EE 1100 Introduction to Electrical Engineering (1 semester credit hour) Introduction to discipline and practice of Electrical and Computer Engineering; Overview of the Electrical Engineering (EE) and Computer Engineering (CE) curricula. Basic study, problem solving, and other skills needed to succeed as an EE or CE major. Introduction to professional ethics, EE and CE engineering design and quantitative methods; team projects designed to replicate decision process in real-world applications of the EE and CE engineering process. BMEN 1100 or CE 1200 or CS 1200 or MECH 1100 can substitute for this course. Credit cannot be received for more than one of the following: BMEN 1100 or CE 1100 or CS 1200 or EE 1100 or MECH 1100. (1-1) Y

EE 1202 Introduction to Electrical Engineering II (2 semester credit hours) EE 1202 introduces the discipline of engineering. It includes a 1.5-hour lecture per week plus a 3-hour fundamentals laboratory that stresses learning about laboratory procedures and equipment. Topics include: Learning the use of common laboratory electronic equipment; understanding the assembly of electronic circuits; and making various measurements. Students also learn how to work together with a partner and how to write a laboratory report. The lecture introduces general engineering practices, engineering research at UT Dallas, engineering activities at selected local companies, and concepts such as innovation and invention. The course also includes lectures and projects on communication, understanding the importance of lifelong learning, ethics, and a knowledge of contemporary issues. EE 1202 may be taken by students outside of engineering in order to learn about the engineering profession. (Same as CE 1202 and TE 1202) (1.5-3) S

EE 2310 Introduction to Digital Systems (3 semester credit hours) Introduction to digital circuits, hardware structures, and assembly-language concepts that underlie the design of modern computer systems. Topics include: Internal data representation and arithmetic operations in a computer, basic logic circuits, MIPS assembly language and an overview of computer architecture. Some knowledge of a high-level language such as C++ or Java is expected. This class also has a laboratory component. Exercises will be assigned in class for completion in the laboratory. This class may be offered as either regular or honors sections (H). (Same as CE 2310) (3-1) S

EE 2V99 Topics in Electrical Engineering (1-4 semester credit hours) May be repeated as topics vary (9 semester credit hours maximum). Instructor consent required. ([1-4]-0) R

EE 3101 Electrical Network Analysis Laboratory (1 semester credit hour) Laboratory to accompany EE 3301. Design, assembly and testing of linear electrical networks and systems. Use of computers to control electrical equipment and acquire data. Prerequisites: (CE 1202 or EE 1202 or TE 1202) and RHET 1302. Corequisite: EE 3301. (Same as CE 3101 and TE 3101) (0-3) S

EE 3102 Signals and Systems Laboratory (1 semester credit hour) In this laboratory course, students will acquire hands on experience in the implementation of the theory and concepts covered in the Signals and Systems lecture course EE 3302. The software tools that are utilized include MATLAB and smartphone programming environments. The labs consist of introduction to the software tools utilized, linear time-invariant systems and convolution, Fourier series, continuous-time Fourier transform, sampling and discrete Fourier transform. Corequisite: EE 3302. Prerequisite: RHET 1302. (Same as CE 3102 and TE 3102) (0-3) S

EE 3110 Electronic Devices Laboratory (1 semester credit hour) Laboratory to accompany EE 3310. Experimental determination and illustration of properties of carriers in semiconductors including carrier drift, carrier diffusion; p-n junctions including forward and reverse bias effects and transient effects; bipolar transistors including the Ebers-Moll model and secondary effects;
field effect transistors including biasing effects, MOS capacitance and threshold voltage. Corequisite: CE 3310 or EE 3310. Prerequisite: RHET 1302. (Same as CE 3110) (0-3) S

EE 3111 Electronic Circuits Laboratory (1 semester credit hour) Laboratory to accompany EE 3311. Design, assembly and testing of electronic circuits that use diodes, transistors and operational amplifiers in configurations typically encountered in practical applications. Corequisite: CE 3311 or EE 3311. Prerequisite: RHET 1302. (Same as CE 3111) (0-3) S

EE 3150 Communications Systems Laboratory (1 semester credit hour) Laboratory to accompany EE 3350. Fundamental elements of communications systems hardware; use of spectrum analyzers and other measurement instruments typically encountered in communication systems; design of active filters in communications systems; analog frequency and amplitude modulators and demodulators; data communication systems. Corequisite: EE 3350. Prerequisite: (CE 3301 or EE 3301 or TE 3301) and RHET 1302. (Same as TE 3150) (0-3) S

