Electronic Engineering Technology

College of Science, Engineering & Technology
Department of Electrical & Computer Engineering and Technology
137 Trafton Science Center S • 507-389-5747
Web site: www.cset.mnsu.edu/ecst

Chair: Bill Hudson, Ph.D.
Program Coordinator: Rajiv Kapadia, Ph.D.

Electronic Engineering Technology is a technological field requiring the application of scientific and engineering knowledge and methods, combined with technical skills, in support of engineering activities. An electronic engineering technologist is a person who is knowledgeable in electronics theory and design and who understands state-of-the-art practices on digital and analog circuits and systems. Computers, controls/automation, robotics, instrumentation, and communications are just a few fields open to engineering technologists.

Overall the program strives to prepare students for entry into the technical workforce with well developed skills. In particular, the department strives to ensure that its graduates have an ability to:
1. Apply knowledge of science, mathematics, and engineering
2. Design, and conduct experiments as well as analyze and interpret data
3. Design a system, component, or process to meet specified needs
4. Function effectively in teams
5. Identify, formulate, and solve engineering problems
6. Have an understanding of professional and ethical responsibilities
7. Communicate effectively

This program is accredited by the Technology Accreditation Commission (TAC) of the Accreditation Board for Engineering and Technology (ABET).

Accreditation. The Electronic Engineering Technology program is accredited by the Technology Accreditation Commission (TAC) of the Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, Telephone: 410-347-7700.

Admission to Major is granted by the department. Minimum program admission requirements are:
- a minimum of 32 earned semester credit hours.
- a minimum cumulative GPA of 2.00 (C).

Contact the department for application procedures.

ELECTRONIC ENGINEERING TECHNOLOGY BS

It is strongly recommended that all EET students enroll in EET 101 Introduction to EET/CET (1) during their freshman year.

Students who do not have the required background for MATH 115 may have to take additional preparatory coursework as well. Consult with your major advisor to plan your general education and major requirements.

All students must complete a minimum of 12 semester credits of mathematics starting with Precalculus math and a minimum of 24 semester credits of combined mathematics and science courses.

Required General Education (15 credits):
ENG 101 Composition (4)
SPEE 102 Public Speaking (3)
MATH 115 Precalculus Math (4)
PHYS 211 Principles of Physics I (4)

Required Support Courses (18 credits):
COMS 110 Introduction to Computer Science (4)
COMS 211 Fundamentals of Computer Science I (4)
MATH 121 Calculus I (4)
MET 427 Quality Assurance (2)

Choose one of the following:
COMS 212 Fundamentals of Computer Science II (4)
COMS 230 Intelligent Systems (4)
COMS 271 C++ Programming (4)
COMS 380 System Analysis and Design (4)

Required for Major (Communication, Mathematics and Science, 16 credits):
ENG 271 Technical Communication (4)
MATH 127 Calculus II for Engineering Technology: Integration (2)
PHYS 212 Principles of Physics II (4)
CHEM 104 Introduction to Chemistry (3)

Choose one of the following:
STAT 154 Elementary Statistics (3)
MATH 354 Concepts of Probability and Statistics (3)

Required Core for Major (EET, 55 credits):
EET 113 DC Circuits (3)
EET 114 AC Circuits (3)
EET 221 Electronic CAD (3)
EET 222 Electronics I (4)
EET 223 Electronics II (4)
EET 225 Digital Principles (3)
EET 241 Electronic Shop Practices (2)
EET 355 Electrical Power Systems (3)
EET 400 Network Analysis (3)
EET 452 Operational Amplifier Applications (3)
EET 454 Microprocessors I (4)
EET 456 Communications I (4)
EET 458 Advanced Instrumentation (1)
EET 480 Automatic Controls (3)
EET 488 Senior Project Design I (1)
EET 489 Senior Project Design II (2)
EET 497* Internship (3)

Choose a minimum of 6 credits from the following courses:
COMS 380 System Analysis and Design (4)
COMS 271 C++ Programming (4)
COMS 230 Intelligent Systems (4)
COMS 212 Fundamentals of Computer Science II (4)
COMS 210 System Analysis and Design (4)

* You may substitute one EET advanced elective for internship.

Required Minor: None.

