Computer Engineering Technology
College of Science, Engineering & Technology
Department of Electrical and Computer Engineering and Technology
137 Trafton Science Center S • 507-389-5747
Web site: www.cset.mnsu.edu/scet
Chair: Bill Hudson, Ph.D.
Program Coordinator: Gale Allen, Ph.D.
Mark Dvorak, Ph.D.; Tom Hendrickson, Ph.D.; Han-Way Huang, Ph.D.; Bill Hudson, Ph.D.; Rajiv Kapadia, Ph.D.; Muhammad Khalig, Ph.D.; Paul Lindfors, Ph.D.; Julio Mandojana, Ph.D.; Ramakrishna Nair, Ph.D.

Computer Engineering Technology is a technological field requiring the application of scientific and engineering knowledge and methods, combined with technical skills, in support of computer activities. A computer engineering technologist is a person who is knowledgeable in computer hardware and software theory and design and who can apply them to a variety of industrial and consumer problems. Computers, controls/automation, robotics, instrumentation, and communications are just a few fields open to computer engineering technologists.

The program strives to prepare students for successful entry into the technical workforce. This means that the curriculum prepares students to:

1. Apply knowledge of mathematics, science, and computer engineering to problems.
2. Design and construct experiments and analyze and interpret the resulting data.
3. Design systems, components, or processes to meet specified needs.
4. Function effectively in teams.
5. Identify, formulate, and solve problems in computer engineering technology.
6. Understand their professional and ethical responsibilities.
7. Communicate effectively.

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.

Students who do not have the required background for MATH 115 may have to take additional preparatory coursework as well. Consult with your major adviser 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 mathematics and science courses.

COMPUTER ENGINEERING TECHNOLOGY BS
It is strongly recommended that all CET students enroll in EET 101 Introduction to EET/CET in their freshman year.

Required for Major (Communication, Mathematics and Science, 36 credits):

- **ENG 101** Composition (4)
- **ENG 271** Technical Communication (4)
- **MATH 115** Precalculus Mathematics (4)
- **MATH 121** Calculus I (4)
- **MATH 127** Calculus II for Engineering Technology: Integration (2)
- **MATH 180** Math for Computer Science (4)
- **PHYS 211** Principles of Physics I (4)
- **PHYS 212** Principles of Physics II (4)
- **SPEE 102** Public Speaking (3)

Choose one of the following:

- **STAT 154** Elementary Statistics (3)
- **MATH 354** Concepts of Probability and Statistics (3)
- **CHEM 104** Introduction to Chemistry (3)

Required for Major (COMS, 20 credits):  

- **COMS 110** Foundation of Computer Science (4)
- **COMS 211** Fundamentals of Computer Science I (4)
- **COMS 212** Fundamentals of Computer Science II (4)
- **COMS 340** Database Systems Management I (4)
- **COMS 380** Systems Analysis and Design (4)

Required for Major (EET, 46 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 400** Network Analysis (3)
- **EET 454** Microprocessors I (4)
- **EET 456** Communications I (4)
- **EET 480** Automatic Controls (3)
- **EET 484** Microprocessors II (4)
- **EET 488** Senior Project Design I (1)
- **EET 489** Senior Project Design II (2)
- **EET 497** Internship (3)

* You may substitute one EET advanced elective for internship. Permission required.

Required Minor: None.

NETWORKING EMPHASIS
Required for Emphasis (Communication, Mathematics, and Science, 36 credits):

- **CHEM 104** Introduction to Chemistry (3)
- **ENG 101** Composition (4)
- **ENG 271** Technical Communication (4)
- **MATH 115** Precalculus Mathematics (4)
- **MATH 121** Calculus I (4)
- **MATH 127** Calculus II for Engineering Technology: Integration (2)
- **MATH 180** Math for Computer Science (4)
- **PHYS 211** Principles of Physics I (4)
- **PHYS 212** Principles of Physics II (4)
- **SPEE 102** Public Speaking (3)

Required for Emphasis (COMS, 22 credits):

- **COMS 110** Foundation of Computer Science (4)
- **COMS 171** Introduction to C++ Programming (2)
- **COMS 211** Fundamentals of Computer Science I (4)
- **COMS 212** Fundamentals of Computer Science II (4)
- **COMS 340** Database Systems Management I (4)
- **COMS 380** Systems Analysis and Design (4)

Required for Emphasis (EET, 48 credits):

- **EET 113** DC Circuits (3)
- **EET 114** AC Circuits (3)
- **EET 221** Electronic CAD (3)
- **EET 222** Electronics I (4)
- **EET 225** Digital Principles (3)
- **EET 230** Microcomputer Technology (4)
- **EET 241** Electronic Shop Practices (2)
- **EET 430** Computer Networking I (4)
- **EET 431** Computer Networking II (4)
- **EET 454** Microprocessors I (4)
- **EET 456** Communications I (4)
- **EET 484** Microprocessors II (4)
- **EET 488** Senior Project Design I (1)
- **EET 489** Senior Project Design II (2)
- **EET 497** Internship (3)

* You may substitute one EET advanced elective for internship. Permission required.

Required Minor: None

POLICIES/INFORMATION
This is the first course in a two-course sequence for students who are planning to major or minor in computer science. The course emphasizes concepts needed for continuing study in computer science, the use of abstraction in program design, and advanced problem-solving skills. Programming in a high-level language is a focal point of the course. Pre: A grade of A or B in COMS 110. Coreq: MATH 121 (Calculus I). F, S

COMS 212 (4) Fundamentals of Computer Science II
This course is a continuation of 211. The course introduces students to object-oriented concepts and programming techniques. It also covers essential data structures such as linked lists, stacks, and queues, and trees. The student will be expected to produce larger applications, utilizing multiple compilation units. Pre: COMS 211 F, S

COMS 380 (4) Systems Analysis & Design
This course explores both structured as well as object oriented systems analysis and design. Use of upper and lower CASE tools are employed in the analysis, design and implementation of a team oriented term project. Pre: COMS 212 F, S
Pre: COMS 260 or 320 S

COMS 480 (4) Software Engineering
This is a course in software engineering that introduces the student to all important aspects of the discipline. The main purpose of this course is to simulate the engineering of a software product, from gathering requirements through implementation and maintenance. The course emphasizes a traditional development methodology. Students will be introduced to Visual Basic and Microsoft Project, but the emphasis of the course will be on principles of software engineering including project planning, requirements gathering, size and cost estimation, analysis, design, coding, testing, and implementation. Pre: COMS 380 F, S

Electronic Engineering Technology

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

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
Hand-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-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

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 S

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 S

EET 298 (1-4) Topics
Varied topics in Electronic and Computer Engineering Technology. May be repeated as topics change. Prerequisite: to be determined by course topic

Pre: EET 114 F

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
A continuation of EET 430. Router configurations, advanced LAN topologies, network configurations, protocols, and switching designs. Network troubleshooting and thread case studies.

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
Servomechanism analysis under transient and steady state conditions. Nega-

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 resources will be stressed. 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
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