EE 3201 Electrical and Computer Engineering Fundamentals-I Laboratory (2 semester credit hours) Introduction to the fundamental building blocks of laboratory measurements and data analysis in Electrical and Computer Engineering. Prerequisites: (CE 1202 or EE 1202) and RHET 1302. Corequisite: EE 3201 or Corequisite: (EE 3301 or CE 3301) and (EE 3320 or CE 3320). (Same as CE 3201) (1-3) S

EE 3202 Electrical and Computer Engineering Fundamentals-II Laboratory (2 semester credit hours) Introduction to more advanced building blocks of laboratory measurements and data analysis in Electrical and Computer Engineering. Prerequisite: CE 3201 or EE 3201. Corequisite: ECS 3390. Prerequisite or Corequisite: EE 3310 or CE 3310. (Same as CE 3202) (1-3) S

EE 3301 Electrical Network Analysis (3 semester credit hours) Analysis and design of RC, RL, and RLC electrical networks. Sinusoidal steady state analysis of passive networks using phasor representation; mesh and nodal analyses. Introduction to the concept of impulse response and frequency analysis using the Laplace transform. Prerequisites: MATH 2420 and PHYS 2326. (Same as CE 3301 and TE 3301) (3-0) S

EE 3302 Signals and Systems (3 semester credit hours) Introduces the fundamentals of continuous and discrete-time signal processing. Linear system analysis including convolution and impulse response, Fourier series, Fourier transform and applications, discrete-time signal analysis, sampling and z-transform. Prerequisite: ENGR 3300. (Same as CE 3302 and TE 3302) (3-0) S

EE 3310 Electronic Devices (3 semester credit hours) Theory and application of solid state electronic devices. Physical principles of carrier motion in semiconductors leading to operating principles and circuit models for diodes, bipolar transistors, and field effect transistors. Introduction to integrated circuits. Prerequisite: CE 3301 or EE 3301 or TE 3301. (Same as CE 3310) (3-0) S

EE 3311 Electronic Circuits (3 semester credit hours) Large-signal and small-signal characteristics of diodes, BJT and MOSFET transistors. Analysis of circuits containing diodes. Analysis of the DC and small-signal characteristics of single-stage BJT and MOSFET amplifiers. Analysis of circuits with an operational amplifier as a black box. Introduction of high-frequency models of BJT and MOSFET transistors and methods to analyze amplifier frequency response. Prerequisite: CE 3310 or EE 3310. (Same as CE 3311) (3-0) S

EE 3320 Digital Circuits (3 semester credit hours) Design and analysis of combinational logic circuits using basic logic gates and other building blocks like multiplexers and ROMs. Design and analysis of latches and flip-flops. Design and analysis of synchronous state machines. State minimization and introduction to state assignment. Design of datapath components: adders, multipliers, registers, shifters, and counters. Electrical properties of logic gates. Credit cannot be received for both courses, CS 4341 and EE 3320. Prerequisite: CE 2310 or EE 2310. (Same as CE 3320) (3-0) S

EE 3350 Communications Systems (3 semester credit hours) Fundamentals of communications...
systems. Review of probability theory and Fourier transforms. Filtering and noise. Modulation and demodulation techniques, including amplitude, phase, and pulse code. Time division multiplexing. This class may be offered as either regular or honors sections (H). Prerequisites: E NGR 3300 and (CE 3301 or EE 3301 or TE 3301) and (CE 3302 or EE 3302 or TE 3302) and ENGR 3341. (Same as TE 3350) (3-0) S

EE 4168 RF/Microwave Laboratory (1 semester credit hour) This course provides hands-on learning of RF and microwave fundamentals in a laboratory setting. The weekly lab sessions are designed, both in subject material and timeframe, to compliment the theory taught in EE 4368. The goal of this laboratory is to enable students to become familiar with RF test equipment, measurement techniques and design procedures. The second half of this lab involves design of microwave transmission media (primarily microstrip), impedance matching circuits and characterization of microwave transistors, culminating in the complete design, fabrication and test of a single-stage microwave amplifier. Prerequisite or Corequisite: EE 4368. (0-1) T

EE 4201 Electrical and Computer Engineering Laboratory in Computing Systems and Computer Engineering (2 semester credit hours) Laboratory topics in Computing Systems and Computer Engineering. Prerequisite: CE 3202 or EE 3202. (Same as CE 4201) (1-3) S

