

Course Descriptions Continued

ECET 297 Electronic Prototype Development—Class 2, lab. 4, cr. 4. *Prerequisites:* ECET 196, ECET 159, and ECET 207.

This course introduces basic concepts in the development of an electronic product prototype. The student develops an electronic device by utilization of: electronic design automation (EDA), design for testing (DFT), surface mount technology (SMT), design for manufacturability (DFM), component characteristic selection techniques, and basic failure predictions. The final prototype is presented in a written and/or oral report.

ECET 302 Introduction to Control Systems—Class 3, lab. 3, cr. 4. *Prerequisite:* ECET 231 This first course in industrial controls is applications-oriented and includes on-off type open and closed-loop control systems, and analog-based systems. Major topics include relay and programmable controller-based systems. **Course offered on a rotational basis.**

ECET 304 Introduction to Communication Systems—Class 3, Lab 2, Cr. 4. *Prerequisites:* Math 209 and ECET 257

The theory and techniques of sending information (voice, music, data, etc.) from one location to another is studied. This includes signal analysis, AM, FM, and PM, modulation techniques, transmitters, receivers, networks, filters, and antennas through the VHF frequency spectrum. In addition, transmission lines, wireless communication, digital communication, and special topics of current interest are introduced. This course also incorporates a student-based communication system design laboratory. **Course offered on a rotational basis.**

ECET 307 Analog Network Signal Processing—Class 3, lab. 3, cr. 4. *Prerequisites:* ECET 207 and Math 209 This is an advanced course in network analysis that stresses network theorems and solutions of time-domain and frequency-domain problems. Transform circuit and signal analysis using Laplace and Fourier techniques are developed, culminating in active filter design applications. Software techniques, such as MATLAB(r) and LabVIEW (tm), are employed to solve mathematical problems. **Course offered on a rotational basis.**

ECET 309 Advanced Embedded Microcontrollers—Class 3, lab. 3, cr. 4. *Prerequisite:* ECET 209 A course emphasizing the advanced applications of embedded microcontrollers. Included are microcontroller architecture, use of advanced programmable counter/timer arrays, analog interfaces, serial communication, and other peripherals. **Course offered on a rotational basis.**

ECET 325 Computer Architecture, Modeling and Performance Analysis—Class 3, lab 3, cr. 4. *Prerequisites:* ECET 209 and Math 209 A study of the architecture, hardware, and system software of computers. Fundamental principles associated with the operation of computers are introduced and studied. Modeling and analysis of computer subsystems, their performance, and interactions are also studied. **Course offered on a rotational basis.**

ECET 345 Advanced Digital Systems—Class 3, lab. 3, cr. 4. *Prerequisite:* ECET 159 Digital system implementation techniques, with an emphasis on digital applications using Applications Specific Integrated Circuits. Computer-aided engineering tools are emphasized along with system considerations, including device selection and testability. **Course offered on a rotational basis.**

ECET 357 Real-time Digital Signal Processing—Class 3, lab. 3, cr. 4. *Prerequisites:* ECET 209, ECET 307 and Math 209 A study of the architecture, instruction set and hardware and software development tools associated with a fixed-point general purpose DSP VLSI processor. Fundamental principles associated with the processing of discrete time signals are also introduced along with the implementation of some common applications such as waveform generation, audio affects, FIR and IIR digital filtering and DFT and FFT based spectral estimation. **Course offered on a rotational basis.**

ECET 368 Linear Integrated Circuits—Class 3, lab. 3, cr. 4. *Prerequisite:* ECET 257 A study of the applications of IC analog integrated circuits. Topics include linear amplifiers, IC specifications, linear and switching voltage regulation, waveform generation, linear and switched capacitor active filters, Norton and operational transconductance amplifiers, and nonlinear circuit applications. Computer-aided analysis of many of these circuits is also presented. **Course offered on a rotational basis.**

ECET 396 Project Development and Management—Class 3, lab. 2, cr. 4. *Prerequisites:* ECET 297, Associate degree and 12 credit hours of upper division course work in ECET

This is a structured course in electronic projects, with an emphasis on planning and design alternatives to meet cost, performance, and user-interface goals. A software tool is utilized for project management. Students work in teams to solve problem assignments using guided design techniques. Creativity is stressed, and the different approaches taken by different teams are compared and discussed.

ECET 480 Professional Issues in EET—Class 1, cr. 1.