ELECTRONIC ENGINEERING TECHNOLOGY MINOR

Required for Minor (Core, 13 credits):
EET 112 Elementary Electronics (3)
EET 113 DC Circuits (3)
EET 114 AC Circuits (3)
EET 222 Electronics I (4)

Required for Minor (Elective Options, 7-8 credits):
DIGITAL OPTION
EET 225 Digital Principles (3)
EET 454 Microprocessors I (4)

ELECTRONICS OPTION
EET 223 Electronics II (4)
Choose one of the following:
EET 452 Operational Amplifier Applications (3)
EET 455 Advanced Power Electronics (3)
EET 492 Integrated Circuit Technology (4)

NETWORKING OPTION
EET 230 Microcomputer Technology (4)
EET 430 Computer Networking I (4)

COMMUNICATIONS OPTION
EET 223 Electronics II (4)  
EET 456 Communications I (4)  

POWER OPTION  
EET 223 Electronics II (4)  
EET 355 Electrical Power Systems (3)  

POLICIES/INFORMATION  

Graduation Policy. Students graduating with a degree in Electronic Engineering Technology must have: 1) completed a minimum of 20 semester credit hours of upper division EET courses; 2) have a cumulative GPA of 2.0 or higher for all MSU EET coursework; and 3) have completed their senior design sequence at MSU.  
P/N Grading Policy. A student who majors or minors in EET must elect the grade option for all required courses including general education courses listed by number even if offered by another department.  
If the credits earned for composition, technical writing and speech courses equal less than 9 credits, either an advanced speech course or a course in English language literature must be selected as a general elective.  
In addition to the transfer of credit policy described in this bulletin for students transferring to MSU from other schools, the electronic engineering program has additional policies:  
1. All transfer student must take EET 221.  
2. For courses taken at technical colleges/vocational technical schools and pertinent courses taken in the military the student may receive up to 8 credits upon review of course materials, grades and written approval by the program coordinator. The credit can be used for EET 112, 113 and 114. The student may also attempt to test out of EET 114, 222, 225 and 223.  
3. For courses taken at community colleges and four-year colleges, up to 25 credits may be accepted if the transcript is from an ABET-accredited program. If the program is not accredited by ABET, up to 20 credits may be accepted. Grades of transfer credits must be C or better to be acceptable for substitution for required courses.  

Testing for course credit will be available via prior application made with the program coordinator. Students may not apply for credit by examination for an EET course in which they were previously enrolled at MSU or for any EET course above EET 225.  

COURSE DESCRIPTIONS  

EET 101 (1) Introduction to EET/CET  
Creative problem solving. Group projects working with simple robots which provide the student with: an introduction to electronic schematics and parts; an introduction to computer hardware and software; and, an introduction to robotics.  
F  

EET 112 (3) Elementary Electronics  
Hands-on experiences in elementary electronics to easily and quickly develop basic knowledge of electronics related to simple analog and digital circuit and components. A self paced format with an open laboratory is used.  
F, S  
GE-3  

EET 113 (3) DC Circuits  
A study of DC electrical circuits, Kirchhoff's laws, series and parallel circuits, inductors, capacitors, circuit response to RL, RC and RLC circuits. Thévenin's equivalent circuit theorem, and other network analysis theorems. Use of dependent sources in DC circuits.  
Pre: MATH 115, or concurrent  
F, S  

EET 114 (3) AC Circuits  
Pre: EET 113 and MATH 115  
F, S  

EET 115 (3) Understanding Computers  
A self-paced, interactive, multi-media course, for nonengineering students, exploring the basics of computer hardware. The course will cover concepts behind computer design and operation, including issues such as the need for RAM, hard drive, memory, ROM, etc.  
F, S  
GE-13  

EET 116 (3) Communications-Past, Present & Future  
This is an introductory course in the use of technology for communication. During the semester students will study the evolution of communications technology from early days to the present. This course will cover wireless, analog, and digital techniques including telephony, the internet, and mobile formats. The student will study theory and principles involved in the different types of communications. Modern techniques in digital communications will be discussed and demonstrated through simulation. A consumer example of digital communication will be given.  
Variable  
GE-13  

EET 117 (3) Introduction to Digital Electronics  
Hands-on experiences in the use of digital integrated circuits and logic families. Students will study logic gates, number systems, flip flops, latches, registers, computer arithmetic and memory. A self paced format with an open laboratory format.  
Variable  
GE-13  

EET 125 (3) Perspective on Technology  
Historical, cultural, ethical, philosophical, developmental, and creative aspects of engineering and technology as a discipline are explored. The course also examines concepts and events leading to important innovations of recent times; microwave ovens, FAX machines, personal computers, traffic signals, and video games. Available for general education and cultural diversity offered as self-paced on line format.  
F  
GE-8 CD-Related  

EET 221 (3) Electronic CAD  
Drafting Principles involving use of computer electronic CAD software in laying out block diagrams, schematic diagrams, production drawings, graphical presentation of data, and printed circuit board layout and construction.  
F  

EET 222 (4) Electronics I  
An introduction to semiconductor theory and circuits: includes characteristics curves, biasing techniques and small signal analysis of FETs and MOSFETs, feedback concept, BJT and FETs frequency response.  
Pre: EET 114 or concurrent  

EET 223 (4) Electronics II  
An introduction to differential amplifier, linear and nonlinear operational amplifiers, power amplifiers, linear digital ICs, oscillators, power supplies, D/A, A/D conversion, four layered devices and their applications.  
Pre: EET 222  
S  

EET 225 (3) Digital Principles  
A study of number systems, Boolean algebra, switching function minimization techniques, binary arithmetic, small scale and medium scale logic chips, programmable logic devices, latches, flip-flops, registers and counters, and sequential circuit design.  
S  

EET 230 (4) Microcomputer Technology  
An introduction to the installation, configuration, upgrading, troubleshooting
and repair of microcomputers. Basic knowledge of desktop systems, basic networking concepts and printers will be introduced. Safety and common preventive maintenance procedures will be covered.