EE 4202 Electrical and Computer Engineering Laboratory in Circuits (2 semester credit hours) Laboratory topics in Circuits. Prerequisite: CE 3202 or EE 3202. (Same as CE 4202) (1-3) S

EE 4203 Electrical and Computer Engineering Laboratory in Signals and Systems (2 semester credit hours) Laboratory topics in Signals and Systems. Prerequisite: CE 3202 or EE 3202. (Same as CE 4203) (1-3) S

EE 4204 Electrical and Computer Engineering Laboratory in Devices (2 semester credit hours) Laboratory topics in Devices. Prerequisite: CE 3202 or EE 3202. (Same as CE 4204) (1-3) S

EE 4205 Electrical and Computer Engineering Laboratory in Power Electronics and Energy Systems (2 semester credit hours) Laboratory topics in Power Electronics and Energy Systems. Prerequisite: CE 3202 or EE 3202. (Same as CE 4205) (1-3) S

EE 4301 Electromagnetic Engineering I (3 semester credit hours) Introduction to the general characteristics of wave propagation. Physical interpretation of Maxwell's equations. Propagation of plane electromagnetic waves and energy. Transmission lines. Antenna fundamentals. Prerequisites: PHYS 2326 and ENGR 3300 and (CE 3301 or EE 3301 or TE 3301). (3-0) S

EE 4302 Electromagnetic Engineering II (3 semester credit hours) Continuation of the study of electromagnetic wave propagation. Metallic and dielectrically guided waves including microwave waveguides and optical fibers. Dipole antennas and arrays. Radiating and receiving systems, plasmas. Propagation of electromagnetic waves in materials and material properties. This course may be used as an honors course. Prerequisite: EE 4301. (3-0) T

EE 4304 Computer Architecture (3 semester credit hours) Introduction to computer organization and design, including the following topics: CPU performance analysis. Instruction set design, illustrated by the MIPS instruction set architecture. Systems-level view of computer arithmetic. Design of the datapath and control for a simple processor. Pipelining. Hierarchical memory. I/O systems. I/O performance analysis. Multiprocessing. Credit cannot be received for both courses, (CS 3340 or SE 3340 or TE 3340) and (CE 4304 or EE 4304). Prerequisite: CE 3320 or EE 3320. (Same as CE 4304) (3-0) S

EE 4310 Systems and Controls (3 semester credit hours) Introduction to linear control theory. General structure of control systems. Mathematical models including differential equations, transfer functions, and state space. Control system characteristics. Transient response, external disturbance, and steady-state error. Control system analysis. Performance, stability, root-locus method, Bode diagram, and Nyquist plot. Control system design. Compensation design using phase-lead and phase-lag networks. Prerequisites: ENGR 2300, and (CE 3302 or EE 3302 or TE 3302). (3-0) S
EE 4325 Introduction to VLSI Design (3 semester credit hours) Introduction to CMOS digital IC design using semi-custom and full-custom design techniques with an emphasis on techniques for rapid prototyping and use of various VLSI design tools. FPGA's, standard cell and full-custom design styles. Introduction to a wide variety of CAD tools. Prerequisite: CE 3320 or EE 3320 (or, for CS majors, CS 4341). (3-0) T

EE 4330 Integrated Circuit Technology (3 semester credit hours) Principles of design and fabrication of integrated circuits. Bipolar and MOS technologies. Passive and active component performance, fabrication techniques including epitaxial growth, photolithography, oxidation, diffusion, ion-implantation, thin and thick film components. Design and layout of integrated devices. Relations between layout and fabrication technique. Prerequisite: CE 3310 or EE 3310. (3-0) S

EE 4340 Analog Integrated Circuit Analysis and Design (3 semester credit hours) Analog integrated circuits and systems. Analysis and design of linear amplifiers, including operational, high-frequency, broad-band and feedback amplifiers. Use of monolithic silicon systems. Prerequisite: CE 3311 or EE 3311. (3-0) S

EE 4342 Introduction to Robotics (3 semester credit hours) Fundamentals of robotics, rigid motions, homogeneous transformations, forward and inverse kinematics, velocity kinematics, motion planning, trajectory generation, sensing, vision, and control. Prerequisite or Corequisite: BMEN 4310 or EE 4310 or MECH 4310 or equivalent. (Same as BMEN 4342 and MECH 4342) (2-3) Y