Prerequisite: First semester ECET senior standing or higher This course addresses professional ethics, legal issues, professional development, technology transfer, and corporate culture as they relate to graduating EET students. Information relating to personal job and career choices, resumes, and interviewing are included.

ECET 496 Project Design and Development, Phase I—Lab. 2, cr. 1. *Prerequisites:* ECET 396 and 8 credit hours of ECET electives with a grade of C or better An extensive individual or small-group design project is carried out with guidance from a faculty advisor. Phase I includes determining customer requirements, considering design alternatives, and issuing a formal project proposal. Software scheduling tools are used extensively. The course concludes with a report and demonstration of functionality of individual hardware and software design blocks.

ECET 497 Project Design and Development, Phase II—Lab. 4, cr. 1. *Prerequisite:* ECET 496 This conclusion of the design project begun in ECET 496 emphasizes system integration and testing. The course concludes with a formal demonstration of and oral presentation on the finished product and a written report on the final design.

OTHER REQUIRED TECHNOLOGY COURSES

CSCI-C 101 Computer Programming—Class 4, cr. 4. *Prerequisite:* Math 014 or equivalent Fundamental concepts of algorithm development, computer programming, and data structuring.

Program Strengths

- Graduates are highly regarded by industry for their in-depth technical expertise.
- Course work is applications-oriented. Experience is gained through laboratory activities that are carefully integrated into the courses.
- Strong emphasis is placed on the development of written and oral communication skills.
- Faculty members have industrial experience.
- Graduates are able to offer their employers immediate contributions as team players who have problem solving and project management experience.

Job Outlook

- The shortage of manpower in the field of electrical and electronic engineering ensures employment opportunities for ECET graduates in all areas of industry and business.
- Currently, many employers have jobs that are unfilled due to a severe shortage of ECET graduates.
- Annual average starting salaries for graduates with a baccalaureate degree is amongst the highest at the University.

Job Titles

(with B.S. Degree)

Applications Engineer
Computer Support Specialist
Controls Engineer
Design Engineer
Electrical Engineer
Embedded Systems Engineer
Instrumentation Engineer
Manufacturing Engineer
Process Controls Engineer
Product Development Engineer
Software Engineer
Systems Administrator
Systems Analyst
Systems Engineer
Test Engineer



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Associate & Bachelor of Science Degrees — EET

ASSOCIATE OF SCIENCE DEGREE - ELECTRICAL ENGINEERING TECHNOLOGY (Plan of Study SE1)							
Semester 1 - Fall	CR	Semester 2 - Spring	CR	Semester 3 - Fall	CR	Semester 4 - Spring	CR
ECET 107 Intro to Circuit Analysis	4	ECET 157 Electronics Circuit Analysis	4	ECET 207 AC Elect. Circuit Analysis	4	ECET 257 Power & RF Electronics	4
ECET 109 Digital Fundamentals	3	ECET 159 Digital Applications	4	ECET 209 Intro to Microcontrollers	4	ECET 231 Electric Power & Controls	4
ECET 196 Intro to ECET Projects	2	MATH M126 Trigonometry	2	MATH M208 Technical Calc. I	3	ECET 297 Electronic Prototype Development	4
MATH M125 Precalculus	3	SPCH S121 Public Speaking	3	PHYS P221 General Physics I	5	MATH M209 Tech. Calculus II ²	3
ENG W131 Elem. Composition	3	CSCI C101 Computer Programming I	4			Humanities or Soc. Sci. Elective ⁵	3
						CAND 991 ⁷	0
Total Credit Hours	15	Total Credit Hours	17	Total Credit Hours	16	Total Credit Hours	18
BACHELOR OF SCIENCE DEGREE - ELECTRICAL ENGINEERING TECHNOLOGY (Plan of Study SE2)							
Semester 5 - Fall	CR	Semester 6 - Spring	CR	Semester 7 - Fall	CR	Semester 8 - Spring	CR
ECET 304 Intro to Communication Systems	4	ECET 396 Project Dev. & Management	4	ECET 496 Project Design & Development Phase I	1	ECET 497 Project Design & Development Phase II	1
ECET 307 Analog Network Signal Processing	4	ECET Elective ¹	4	ECET 480 Prof. Issues in ECET	1	Technical Selective ³	3
ECET Elective ¹	4	ECET Elective ¹	4	ECET Elective ¹	4	Humanities or Soc. Sci. Elective ⁵	3
Humanities or Soc. Sci. Elective ⁵	3	ENG W234 Tech. Report Writing	3	Science Selective ⁴	5	Humanities or Soc. Sci. Elective ⁵	3
		MATH K310 Stat. Techniques	3	Communication Selective ⁶	3	Free Elective	3
				Technical Selective ³	3	CAND 991 ⁷	0
Total Credit Hours	15	Total Credit Hours	18	Total Credit Hours	17	Total Credit Hours	13

