7480 Harmonics in Power Systems (3)
Prerequisites: EE 4420 or equivalent. Introduction to harmonic analysis in power systems, including generation, transmission, and distribution systems; harmonic filtering, compensation, symmetrization, and harmonic resonance.

7520 Optimal Control Theory (3) Prerequisites: EE 4540 or equivalent. Internal stability, model uncertainty, robust stability, robust performance, controller design, pole placement, loop shaping H∞-control and other optimal robust control design techniques.

7530 System Identification (3) Prerequisites: EE 4540, 4660 or equivalent. Convolutional parameter estimation and adaptive modeling; control oriented identification; model uncertainties; model validation; review of research literature on model identification.

7540 Optimization of Stochastic Dynamic Systems (3) Prerequisites: EE 4540 and 4660 or equivalent. Optimal estimation problem, optimal control problem, and the separation principle of optimal stochastic control theory; Kalman filters, diffusion models, nonlinear filtering, optimal control during random environments, mixed-signal integrated circuit testing and measurements.

7560 Topics in Modern System Science (3) Prerequisite: EE 4540 or equivalent. Research literature, operator theory and functional analysis, algebraic and differential invariants, generalized eigenvalue problems, perturbed matrices, non-linear optimization, system identification.


7615 Digital Communication I (3) Prerequisites: EE 4420 and 4560 or equivalent. Theory and design of sampled data communication systems; continuous-time systems and sampling of continuous-time systems; performance analysis in frequency and time domain; design techniques based on optimal controls; robustness analysis of sampled-data feedback control systems under plant perturbations.

7620 Advanced Topics in Communications (3) Prerequisites: EE 4460 or equivalent. Hypothesis testing, detection of known and unknown signals, estimation of signal parameters, signal resolution.

7640 Information Theory, Coding, and Cryptography (3) Prerequisite: EE 4460 or equivalent. Measures of information, channel capacity, Shannon and Huffman coding, rate-distortion theory, linear codes, cyclic codes, BCH and Golay codes, convolutional codes, problems of data security, probabilistic ciphers, computationally complex ciphers.

7660 Random Processes II (3) Prerequisites: EE 4460 or equivalent. Stationary processes, sequences of random processes, Markov chains, and queuing models.

7670 Communication Networks (3) Prerequisite: EE 7660. Protocols, performance, and implementation of the data link layer and the network layer of communication networks.

7672 Switching and Broadband Networks (3) Prerequisites: EE 4540, 4660 or equivalent. Networks of digital communication systems; switching and congestion control.

7674 Wireless Communication Networks (3) Prerequisite: EE 7615. Theory, implementation, standards, and security issues in mobile wireless communication networks.

7700 Advanced Topics in Computer Engineering (3) May be taken for a max. of 12 hrs. of credit when topics vary.

7715 Computer Arithmetic (3) Prerequisites: EE 3755 or equivalent. Number system architecture, high performance adders, multipliers, dividers; floating-point arithmetic; residue number systems; hardware implementations.

7720 Advanced Computer Architecture (3) Prerequisite: EE 4740 or equivalent. High performance computer architecture; superscalar processing; parallel processing and interconnection networks.

7725 Interconnection Networks (3) Prerequisite: EE 4740 or equivalent. Interconnection network theory, analysis, and implementation; shared memory, coherent caches, and related topics.

7728 Multiprocessor Computer System Design (3) Prerequisite: EE 4740 or equivalent. Symmetric shared memory multiprocessors, distributed shared memory systems, simultaneous multi-threaded and chip-multiprocessors.

7730 Image Analysis I (3) Prerequisite: EE 3120 or equivalent. Basic fundamentals and techniques of digital image processing; hardware and software, applications, 2-D transforms, preprocessing, texture analysis, and edge detection; emphasis on application of theory to practical problems.

7740 Image Analysis II (3) Prerequisite: EE 4660 and 7730. Continuation of EE 7730. Formal mathematical treatment of image segmentation, shape analysis, texture analysis, and scene analysis.

7745 Neural Networks and Iterative Maps (3) Prerequisite: EE 4745 or equivalent. Neural network approach to artificial intelligence, general properties of iterative maps, mapping networks for pattern recognition, optimization; genetic algorithms; implementation issues.

7750 Machine Recognition of Patterns (3) Prerequisite: EE 4660 or equivalent. Recognition and classification of patterns, computer vision, human perception.

7760 Logic Testing and Testable Design (3) Prerequisite: EE 3755 and EE 3140 or equivalent. Switch level fault models, test generation/propagation, testing for sequential circuits, VLSI testing, design for testability.

7765 Distributed System Computer Reliability (3) Prerequisite: EE 4440 and 4740 or equivalent. Reliability measures, standards, evaluation and bounds; multimode and statistical dependent failure analysis; distributed and parallel processing; availability and reliability, graceful degradation, performance, software reliability.

7770 Interworking Principles (3) Prerequisite: EE 4710 or equivalent. Internet protocols, networks, and transport layers, IP switching, Routing techniques, Internet Security, Firewalls.

7780 Software Design Principles (3) Prerequisite: CSC 3102 or equivalent. Engineering approach to computer software development; structured and modular programming concepts; software design and management; program testing and correctness proofs; diagnostic tools; software measures; other topics from software engineering.

7790 Parallelization of Computer Algorithms (3) Prerequisite: EE 3755 or equivalent. Analysis and optimization of programs for a variety of architectures; impact on architectural design.

7795 Models and Methods for Parallel Computation (3) Prerequisite: EE 4740 or consent of instructor. Mathematical treatment of space and time complexity of computations; formal models of computers and memory systems.

8000 Thesis Research (1-12 per sem.) Prerequisite: permission of department. "S"/"U" grading.

9000 Dissertation Research (1-12 per sem.) Prerequisite: permission of department. "S"/"U" grading.

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1050 Introduction to Engineering (2) Introduction to engineering history, disciplines, professional engineering; pass/fail grading. 2050 Undergraduate Seminar (1) For engineering students only. Pass/Fail grading. Topics related to academic and professional career development for engineering students. Speakers will include on-campus representatives, industrial, governmental and consulting professionals, and education experts.

9000 Dissertation Research (1-12 per sem.) "S"/"U" grading.