Pre: EET 113 or permission of instructor

EET 241 (2) Electronic Shop Practices
An introduction to tools, equipment, materials, and techniques used in fabrication of electronic projects and printed circuit boards.

Pre: EET 222 and 221

EET 355 (3) Electrical Power Systems
Electrical power and magnetic circuit concepts, transformers, generators and motors (DC, synchronous, induction), special purpose motors, power-electronic motor drivers, prime movers/alternatives, generation, transmission/distribution, system stability/protection.

Pre: EET 114 F

EET 393 (1-4) Practicum
Elective credit for approved experience in off-campus work related to EET major.

Permission required. F, S

EET 400 (3) Network Analysis
A course in network analysis that stresses time, frequency and Laplace transform domain techniques.

Pre: EET 114 and MATH 127 S

EET 425 (3) Advanced Digital Design
A study of multiple-output switching functions optimization, flip-flops, registers and counters, programmable logic devices, synchronous sequential circuit design and synthesis, pulse mode and fundamental model sequential circuit design, test methods, and test vector generation.

Pre: EET 225 Variable

EET 430 (4) Computer Networking I
An introduction to the basic foundations of computer networking. The course will encompass telecommunications, local area networks, wide area networks and wireless communication. Topics covered include OSI model, the TCP/IP MODEL, different network topologies and associated hardware, error detection and correction, protocols, and security.

Pre: EET 230 and COMS 112 or consent of instructor. F

EET 431 (4) Computer Networking II

Pre: EET 430 S

EET 452 (3) Operational Amplifier Applications
Operational amplifier circuits utilized in filters, sensors, comparators, voltage regulators, device testing, measurement systems, multipliers, phase-locked loops, and A/D converters. Differential amplifier basics. Linear integrated circuit processing.

Pre: EET 223 and MATH 121 F

EET 454 (4) Microprocessors I
A study of microcomputer hardware and software fundamentals, the instruction set and the addressing modes of a microprocessor/microcontroller, assembly programming, basic I/O concepts, parallel I/O methods, asynchronous serial I/O methods, synchronous serial I/O methods, A/D conversion, and timer applications.

Pre: EET 225 S

EET 455 (3) Advanced Power Electronics
The half-wave rectifier with power loads, power semiconductor switches, thyristor states, controlled rectifiers, commutating circuits, AC voltage controllers (poly and single phase), motor controllers, DC-DC converters, and inverters.

Pre: EET 223 and 355 Variable

EET 456 (4) Communications I
Communications principles and systems. Practical engineering aspects involved in modulation-demodulation, receivers, transmitters and filters. Also included are radiation and antennas, guided waves, microwaves, and microwave systems.

Pre: EET 222 or Consent S

EET 458 (1) Advanced Instrumentation
Experiences with electronic equipment and instrumentation including maintenance, repair, calibration, safety and component identification.

Pre: 25 hours of EET courses, or consent S

EET 480 (3) Automatic Controls

Pre: EET 400 F

EET 484 (4) Microprocessors II
A study of a high performance microprocessor architecture. Applications of a microprocessor for monitoring and controlling systems will be studied. Optimal utilization of a microprocessors recourses will be studied. PC programming in assembly and a high level language.

Pre: EET 454 or consent of instructor F

EET 486 (3) Communications II

Pre: EET 456 Variable

EET 487 (3) RF Systems Technology

Pre: EET 456 Variable

EET 488 (1) Senior Project Design I
A group design project performed in consultation with the instructor. Phase I includes the acceptance of the proposal, defining, and limiting the project objectives, initial source contacts and procurement of materials.

Pre: EET 241, four 400-level EET courses or Consent of Instructor F, S

EET 489 (2) Senior Project Design II
Phase II includes completion of the project with evidence of extensive laboratory performance. A final oral report to the class and a standard formal written report are required.

Pre: EET488 F, S

EET 491 (1-4) In-Service

EET 492 (4) Integrated Circuit Technology
Semiconductor industry and overview of integrated circuit manufacturing, integrated circuit types, crystal growth and wafer manufacturing, physics of semiconductor materials, detail of major IC fabrication steps, process yield, semiconductor devices and integrated circuit formation, packaging, and semiconductor measurements, introduction to layout tools.

Pre: EET 223 S

EET 497 (1-6) Internship
EET 499 (1-4) Individual Study
F, S