Degree Codes: AS=SE1 BS=SE2 AS Total Credit Hours 65 BS Total Credit Hours (as listed) 129
 Date POS Effective: 6/1/2005 Minimum Required 126

Departmental Policies: It is the responsibility of each student to assure that he/she schedules the necessary prerequisites and courses to meet ECET graduation requirements. Questions may be directed to your academic advisor. Any variation from the courses listed on the plan of study requires ECET Departmental approval.

¹**ECET Elective Courses**—The courses listed below may not all be offered each year and the list of courses may be revised. See advisor for latest listing. Prerequisites are shown in parenthesis.

ECET 302 Introduction to Control Systems (ECET 231)
 ECET 309 Advanced Embedded Microcontrollers (ECET 209)
 ECET 325 Comp. Arch., Modeling & Perform. (ECET 209 & Math 209)
 ECET 345 Advanced Digital Systems (ECET 159)
 ECET 357 Real-time Digital Signal Processing (ECET 209, 307)
 ECET 368 Linear Integrated Circuits (ECET 307)

²**Math M209**—Terminal AS students may substitute Math K310 or a science elective (lab based in chemistry, physics, or biology).

³**Technical Selectives**

BUS A201 Intro to Financial Acct. CIMT 300 Apps. of Automation in Manufacturing
 BUS A202 Intro to Mngrl Acct. C&IT 175 Visual Programming
 BUS L201 Legal Environ. of Bus. C&IT 230 Data Communications
 CGT 110 Tech Graphics Comm.

³**Technical Selectives Continued**

ECON 103 Intro to Microeconomics MET 230 Fluid Power
 ECON 104 Intro to Macroeconomics MET 242 Manufacturing Processes II
 IET 104 Industrial Organization OLS 252 Human Behavior in Orgs.
 IT 342 Intro. to Statistical Quality OLS 274 Applied Leadership
 IT 450 Production Cost Analysis OLS 331 Occpntl Safety & Health
 MET 111 Applied Statics PSY P233 Industrial Psychology
 MET 141 Materials I Foreign Languages (e.g., French, German, Japanese, Spanish)
 MET 142 Manufacturing Processes I
 MET 213 Dynamics

⁴**Science Selectives**—Science selectives must be lab-based. List of recommended courses are listed below. Any courses not on the list MUST be preapproved.

CHEM C101/C121 Elementary Chemistry/Lab
 BIOL L100 Humans & the Biological World/Lab
 BIOL L101 Introduction to Biological Sciences I/Lab
 PHYS P222 Physics 2/Lab
 PHSL P261 Human Anatomy & Physiology/Lab

⁵**Humanities/Social Science Electives**—Students are required to select 4 Humanities/Social Science Electives for the Bachelor of Science degree. To satisfy this requirement, **two** electives must be selected from the approved area lists for **Global Perspectives** (1 elective minimum) and **Social Issues** (1 elective minimum).

The other two electives may be any courses from Anthropology, Communications, English, Foreign Languages, Geology, History, Philosophy, Political Science, Psychology, Religious Studies, Sociology, or Visual & Performing Arts. Humanities/Social Science electives may be taken under the Pass/No Pass option. See University Regulations.

Global Perspectives

Foreign Languages (200 level or higher)
 POLYS Y109 Intro to International Relations
 POLYS Y335 Western European Politics
 POLS Y343 Dev. Prob. in the Third World
 POLS Y376 Interntl Political Economies
 HIST H101 The World in the Twentieth Cen.
 HIST H114 Western Culture II
 HIST B361 Europe in the Twentieth Century
 ANTH E105 Culture & Society
 GEOG G113 Political Geography
 GEOG G213 Intro to Economic Geography

Social Issues

Phil P140 Intro to Ethics
 Phil P306 Business Ethics
 JOUR C200 Intro to Mass Communications
 PSY P320 Social Psychology
 PSCH S427 Cross-cultural Communications
 SOC S317 Inequality
 SOC S230 Society and the Individual
 SOC S335 Race and Ethnic Relations

Other Popular Humanities/Social Science Electives

HIST H105 American History I SPCH S122 Interpersonal Communication
 HIST H106 American History II ENG L101 Western World Master I
 MUS M174 Music for the Listener ENG L102 Western World Master II
 POLS P103 Intro To American Politics Philosophy Courses
 POLYS Y109 Intro to Internl Relations Other History Courses
 PSY P103 General Psychology Religious Studies
 SOC S161 Principles of Sociology

⁶Communication Selectives

SPCH S223 Business & Prof. Comm.
 SPCH S229 Discussion & Group Methods
 SPCH C320 Advanced Public Speaking

⁷**CAND 991**—Course that students must enroll when enrolling for the last course for graduation of AS and BS degrees. This is the student's application for graduation. There are no fees assessed for this course. No class attendance is required and no grade will be issued.

