# 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: Gale Allen, Ph.D.
Web site: www.cset.mnsu.edu/ecst

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**Required Courses (19 credits):**
- **PHYS 211** Principles of Physics I (4)
- **SPEE 102** Public Speaking (3)
- **ENG 271** Technical Communication (4)
- **PHYS 212** Principles of Physics II (4)
- **MATH 127** Calculus I for Engineering Technology: Integration (2)
- **CHEM 104** Introduction to Chemistry (3)

**Required Core for Major (EET, 55 credits):**
- **MATH 271** Calculus I (4)
- **MATH 272** Calculus II (4)
- **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 492** Internship (3)

Choose a minimum of 6 credits from the following courses:
- **EET 425** EE 430  
- **EET 455** EE 484  
- **EET 487** EE 492

* 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 114** AC Circuits (3)
- **EET 113** DC 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)

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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 Minnesota State Mankato EET coursework; and 3) have completed their senior design sequence at Minnesota State Mankato.

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 Minnesota State Mankato 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.

Petition to evaluate transfer credits must occur no later than the first semester the student is enrolled in or declared a major housed in the Department of Electrical and Computer Engineering Technology.

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 Minnesota State Mankato 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. Thevenin'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

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-6, 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 F

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 technique, 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
operational amplifiers are used in filters, sensors, comparators, and voltage references. Electronic Shop Practices introduces students to tools, equipment, materials, and techniques used in fabrication of electronic projects and printed circuit boards. Pre: EET 222 and 221 S

EET 298 (1-4) Topics offers a variation of topics in Electronic and Computer Engineering Technology. It may be repeated as topics change. Prerequisite: to be determined by course topic.

EET 355 (3) Electrical Power Systems covers electrical power and magnetic circuit concepts, transformers, generators, and motors (DC, synchronous, induction), special purpose motors, power electronics, motor drivers, prime movers/alternatives, generation, transmission/distribution, system stability/protection. Pre: EET 114 F

EET 393 (1-4) Practicum offers 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 studies multiple output switching functions optimization, flip-flops, registers, 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 / 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 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 484 (4) Microprocessors II / A study of a high performance microprocessor architecture. Applications of a microprocessor for monitoring and controlling systems will be studied. Pre: EET 454 or consent of instructor F


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: EET 488 F, S

EET 491 (1-4) In-Service / EES 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
Should be taken at end of junior year.
Permission required. Pre: 40 hrs EET credits or written permission from program coordinator. F, S

EET 498 (1-4) Topics
Varied topics in Electronic and Computer Engineering Technology. May be repeated as topics change.
Prerequisite: to be determined by course topic

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