EE 4360 Digital Communications (3 semester credit hours) Information, digital transmission, channel capacity, delta modulation, and differential pulse code modulation are discussed. Principles of coding and digital modulation techniques such as Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), and Continuous Phase Frequency Shift Keying (CPFSK) are introduced. M-ary signaling such as Quadrature amplitude and phase shift keying, and M-ary PSK and FSK are also discussed. Prerequisites: ENGR 3341 and (CE 3302 or EE 3302 or TE 3302). (Same as TE 4360) (3-0) T

EE 4361 Introduction to Digital Signal Processing (3 semester credit hours) An introduction to the analysis and design of discrete linear systems, and to the processing of digital signals. Topics include time and frequency domain approaches to discrete signals and systems, the Discrete Fourier Transform and its computation, and the design of digital filters. Prerequisite: CE 3302 or EE 3302 or TE 3302. (Same as TE 4361) (3-0) T

EE 4362 Introduction to Energy Conversion (3 semester credit hours) Single phase and three phase electrical system; Real, Reactive, Apparent, and Complex powers, Power factor; Generation of three phase voltages, Star and Delta connections, Power calculations and measurements; Transformers: Theory of operation, voltage and current ratios, transformer ratings, three phase transformers; Electric Machines: DC, Induction, and Synchronous Machines - Characteristics, analysis and operation; Introduction to Renewable Energy Systems: Solar and Wind Energy Systems. Prerequisite: EE 3301. (3-0) Y

EE 4363 Introduction to Power Electronics (3 semester credit hours) Power Electronic devices operation and characteristics - Thyristor, Power MOSFET, IGBT, and other devices. Rectifiers and controlled rectifiers operation and control. DC-DC converters - buck and boost converters. Inverters and PWM operation. Switching mode power supplies. Prerequisite: EE 3301 (3-0) Y

EE 4365 Introduction to Wireless Communication (3 semester credit hours) Introduction to the basic system concepts of cellular telephony. Mobile standards, mobile system architecture, design, performance and operation. Voice digitization and modulation techniques; PCS technologies. Prerequisites: EE 3302 and ENGR 3341. (Same as TE 4365) (3-0) Y

EE 4367 Telecommunication Networks (3 semester credit hours) Trunking and queuing, switching technologies: voice, data, video, circuit switching and packet switching, transmission technologies and protocols, transmission media - copper, fiber, microwave, satellite, protocols -
bipolar formats, digital hierarchy, optical hierarchy, synchronization, advanced switching protocols and architectures; frame relay, ATM, HDTV, SONET. Prerequisite or Corequisite: **EE 3350** or **TE 3350**. (Same as **TE 4367**) (3-0) Y

**EE 4368** RF Circuit Design Principles (3 semester credit hours) Principles of high-frequency design, transmission lines, the Smith chart, impedance matching using both lumped and distributed components, and simple amplifier design. Prerequisites: (**CE 3310** or **EE 3310**) and **EE 4301**. (3-0) S

**EE 4370** Embedded Microprocessor Systems (3 semester credit hours) An introduction to microprocessors and their uses. Features commonly found in a CPU are discussed, such as: The Program Counter, Stack, Status Register, General Purpose Registers, ALU, Instruction Set and peripheral devices. Memory (SRAM, DRAM, EPROM, EEPROM) and Memory Mapped IO Peripheral Devices. Assembly language is used to create the binary machine code necessary to program a Microprocessor system. The special features of microprocessors: the stack, interrupts, input ports, output ports, and display. Prerequisite: **CE 3320** or **EE 3320**. Corequisite: **CE 4304** or **EE 4304**. (Same as **CE 4370**) (3-1) Y

**EE 4371** Introduction to MEMS (3 semester credit hours) This course will target an audience of motivated senior-level undergraduates, with the goal of providing an introduction to M/NEMS fabrication techniques, selected device applications, and the design tradeoffs in developing systems. Prerequisites: **CHEM 1311** and (**MECH 3310** and **MECH 3350** and **PHYS 2126** and **PHYS 2326**) or ((**CE 3310** or **EE 3310**) and **PHYS 2125** and **PHYS 2325**). (Same as **MECH 4370**) (3-0) Y