Course Descriptions

ECET 107 Introduction to Circuit Analysis—*Class 3, lab. 3, cr. 4. Corequisite: Math 125.* Voltage, current, resistance, Ohm's law, Kirchhoff's current and voltage law, resistance combinations, and Thevenin's, Norton's and superposition theorems are studied and applied. DC and AC circuits are studied and utilized, with basic AC terminology described. Ideal RC coupling and filter circuits and RC switching circuits are introduced. Fundamental analog circuits with ideal or near-ideal electronics devices are utilized in the lecture and laboratory to enhance the understanding of basic circuits laws and theorems.

ECET 109 Digital Fundamentals—*Class 2, lab. 3, cr. 3.* This course introduces basic gate and flip-flop logic devices and their application in combinational and sequential digital circuits. Topics include decoders, displays, encoders, multiplexers, demultiplexers, registers, and counters. Logic circuit analysis, implementation of circuits using standard IC chips or programmable logic devices, circuit testing, and troubleshooting are emphasized.

ECET 157 Electronics Circuit Analysis—*Class 3, lab. 3, cr. 4. Prerequisites: ECET 107, Math 125* Capacitors, inductors, switching circuits, transformers, rectifiers, linear regulators, dependent sources, operational amplifiers, BJT & MOSFET based small signal amplifiers, waveform generation, and programmable analog devices are studied. Circuit fundamentals such as Kirchhoff's laws are utilized in analysis and design of circuits. Computer simulation is used.

ECET 159 Digital Applications—*Class 3, lab. 3, cr. 4. Prerequisites: ECET 107 and ECET 109* This course continues the study of combinational and sequential digital applications using programmable logic devices and standard logic devices. The input and output characteristics of the various common logic families, the appropriate signal conditioning techniques for on/off power interfacing, digital and analog signal interfacing techniques, and memory devices and systems are discussed.

ECET 196 Introduction to EET and Projects—*Class 1, lab. 3, cr. 2* This course introduces EET projects and the EET program. Included are topics about EET projects, options and electives in the EET curriculum, university services, study techniques and student employment and career opportunities. Also introduced are techniques for proper and safe use of basic hand and machine tools, and the processes of fabricating, assembling and testing printed circuit boards.

ECET 207 AC Electronics Circuit Analysis—*Class 3, lab. 3, cr. 4. Prerequisites: ECET 157, and Math 115 or Math 126* AC circuits including the j operator, phasors, reactance and impedance are studied. Circuit laws, network theorems, and the fundamental concepts of Fourier analysis are applied and used in the study of topics such as passive filters, IC filters, amplifiers, resonant circuits, single-phase and three-phase circuits. Computer aided analysis of circuits is used.

ECET 209 Introduction to Microcontrollers—*Class 3, lab. 3, cr. 4. Prerequisites: CSCI-C 101 and ECET 159* This course is an introduction to microprocessor hardware and software, focusing on embedded control applications. Interconnections of components, peripheral devices, bus timing relationships, structured C-language programming, debugging, input/output techniques, and use of PC-based software development tools are studied.

ECET 231 Electrical Power and Controls—*Class 3, lab. 3, cr. 4. Prerequisites: Math 208 and Physics 221; Corequisite: ECET 257* This course introduces magnetic materials and properties followed by analysis of transformers and power conditioning equipment, induction motors, and single-phase and three-phase power systems. Motor control devices, programmable logic controllers, PLC input and output devices, and power systems communications and monitoring are introduced.

ECET 257 Power and RF Electronics—*Class 3, lab. 3, cr. 4. Prerequisites: ECET 207 and Math 208* This course is a study of the application of circuit analysis techniques to amplifiers used in power and RF electronics, including bipolar junction transistors, power MOSFETs, thyristors, RF amplifiers, phase lock loops, switching power supplies, and appropriate applications. Computer-aided analysis of circuits is used.