DEPARTMENT OF ENGINEERING TECHNOLOGY & APPLIED COMPUTING

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The Department of Engineering Technology & Applied Computing offers four-year degree programs Construction Engineering Technology, Manufacturing Engineering Technology (with concentrations in Bio-Manufacturing, Design & Technical Graphics, or General), Computer Science, and Cybersecurity. In addition, the department offers a two-year (AAS) degree in Manufacturing Engineering Technology (with concentrations in General, Instrumentation and Automation, or Precise Machining). The Department works in collaboration with regional universities to provide engineering transfer programs, 2 dual degree programs in Engineering Technology and Engineering.

Engineering Technology

Engineering technology has been defined as that part of the technological field which requires the application of scientific and engineering knowledge and methods combined with technical skills in support of engineering activities; it lies in the occupational spectrum between the craftsman and the engineer at the end of the spectrum closest to the engineer.

Engineering technology is oriented less toward theory and more toward practical applications. The term "engineering technician" is applied to the graduates of associate degree programs. Graduates of baccalaureate programs are called "engineering technologists."

Transfer Programs

Pre-Engineering

The students in the pre-engineering transfer program are strongly encouraged to work with their advisor in the Department of Engineering Technology to develop a transfer plan.

The exact plan followed will depend on the specialized area (civil, chemical, mechanical, electrical, etc.) and the engineering school to which the student plans to transfer. Also, many students are not prepared for calculus their first semester and special programs must be arranged. Students will not receive a pre-engineering degree or certificate from Missouri Western State University.

Pre-Architecture

The pre-architecture transfer program is designed for students preparing themselves to transfer to a school of architecture. The students in the pre-architecture transfer program are strongly encouraged to work with their advisor in the Department of Engineering Technology to develop a transfer plan and to contact an advisor at their chosen transfer university. Students will not receive a pre-architecture degree or certificate from Missouri Western State University.

Computer Science

The Computer Science program at Missouri Western State University emphasizes applied learning and practical problem-solving to prepare students for careers in today's technology-driven workforce. Students develop competencies in programming, data structures, software development, and systems design while working with modern computing tools and platforms. Coursework is reinforced through hands-on projects, team-based assignments, and industry-relevant applications that mirror real-world challenges. Students also have opportunities to participate in internships, undergraduate research, and collaborative projects with regional employers. Graduates are prepared to enter the workforce as skilled computing professionals or continue their education in advanced areas of computer science.

Cybersecurity

The Cybersecurity program at Missouri Western State University provides an applied, practice-oriented education focused on securing systems, networks, and data. The program integrates foundational theory with hands-on laboratory experiences in network defense, ethical hacking, digital forensics, and risk management. Students engage in real-world scenarios, simulations, and team-based exercises that reflect current industry practices. Opportunities for internships, certifications, and interaction with industry professionals enhance student learning and career readiness. Graduates are equipped with the technical skills and practical experience needed to protect information systems and support organizational security needs across a wide range of industries.

Majors

- Computer Science (Bachelor of Science, B.S.) (https://catalog.missouriwestern.edu/undergraduate/business-professional-studies/engineering-technology-applied-computing/computer-science-bs/)
- Construction Engineering Technology (Bachelor of Science, B.S.) (https://catalog.missouriwestern.edu/undergraduate/business-professional-studies/engineering-technology-applied-computing/construction-engineering-technology-bs/)
- Cybersecurity (Bachelor of Science, B.S.) (https://catalog.missouriwestern.edu/undergraduate/business-professional-studies/engineering-technology-applied-computing/cybersecurity-bs/)
- Manufacturing Engineering Technology (Bachelor of Science, B.S.) (https://catalog.missouriwestern.edu/undergraduate/business-professional-studies/engineering-technology-applied-computing/manufacturing-engineering-technology-bs/)
- Manufacturing Engineering Technology (Associate of Science, A.A.S.) (https://catalog.missouriwestern.edu/undergraduate/business-professional-studies/engineering-technology-applied-computing/manufacturing-engineering-technology-aas/)

Minors

- Cognitive Science Minor (https://catalog.missouriwestern.edu/undergraduate/interdisciplinary-studies/cognitive-science-minor/)
- Computer Science Minor (https://catalog.missouriwestern.edu/undergraduate/business-professional-studies/engineering-technology-applied-computing/computer-science-minor/)
- Construction Management Minor (https://catalog.missouriwestern.edu/undergraduate/business-professional-

studies/engineering-technology-applied-computing/construction-management-minor/)

- Cybersecurity Minor (https://catalog.missouriwestern.edu/undergraduate/business-professional-studies/engineering-technology-applied-computing/cybersecurity-minor/)
- Entrepreneurship Minor (https://catalog.missouriwestern.edu/undergraduate/interdisciplinary-studies/entrepreneurship-minor/)
- Manufacturing Technology Minor (https://catalog.missouriwestern.edu/undergraduate/business-professional-studies/engineering-technology-applied-computing/manufacturing-technology-minor/)

Courses

Applications of Computer Technology (ACT)

ACT 101 Introduction to Information Technology Credits: 3
Typically Offered: Fall, Spring.
Course Description: This course introduces students to the basic concepts of information technology relevant to all applications of computing. Upon completion, students will be well prepared to use computers to solve problems in other domains and pursue more advanced studies in computer science and cybersecurity. This course will prepare students to attempt the pre-professional ITF+ certification exam from CompTIA.