**EE 4388** Senior Design Project I (3 semester credit hours) First of two sequential semesters devoted to a team project that engages students in the full engineering design process. The goal of senior design projects is to prepare the student to run/participate in engineering projects related to an appropriate industry. Thus, all project teams are to follow standard industrial practices and methods. Teams must carry the engineering project to completion, examining real world and multiple design constraints, following applicable industrial and business standards. Such constraints may include but are not limited to: economic, environmental, industrial standards, team time/resource management and cross-disciplinary/departmental result integration. Students are required to work in teams that include collaborative design interaction. Additionally, cross-disciplinary teams are encouraged but not required. In Senior Design I, project proposals will be written, reviewed and approved. Initial designs will be completed and corresponding constraints will be determined. All students will participate in a public oral and poster presentation following departmental approved guidelines at a departmental approved time and location. Teams will also submit a written end of semester progress report and documented team communication (complete sets of weekly reports and/or log books) following guidelines approved by the faculty. Prerequisites: **ECS 3390** and one of the following prerequisite sequences: ((**CE 3311** or **EE 3311**), and (**CE 3320** or **EE 3320**), and (**CE 3345** or **CS 3345** or **SE 3345** or **TE 3345**), and (**CE 3354** or **CS 3354** or **SE 3354**)), or ((**ENGR 3300** and (**CE 3302** or **EE 3302** or **TE 3302**), and (**CE 3311** or **EE 3311**), and (**CE 3320** or **EE 3320**)), or ((**ENGR 3300** and (**CE 3302** or **EE 3302** or **TE 3302**), and (**CE 3311** or **EE 3311**), and (**CE 3320** or **EE 3320**)); prerequisite or corequisite: **EE 3350** or **TE 3350**.] (Same as **CE 4388** and **TE 4388**) (3-0) S

**EE 4389** Senior Design Project II (3 semester credit hours) Continuation of the Senior Design project begun in the previous semester. In Senior Design II, projects based on approved project proposals will be completed. All limitations of the design will be determined and addressed. All students will participate in a public oral presentation following faculty-approved guidelines at a faculty-approved time and location. Teams will also submit a written final report and documented team communication (complete sets of weekly reports and/or log books) following faculty-approved guidelines. Prerequisite: **CE 4388** or **EE 4388** or **TE 4388**. (Same as **CE 4389** and **TE 4389**) (3-0) S
EE 4390 Computer Networks (3 semester credit hours) An introduction to packet-based computer and data communication networks, including the OSI model, Internet, TCP/IP, ATM, Ethernet, Frame Relay, and Local Area Networks. Enterprise network design procedures are introduced in conjunction with IP routing, VPN, MPLS and VOIP. Credit cannot be received for both courses, (CE 4390 or CS 4390 or TE 4390) and EE 4390. Prerequisite or Corequisite: EE 3350 or TE 3350. (3-0) S

EE 4391 Technology of Plasma (3 semester credit hours) Plasmas are critical to making the best electronic devices. This class will be an introduction to the technology required to make and use these plasmas. Topics include: high-vacuum technology (gas properties, pumps, pressure gauges, flow-meters, gas composition analysis) and plasma technology (etch, deposition, and lamps). Recommended: ENGR 3341. Prerequisites: ENGR 3300 and (CE 3310 or EE 3310). (Same as MSEN 4391) (3-0) T

EE 4392 Introduction to Optical Systems (3 semester credit hours) Operating principles of optical communications systems and fiber optic communication technology. Lightwave fundamentals, characteristics of integrated optic waveguides and optical fibers, attenuation and dispersion, operating principles of optical sources, detectors and optical amplifiers, optical transmitters and receivers, modulation techniques, effect of noise in optical systems, system design fundamentals, network topologies. Prerequisites: (CE 3302 or EE 3302 or TE 3302), and EE 4301 and (CE 3310 or EE 3310). (3-0) T

EE 4399 Senior Honors in Electrical Engineering (3 semester credit hours) For students conducting independent research for honors theses or projects. May be repeated for credit as topics vary. Instructor consent required. (3-0) T

EE 4V95 Undergraduate Topics in Electrical Engineering (1-9 semester credit hours) May be repeated for credit as topics vary (9 semester credit hours maximum). Instructor consent required. ([1-9]-0) R

EE 4V97 Independent Study in Electrical Engineering (1-9 semester credit hours) Independent study under a faculty member’s direction. May be repeated for credit as topics vary (9 semester credit hours maximum). Instructor consent required. ([1-9]-0) R

EE 4V98 Undergraduate Research in Electrical Engineering (1-9 semester credit hours) This course may be used as an honors course. May be repeated for credit as topics vary (9 semester credit hours maximum). Instructor consent required. ([1-9]-0) R