ECE 559 – Microfabrication and Nanofabrication Topics II
7) ECE 644 B1 – Digital Image and Video Processing (only for Computer Engineering stream)
8) ECE 710 B2 – Advanced Topics in Computer Engineering: Wearable Tech, IoT, Data Analysis
9) ECD 720 A3 – Advanced Topics in Software Engg and Intelligent Sys: Metaheuristic Optimization
10) ECE 740 B1 – Advanced Topics in Signal and Image Processing
12) ECE 750 B2 – Advanced Topics in Integrated Circuits: Devices for sensing applications

Control Systems
At least four of the following courses:

1) ECE 560 – Modern Control Theory
2) ECE 561 – Nonlinear Control Systems
3) **ECE 664** – Nonlinear Control Design with Application
4) **ECE 665** – Multivariable Robust Control
5) **ECE 760 B1** – Advanced Topics in Control Systems: Optimal Control and Estimation
6) **CH E 662** – System Identification
7) **CH E 694 A3** - Advanced Topics in Chemical Engineering: Optimal Control

**Electromagnetics & Microwaves**
1) **ECE 576** – Advanced Engineering Electromagnetics
2) **ECE 577** – Antenna Theory and Design
3) **ECE 578** – Microwave and Millimeter-wave Circuits

**Energy Systems**
At least four of the following courses:
1) **ECE 531** – Industrial Drives
2) **ECE 633** – Modeling and Simulation of Electromagnetics Transient in Electrical Circuit
3) **ECE 636** – Voltage Source Converters
4) **ECE 730 A1** – Advanced Topics in Energy Systems: Smart Grid Fundamentals
5) **ECE 730 A2** – Advanced Topics in Energy Systems: Power Converter System Design
6) **ECE 730 A3** – Advanced Topics in Energy Systems: HVDC Systems

**Photonics & Plasmas; Microsystems & Nanodevices**
At least three of the following courses:
1) **ECE 558** – Microfabrication & Nanofabrication Topics I
2) **ECE 559** – Microfabrication & Nanofabrication Topics II
3) **ECE 673** – Laser Applications
4) **ECE 770 A2** – Optics for Microsystems
5) **ECE 770 A3** – Advanced Topics in Photonics Plasmas: Nanoscale Optics

And at least one of the following courses:
6) **ECE 571** - Optical and Quantum Electronics
7) **ECE 675** – Plasma Engineering
8) **ECE 770 A1** – Laser-plasma Interactions
9) **PHYS 595** - Special Topics in Physics: Optical Properties of Solids

**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 B2** – Advanced Topics in Computer Engineering: Wearable Tech, IoT, Data Analysis
7) **ECE 720 A3** – Advanced Topics in Software Engineering & Intelligent Systems: Metaheuristic Optimization
8) **ECE 720 A4** – Advanced Topics in Software Engineering & Intelligent Systems: Data Analytics for Software Engineering
9) **ECE 740 A1** – Deep Learning Computer Vision