ELECTRICAL ENGINEERING (EE)

Courses

**EE 209. Transient Phenomena. 3 Credits.**
Study of complex variable basis of Laplace and Fourier Transforms; applications to transient behavior of lumped and distributed parameter systems, root locus. Nyquist criterion and two-dimensional field problems. Prerequisite: MATH 271.

**EE 210. Control Systems. 3 Credits.**
Analysis and design of continuous and discrete-time control systems; stability, signal flow, performance criteria, classical and state variable methods, simulation design tools, computer-based realizations. Prerequisites: EE 171 or ME 111. Cross-listed with: ME 210.

**EE 212. Computer Vision. 3 Credits.**
Introduction to computer vision systems for interactive and industrial applications using both hard/software computational approaches. Pre/co-requisites: MATH 124 or MATH 271 and CS 026, or Instructor permission. Cross-listing: CS 212.

**EE 215. Electric Energy Systems Analys. 3 Credits.**
Transmission line, generator, transformer modeling and control, per-unit conversion, power flow calculations and software, symmetric components and fault analysis, protection/relaying, stability analysis, smart grid. Prerequisite: EE 113. Co-requisite: MATH 124.

**EE 221. Prin VLSI Digital Circuit Des. 0 or 3 Credits.**
Design of VLSI circuits using a modular approach with industrial grade software: schematic capture; circuit design languages (HDL); full-custom layouts; mixed signals; synthesis. Laboratory. Pre/co-requisites: EE 131, EE 163, EE 121.

**EE 222. Prin VLSI Analog Cir Design. 0 or 3 Credits.**
The design, layout, and simulation of VLSI analog circuits. Emphasis on small signal models and circuits used in operational amplifiers. Prerequisites: EE 163, EE 121, Instructor permission.

**EE 224. Principles VLSI System Design. 3 Credits.**

**EE 227. Biomed Measmnts Instrum & Sys. 3 Credits.**
Biomedical and clinical engineering in research, industry, and health care institutions. Measurement techniques and instrumentation. Integrated biomedical monitoring, diagnostic, and therapeutic systems. Co-requisites: EE 121, ANPS 020; Instructor permission. Alternate years.

**EE 228. Sensors. 3 Credits.**
Sensor design, interrogation, and implementation. A wide variety of electrical, electronic, optical, mechanic, and cross-disciplinary devices. System designs, measurement techniques, and methodologies. Prerequisites: Senior standing in Engineering or Physics.
EE 266. Science & Tech Integrated Cir. 3 Credits.
Science and technology of integrated circuit fabrication. Interaction of processing with material properties, electrical performance, economy, and manufacturability. Prerequisites: EE 163 or EE 261; concurrent registration in EE 164 or EE 262.

EE 272. Information Theory. 3 Credits.
Introduction to probability concepts of information theory; entropy of probability models; theoretical derivations of channel capacity; coding methods and theorems, sampling theorems. Prerequisites: STAT 143/STAT 151/STAT 153.

EE 273. Digital Communications. 3 Credits.
Digital modulation/demodulation methods and BER performance; source entropy and channel capacity; optimal detection; convolutional codes and decoding algorithms. Pre/co-requisites: EE 174 and STAT 151.

EE 274. Intro Wavelets & Filter Banks. 3 Credits.

EE 275. Digital Signal Processing. 3 Credits.
Sampling and reconstruction of signals. DFT, FFT and the z-transform. FIR and IIR filter design. Speech coding. Accompanying lab: EE 289. Pre/co-requisites: EE 171; Instructor permission.

EE 276. Image Processing & Coding. 3 Credits.
Image enhancement techniques by point and spatial operations. Data compression techniques to include scalar quantization, entropy coding, transform and sub-band coding. Labs on PC hardware; PC and Unix-based software. Prerequisite: EE 275.

EE 277. Image Anyl&PATTERN Recognition. 3 Credits.

EE 278. Wireless Communication. 3 Credits.
Modern wireless systems, including cellular design, propagation modeling, multiple access and equalization techniques. Pre/co-requisites: EE 174 and STAT 151.

EE 281. Materials Science Seminar. 1 Credit.
Presentation and discussion of advanced electrical engineering problems and current developments. Prerequisite: Senior or Graduate Engineering enrollment.

EE 295. Special Topics. 1-18 Credits.
Special topics in developing areas of Electrical Engineering. Prerequisites: Senior standing; or Instructor permission.

EE 301. System Theory. 4 Credits.
Basic concepts in system theory; linear vector spaces; state variable representation; phase plane analysis of nonlinear dynamic systems; limit cycles; Lyapunov stability. Applications in engineering. Prerequisites: MATH 230 or MATH 271, MATH 124, EE 171.

EE 302. Stochastic Processes. 4 Credits.
Probability theory, random variables and stochastic processes. Response of linear systems to random inputs. Applications in engineering. Prerequisites: EE 171 and STAT 151.

EE 310. Digital Control Systems. 3 Credits.
Digital control system analysis and design using transform, algebraic, and state space methods. Sampled data systems, stability, quantization effects, sample rate selection, computer-based realization. Prerequisite: EE 210 or Instructor permission.

EE 312. Intro Optimum Control Systems. 3 Credits.
Optimal control problem formulation and solution; including the calculus of variations, Pontryagin’s maximum principle, Hamilton-Jacobi theory, dynamic programming, and computational methods. Prerequisite: EE 210.

EE 314. Nonlinear System Theory. 3 Credits.
Basic nonlinear methods including computational and geometrical techniques for analysis of nonlinear systems. Describing function methods and bifurcation and catastrophe theory. Sensitivity and stability considerations. Prerequisite: EE 201 or MATH 230.

EE 338. Semiconductor Dev Model&Simul. 3 Credits.
Analysis and application of computer models for semiconductor process and device simulation. Strategies for development of device models for circuit simulation. Prerequisite: EE 262; Instructor permission.

EE 341. ST:Electromagnetic Field Thry. 3 Credits.
For advanced students in the field of electromagnetism. Topics selected from special interests of staff with lectures and readings from current literature.

EE 352. Adv Semicond Device Phys & Des. 3 Credits.
MOSFET, bipolar, and CMOS device parameters, their characterization, and their relation to process technology. Description and use of computer-aided process and device models. Prerequisite: EE 262. Alternate years. Spring semester.

EE 354. MOS Analog Intergrsd Circ Dsgn. 3 Credits.
Analysis and design of MOS analog integrated circuits. Each student will design, layout, test, and document an analog integrated circuit using computer-aided-design techniques. Prerequisite: EE 338, EE 339.

EE 365. Optoelectronic Devices. 3 Credits.
Optical and electro optical properties of semiconductors. Applications to photodetectors, solar cells, light emitting diodes and lasers. Prerequisites: EE 142, EE 261.

EE 366. Solid State & Semicond Thry I. 3 Credits.
EE 371. Estimation Theory. 3 Credits.

EE 373. Adv Topics in Communications. 3 Credits.
Advanced topics of current interest in communication systems. Topics may include channel coding/decoding, software radio, ad-hoc networks, wireless systems, etc. Prerequisites: EE 273 or Instructor permission.

EE 391. Master’s Thesis Research. 1-18 Credits.

EE 392. Master’s Project. 1-3 Credits.
Master’s Project.

EE 395. Advanced Special Topics. 1-6 Credits.
Advanced topics of current interest in electrical engineering. Prerequisite: Instructor permission.

EE 491. Doctoral Dissertation Research. 1-18 Credits.