

EECE Graduate Course Offerings

500. Random Processes. (3,0,3) Discrete and continuous stochastic processes, correlation and power spectrum, filtering and estimation, Markov processes.

501. Linear Systems. (3,0,3) Representation of signals and systems, frequency-domain transform techniques, time-domain state-space methods.

502. Digital Signal Processing. (3,0,3) Z-transforms, digital filtering; finite and infinite impulse responses, synthesis methods, the discrete Fourier transform.

510. Communication Networks. (3,0,3) Seven-layer OSI model, Data Link Layer and Network Layer protocols, Transport Layer, TCP/IP, higher layers, cross-layer design.

511 Queuing Theory and Applications.(3,0,3) Markov Processes, queuing models, applications to communication networks.

520 Digital Communication Systems. (3,0,3) Digital baseband modulation systems, Matched filtering, Nyquist criterion for ISI, MPSK, MFSK, and MQAM, AWGN error probability, spread spectrum and OFDM .

521 Information Theory. (3,0,3) Source entropy, discrete memoryless sources, mutual information and capacity, coding theorems, applications. EECE 500.

522 Error Correcting Codes. (3,0,3) Linear block codes, BCH and Reed-Solomon codes, convolutional codes, Viterbi decoding, LDPC codes, turbo codes.

530. Optical Networks. (3,0,3) Optical transport technologies, WDM, long-haul networks, metro network, local networks, access networks.

531. Photonic Devices. (3,0,3) Optical fiber technologies, laser sources, fiber amplifiers, photodetectors, wavelength routers, passive components.

532. Fiber Optic Transmission. (3,0,3) Fiber link engineering, losses, dispersion effects, compensation techniques, optical modulation and coding applications.

540. Wireless Communications. (3,0,3) Wireless propagation, shadow fading and multipath effects, wide area cellular telephony, wireless LAN, emerging broadband wireless standards.

541. Mobile Wireless Networks. (3,0,3) Mobility effects in wireless propagation, coding, modulation and multiple access.

550. Control Systems. (3,0,3) State-space methods, observability, controllability, stability, state estimation, prediction and adaptive control. Prereq: EECE 461 or equivalent.

551. Sensors and Controls. (3, 0, 3) Sensor technologies, incorporation of sensors in control loops, performance analysis, case studies. Prereq: EECE 550

552. Fault Tolerant Controls. (3,0,3) Reliability in control systems, fault detection and mitigation, fault-tolerant control systems, applications to flight control. Prereq: EECE 550

560. Physical Electronics. (3,0,3) Physics of solid-state and opto-electronic devices, current technologies and applications. Prereq. EECE 335 or equivalent.

561. Fundamentals of RF IC Design: (3,0,3) Design of RF integrated circuits, lumped and distributed RLC networks, Smith chart, S-parameters, noise effects. Prereq. EECE 353 or equivalent.

562. Electronic Devices for Communication Systems I: (3,0,3) Physical theory and operation of MOS field-effect transistors and RF performance for wireless and lightwave applications. Prereq. EECE 335 or equivalent.

563. Nanoscale Computational Electronics: (3,0,3) Numerical investigation of device phenomena at nanoscale with application to modern devices. Prereq. EECE 335 or equivalent.

564. RF IC Building Blocks: (3,0,3) Design of RF IC building blocks, for wireless and lightwave applications. EECE 561.

565. Low Power Devices and Circuits for Sensory Control Systems. Transducers and sensor networks (Thermal, vibration, optical acoustic, and piezoelectric) for ultra low power (bio, microrobotics, microsatellite, environmental, and aviation) control systems. Prerequisite: Instructor permission.

566. IC and MEMS Fabrication. (3, 0, 3). Principles of planar technology; CMOS, Bipolar, BiCMOS, MEMS, yield and wafer scale integration, Interconnects and multi-chip modular technology. Res tr: Permission of instructor required.

567. Mixed Signal Circuits and System Design. (3, 0, 3). Building Blocks of Mix Signal circuits design, current mirrors, differential amplifiers, weighted multipliers, operational amplifiers, and digital gates and circuit. Prereq: EECE 353.

570. Power Systems. (3,0,3) Energy sources; transmission line parameters, modeling, performance and design, introduction to network matrices and load flow, faults and outages management.

