Electrical and Computer Engineering
MSE Track in Integrated Circuits and Microsystems

Introduction
Our Integrated Circuits and Microsystems curriculum offers courses in Computer Systems Design, Integrated Circuits Design, Microfabrication and MEMS, Embedded Systems Design (FPGA), Implementation Sensory Information Processing, Brain-Machine Interfaces, Neurally Integrated Prosthetics and Robotics. These courses span various departments in the Whiting School of Engineering, and can also be taken in other divisions of the University, per the ECE MSE Program guidelines.

General Requirements
1. Satisfactory completion of eight one-semester graduate courses. All require advisor approval. These courses may not include primarily research/independent study courses (e.g. 520.700, 520.800, 520.801, etc.) Seminar courses (e.g. 520.601) and special studies courses may not be used.
   - Five courses must come from the full-time ECE department (520.XXX), and be 600 level or above.
   - Three Additional courses must be level 600 (WSE) / 400 (KSAS) or above.

2. Completion of either (1) two additional graduate courses, or (2) a master’s essay, or (3) a special research project approved by an ECE faculty member.

List of ECE Courses Relevant to the Track
(not all courses are offered every year)

EN.520.627 Photovoltaics and Energy Devices
EN.520.680 Speech and Auditory Processing by Humans and Machines
EN.520.735 Sensory Information Processing
EN.520.738 Advanced Electronic Lab Design
EN.520.762 Emerging Models of Computation
EN.520.771 Advanced Integrated Circuits
EN.520.773 Advanced Topics in Microsystem Fabrication

Relevant Courses in Other Departments
Courses in the Johns Hopkins Engineering for Professionals (EP) Program
EN.525.712 Advanced Computer Architecture
EN.525.723 Computer and Data Communication Networks II
EN.525.725 Power Electronics
EN.525.738 Advanced Antenna Systems
EN.525.742 System-on-a-Chip FPGA Design Lab
EN.525.743 Embedded Systems Development Lab
EN.525.754 Wireless Communication Circuits
EN.525.768 Wireless Networks
EN.525.774 RF and Microwave Circuits I
EN.525.775 RF and Microwave Circuits II
EN.525.779 RF Integrated Circuits
EN.525.786 Human Robotics Interaction
EN.525.787 Microwave Monolithic Integrated Circuit (MMIC) Design
EN.525.788 Power Microwave Monolithic Integrated Circuit (MMIC) Design
EN.525.796 Introduction to High-Speed Optoelectronics

Computer Science (EP)
EN.605.713 Robotics
EN.605.728 Quantum Computation
EN.605.746 Advanced Machine Learning

Courses in Material Science
EN.510.611 Solid State Physics
EN.510.612 Solid State Physics

Courses in Computer Science
EN.600.620 Parallel Programming
EN.600.633 Intro Algorithms
EN.600.675 Machine Learning
EN.600.676 Machine Learning: Data to Models
EN.600.615 Databases
EN.600.636 Algorithmic Game Theory
EN.600.655 Computer Integrated Surgery I
EN.600.656 Computer Integrated Surgery II
EN.600.661 Computer Vision

Courses in Mechanical Engineering
EN.530.624 Dynamics of Robots and Spacecraft
EN.530.646 Robot Devices, Kinematics, Dynamics, and Control
EN.530.672 Biosensing & BioMEMS
EN.530.675 Locomotion I: Mechanics
EN.530.676 Locomotion II: Dynamics

ECE Activity in Microsystems and Computer Engineering

Core Faculty:
Andreas Andreou
Ralph Etienne-Cummings
Mounya Elhilali
Amy Foster
Hynek Hermansky
Jacob Khurgin
Gerard Meyer
Philippe Pouliquen

Research Activity:
Brain-inspired, Energy-aware Computing Architectures for Big Data Active Ultrasound Pattern Injection System (AUSPIS)
DARPA Unconventional Processing of Signal for Intelligent Data Exploitation (UPSIDE)
Bidirectional Neuro-prostheses
Energy Efficient Closed-loop Compressed Sensing Based Neural Recording System Proto-object Based Dynamic Visual Saliency Model
Wireless Biotelemetry Using Ultra-wideband Communications Neuromorphic Cognitive Circuits and Systems
Detect, Identify, Classify and Transmit Information in Speech Sensory Information Processing for Robotics Applications
Probabilistic Computer Systems and Applications

**Contact Information**
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