ACT 102 Introduction to Web Page Development Credits: 3
Typically Offered: Fall.
Course Description: This course is an introduction to the design, creation, and maintenance of web pages and websites. Students learn how to critically evaluate website quality, create and maintain quality web pages, investigate web design standards, and create and manipulate images. The course progresses through web design tools HTML, XHTML, Cascading Style Sheets, and concludes with PHP. Each student will develop a fictitious organization website.

ACT 201 Microcomputer Applications Credits: 3
Typically Offered: Spring.
Course Description: Applications of productivity software such as Microsoft Office Word, Excel, Access, and PowerPoint for careers, school, and home. Impact of technology on society by computer information systems, networks, e-commerce, and the Internet is included. Previous computer experience recommended.

ACT 211 Internet Scripting Credits: 3
Typically Offered: Departmental Discretion.
Course Description: This course covers basic internet scripting technologies such as PHP, JavaScript, and ASP. **Prerequisite(s):** A grade of C or higher in ACT 102 and CSC 184.

ACT 301 Applied Database Systems Credits: 3
Typically Offered: Spring.
Course Description: Emphasis is placed upon the core concepts of relational database application development. Students will gain proficiency in Microsoft Access; the concepts learned will allow the students to apply database application development concepts to a real world type application. **Prerequisite(s):** A grade of C or higher in ACT 201 or credit or concurrent enrollment in CSC 184 or CSC 187.

ACT 302 Data Analytics Credits: 3
Typically Offered: Departmental Discretion.
Course Description: Introduction to the application of statistics and algorithms to finding patterns in data sets and building predictive models. Fundamental algorithms for performing descriptive and predictive analytics will be studied along with techniques for judging the utility of models and datasets. Students will gain experience with advanced features of spreadsheet software and specialized statistical software packages for data analysis. 3 hours, offered in Spring semesters. **Prerequisite(s):** A grade of C or higher in CSC 184, ACT 201, or GBA 201 and a grade of C or higher in MAT 111, MAT 111E, GBA 210, or PSY 300.

ACT 311 Web Development Tools Credits: 3
Typically Offered: Departmental Discretion.
Course Description: This course uses Adobe Design Suite tools to lead the student through the process of web-application development. Students will gain knowledge and hands-on practice in building and maintaining web applications using Dreamweaver, Flash, and Photoshop. Students will use Java, PHP and MySql to interact with external databases. **Prerequisite(s):** A grade of C or higher in ACT 211.

ACT 405 Business Intelligence Credits: 3
Typically Offered: Departmental Discretion.
Course Description: Students learn how to make better business decisions, use fewer resources, and improve the company's bottom line by developing and using a data warehouse. This course provides an overview of business intelligence and data warehousing and gives students a look at all the major facets of developing and using a data warehouse to make effective business decisions. **Prerequisite(s):** A grade of C or higher in CSC 305.

ACT 476 Applications of Computer Information Sciences Capstone Credits: 3
Typically Offered: Departmental Discretion.
Course Description: The capstone course will encompass and consolidate all of the concepts covered in the ACT curriculum. In this course, students will manage an Information Systems project, design an appropriate database and incorporate both LAN and Web-based distributed information solutions to support a business process, effectively document the system and incorporate elements of the general education into a successfully implemented information systems solution. **Prerequisite(s):** A grade of C or higher in CSC 400.

ACT 490 Information Technology Career Preparation Credits: 1
Typically Offered: Departmental Discretion.
Course Description: In this course students will begin applying their MWSU education towards building a career in IT. Students will learn how to navigate a career path in IT, explore alternative career paths, and explore opportunities for continuing education and professional development. Students will develop application materials and attempt entrance, exit, and / or certification exams in preparation for graduation, applying to jobs, and applying to graduate schools. **Prerequisite(s):** Senior status and a declared major in ACT.

Construction Engineering Technology (CET)

CET 101 Construction Industry Introduction Credits: 3
Typically Offered: Fall, Spring.
Course Description: This foundational course introduces students to the diverse construction industry. Topics include various business sectors and companies, project and contract delivery methods, and the roles of key stakeholders such as owners, contractors, and engineers. Students will learn essential construction terminology and processes involved in managing construction projects. The course highlights the importance of reading and interpreting working drawings and construction documents, utilizing computer technologies, and understanding legal and safety requirements. By the end of the course, students will have a comprehensive overview of career opportunities in construction and the skills necessary for success in the field.

CET 105 Construction Materials Credits: 3
Typically Offered: Fall.
Course Description: Introductory study of materials used in the construction industry. Materials are studied with regard to properties of their substances and utilization in construction.