571. Smart Power Grids (3, 0, 3) Power grid concepts, microgrids, smart power grids, solar and wind energy, load flow analysis, fault management.

572. Alternative Energy Systems. (3, 0, 3) Generation, storage, and efficient use of photovoltaic, solar, wind, nuclear, thermoelectric, geothermal, fuel cell, and other sources energy.

581. Computer Graphics. (3, 0, 3) Image input and output devices, graphics hardware and software, interactive techniques, animation.

582 Image Processing (3, 0, 3) 2-D digital signal processing, image processing techniques; data compression for image storage and transmission; image reconstruction from noisy projections. Prereq: EECE 430 or equivalent.

583. Emerging Interactive Systems (3,0,3). Mobile devices, electronic kiosks, advanced virtual and augmented interfaces. Multidisciplinary design, technical, and human-factors aspects. Restr: Permission of instructor required.

584. Mobile Devices and Application Design: Architectures, networks, and displays. Mobile device programming. Restr: Permission of instructor required.

585. Mobile Graphics Programming (3,0,3). 2D and 3D graphics for mobile devices. Standards, performance issues, computational and memory constraints. Restr: Permission of instructor required.

590 Special Topics. (3, 0, 3) New and emerging topics in electrical engineering. Restr: Permission of instructor required.

597/598 Directed Individual Study. (3,0,3 ea) Guided individual study and research in selected topics.

599 Thesis Research and Thesis (1-9 credits). Grades: S,U,W.

600. Advanced Topics in Random Processes. (3,0,3) Selected topics in advanced stochastic processes and applications. Prereq. EECE 500

601. Linear Filtering and Estimation. (3,0,3) state-space models for linear dynamical systems; Kalman filtering; estimation theory and applications in control and communication systems. Prereq. EECE 501

610. Advanced Topics in Communication Networks. (3,0,3) Queuing theoretic modeling and analysis of network performance. Prereq. EECE 510

620. Current Topics in Information and Coding Theory. (3,0,3) Selected topics from current literature. Prereq. EECE 521

630. Advanced Optical Transmission. (3,0,3) Advanced coding, modulation and multiple access methods for ultra high-speed optical transmission. Prereq. EECE 530.

631. Advances in Photonic Devices. (3,0,3) Selected readings from current literature in photonic communications devices. Prereq. EECE 531

640. Broadband Wireless Communication Systems. (3,0,3) Advanced coding and modulation systems, space-time coding, MIMO channels, cooperative communications, network coding, emerging standards. Prereq. EECE 540.

641. Cognitive Radios (3,0,3) Cognitive and software radios, architectures and implementations, standards and applications. Prereq. EECE 540.

642. MIMO Wireless Channels and Space-Time Coding. MIMO channel modeling, capacity analysis, space-time coding, applications. Prereq. EECE 540

650. Advanced Control Systems (3,0,3) Linear and non-linear dynamical systems, filtering, estimation and prediction, applications. Prereq. EECE 550

651. Advanced Topics in Sensors and Controls (3, 0, 3) Selected readings from current literature. Prereq. EECE 551.

660. Solid State Physics for Devices: (3,0,3) Rigorous application of principles of solid-state physics to electronic and photonic devices. Prereq: EECE 560.

661. Introduction to Quantum Mechanics. (3,0,3) Basic concepts of quantum mechanics and their application to solid-state devices. Prereq: EECE 470 or equivalent.

662. Electronic Devices for Communications II. (3,0,3) Physical theory and operation of Bipolar junction transistors and RF performance for wireless and lightwave applications. Prerequisite: EECE 560.

663. Fluctuation Phenomena. (3,0,3) Fundamental study of fluctuation phenomena in solid-state devices which limit device performance for communication applications. Prereq: EECE 500.

670. Advanced Topics in Energy Systems. (3,0,3) Case studies and current readings in emerging trends in energy systems, alternative and hybrid energy sources, and smart energy grids. Prereq. EECE 570

690 Special Topics (3,0,3) New and advanced topics in electrical engineering. Prereq: Permission of instructor required.

699 Dissertation Research and Dissertation. (1-24) Grades: S,U,W.

899 Examination only. (3) Required of all graduate non-thesis students taking examinations, oral and/or written, who are not registered for any other course. Grades: S,U,W.