

GRADUATE COURSES

Electrical and Computer Engineering



UMass

Dartmouth

COLLEGE OF ENGINEERING

Spring 2023

Classes begin 1/17/2023

Department contact: 508.999.9164

Dr. Dayalan Kasilingam, Chairperson

Dr. Liudong Xing, Graduate Program Director

ECE 521	Random Signals and Systems I P. Gendron (pgendron@umassd.edu) Monday, Wednesday 5:00-6:15 PM SENG-212	ECE 558	Intro. to Electroacoustic Transducers D. Brown (dbrown@umassd.edu) Monday, Wednesday 3:00-4:50 PM SENG-113
ECE 530	Intro. Advanced Electronics & Optoelectronics Y. Li (yifei.li@umassd.edu) Tuesday, Thursday 8:00-9:15 AM SENG-212	ECE 560	Computer Systems Performance Evaluation L. Xing (lxing@umassd.edu) Monday, Wednesday 2:00-3:15 PM TBA
ECE 535	Analog Integrated Circuit Design D. Rancour (drancour@umassd.edu) Tuesday, Thursday 3:30-4:45 PM SENG-222	ECE 562	Advanced Computer Architecture Staff Tuesday, Thursday 11:00-12:15 PM SENG-212
ECE 548	Cyber Threats and Security Management H. Liu (hliu@umassd.edu) Monday 3:00-5:45 PM SENG-222	ECE 653	Satellite Oceanography S.Lohrenz (slohrenz@umassd.edu) Tuesday, Thursday 12:30-1:45 PM SMASTE-247, SENG-105

COURSE DESCRIPTIONS

ECE 521 three credits

Random Signals and Systems I

3 hours lecture

Prerequisites: ECE 384 (or equivalent) and ECE 321 (or equivalent)

Random variables and probabilistic description of signals and systems. The course provides the analytical tools for studying random phenomena in engineering systems and provides graduate students with an extensive treatment of probability theory, Bayes theorem, random variables, distribution and density functions, conditional distributions, moments, functions of random variables, characteristic functions, stochastic processes, Gaussian processes, stationary processes, correlation functions, power spectral density, response of systems to random inputs, mean square error estimation, filtering and prediction, and noise analysis. The course prepares students for a wide range of courses in communications, signal processing, acoustics, control, and other areas of engineering in which random signals and systems have an important role.

ECE 530 three credits

Introduction to Advanced Electronics & Optoelectronics

3 hours lecture

Illustration of principles of advanced electronics and photonics by showing their applications in advanced radar, wired/wireless communications, and electronic sensing. Key electronics/photonics devices including high speed transistors, diodes, lasers, high frequency modulators, photodetectors, amplifiers, and passive circuitries are discussed. System applications including advanced radar system, radio over fiber, and millimeter wave /THz signal generation and processing are deliberated and analyzed.

ECE 535 three credits

Analog Integrated Circuit Design

3 hours lecture

Introduction to the design of CMOS analog integrated circuits (IC's), with occasional references to bipolar IC's to make comparisons. Required readings from the current literature lead to a formal written report on recent developments in analog IC's. Students are required to complete the design of a complex IC and make a class presentation of its design methodology and simulation results.

ECE 548 three credits

Cyber Threats and Security Management

3 hours lecture

Prerequisites: Graduate standing in computer engineering or permission of instructor Fundamentals and practices in information assurance (IA) and cyber defense (CD). This course covers threats in the cyber realm, design principles to create trustworthy systems, and security lifecycle. Topics include threat models, attack surface, social engineering, vulnerability identification, risk assessment, and fail secure system design. Hands-on exercises will demonstrate the interaction between security and system usability as well as the effects of security mechanisms in specific scenarios.

ECE 558 three credits

Introduction to Electroacoustics Transducers

3 hours lecture

Design, modeling, properties, and application of electromechanical piezoelectric transducers and arrays used for underwater acoustic sound, navigation, and ranging. The course focus is on piezoelectric ceramic devices and the use of lumped parameter equivalent electrical circuit analysis. This introductory course will require lectures, laboratory exercises, calibration experiments and class project.

ECE 560 three credits

Computer Systems Performance Evaluation

3 hours lecture

Prerequisites: MTH 331 (or equivalent) and graduate standing

Development of a broad working knowledge of probability, queuing theory, petri-nets, simulation and empirical modeling as applied to computer systems hardware and software performance modeling and assessment. The course is oriented toward a practical application of theory and concepts with an emphasis placed on the use of computer tools to model performance and to perform tradeoff analysis.

ECE 562 three credits

Advanced Computer Architecture

3 hours lecture

Prerequisites: ECE 456 (or equivalent)

Advanced computer design, emphasizing fundamental limitations and tradeoffs in designing high performance computer systems. Students develop an understanding of the theoretical foundations in both hardware and software by studying parallel computer models; program partitioning, granularity, and latency; processor architectures and interconnects; and memory hierarchy, interleaving and bandwidth. Specific architectures such as shared memory multi-processors, message passing multi-computers, and superscalar, supervector, VLIW and dataflow designs will be explored.

653 three credits

Satellite Oceanography

3 hours lecture

Prerequisite: MAR 555 or permission of instructor

Provides an overview of the use of satellite-based remote sensing for making measurements within the marine environment. Each of the primary satellite sensors used by oceanographers is introduced along with the principles behind their operation, measurement retrieval, data handling, and data interpretation/usage. Emphasis is placed on physical and biogeochemical applications of satellite-based data, along with their analysis and advantages, rather than engineering and physical/optical theory of measurement. This course relies heavily on outside readings from the primary oceanographic literature to showcase satellite data analysis and specific applications of these data types. Included in the course are a series of student-led presentations and discussions of assigned class readings and a possible class project utilizing a satellite-derived data set and data processing techniques.