CET 202 Surveying I Credits: 3
Typically Offered: Fall.
Course Description: Introduction to the basic principles of plane surveying with applications to engineering and construction problems; uses laboratory periods for in-the-field applications of introductory surveying techniques. Relevant computer software will be used. Two hours lecture, three hours lab. **Prerequisite(s):** Credit or concurrent enrollment in both MAT 116 and MAT 119.

CET 250 Introduction to Statics, Strength of Materials and Structures Credits: 4
Typically Offered: Spring.
Course Description: Studies fundamentals of statics and mechanics of materials as they apply to construction processes such as statics equilibrium, axial, torsional, bending, and stress and strain analysis. Introduction to various methods used in analysis of structures such as beams, trusses and frames will be included. Three hours lecture, three hours lab. **Prerequisite(s):** MAT 116 and MAT 119.

CET 252 Advanced Surveying Credits: 3
Typically Offered: Spring.
Course Description: Intermediate and advanced surveying techniques and procedures with applications to engineering and construction problems; includes mapping, hydrography, and photogrammetry; promotes in-the-field application of techniques. **Prerequisite(s):** CET 202 and credit or concurrent enrollment in EGT 205.

CET 254 Construction Methods and Equipment Credits: 4
Typically Offered: Spring.
Course Description: Introduction to the basic knowledge and skills of methods of building construction including foundation, structural framing, floor, roof, and wall systems; to the acquisition, selection, and use of construction equipment; and to the reading of construction blueprint drawings and specifications. Three hours lecture, three hours lab. **Prerequisite(s):** CET 105.

CET 255 Legal Aspects of Boundary Surveying Credits: 3
Typically Offered: Fall.
Course Description: Includes preparation of plats and writing of property descriptions referenced to Public Land Surveys of Subdivision of Townships and Sections. Discusses surveying and land right terminology as well as resurveying, retracing, restoration, monumentation and dedication. Also studies selected case law. Computer programs and field trips will be utilized. **Prerequisite(s):** Credit or concurrent enrollment in CET 202.

CET 256 Bituminous, Concrete and Soils Credits: 3
Typically Offered: Spring.
Course Description: Studies the properties and engineering applications of prime materials used in structural and roadway construction, including classification, basic quality control, and construction practices used with respect to asphalt, concrete, and soils. Two hours lecture, three hours lab. **Prerequisite(s):** CET 105.

CET 260 Mechanics of Materials Credits: 4
Typically Offered: Spring.
Course Description: Axial, torsional, bending, and combined stress and strain analysis; mechanical properties and applications for static, fatigue, creep, and impact conditions; emphasizes beam stresses and deflections, columns, and riveted and welded connections. There will be specific emphasis on quality and accuracy for reports and assignments. Three hours lecture, three hours lab. **Prerequisite(s):** EGT 260.

CET 265 Subdivision Planning and Layout Credits: 3
Typically Offered: Spring.
Course Description: Platting of boundaries, topographic layout, planning and layout for streets, sewers and water lines. Building site surveys. **Prerequisite(s):** CET 202.

CET 270 Electrical Installations Credits: 3
Typically Offered: Spring.
Course Description: Studies of DC circuits and electrical components, including conductors, insulators, resistors, inductors, capacitors, switches, voltage and current sources. Fundamentals of AC circuits, motors and generators, three-phase industrial power, power generation, distribution, transmission, and transformers. Includes laboratory sessions to demonstrate and reinforce understanding of these topics. Two hours lecture, three hours lab. **Prerequisite(s):** CET 105 or EGT 220.

CET 290 Construction Technology Internship Credits: 1-3
Typically Offered: Fall, Spring, Summer.
Course Description: Intended for students working full-time or part-time for a company in a job related to their major, which reinforces and extends knowledge and skills. Requires periodic progress reports, supervisor evaluation and a formal final report addressing the experience and the educational benefits derived. **Prerequisite(s):** Departmental approval.

CET 302 Electronic Surveying Credits: 4
Typically Offered: Spring.
Course Description: Land surveying work utilizing electronic surveying equipment including but not limited to: total station with data collector, topographic surveying utilizing data collection down-loaded into software program utilizing AutoCAD for topographic contouring, utilization of collected data for microstation mapping, utilization of GPS equipment for traversing and also techniques of GIS mapping. **Prerequisite(s):** CET 202 and credit or concurrent enrollment in EGT 205.

CET 308 Analysis of Structures Credits: 3
Typically Offered: Fall.
Course Description: Introduction to various methods used in the analysis of statically determinate and indeterminate structures. Load path, load tracing, and code provisions are discussed. Three hours lecture. **Prerequisite(s):** CET 260 or MET 260 and MAT 147.

CET 310 Construction Contract Documents Credits: 3
Typically Offered: Spring.
Course Description: Interpretation of construction drawings; architectural, structural, mechanical, electrical and landscaping documents; development, interpretation and implementation of specifications and other construction documents. **Prerequisite(s):** CET 105.

CET 315 Mechanical Systems Credits: 3
Typically Offered: Fall.
Course Description: Principles of water supply and treatment, plumbing, sanitation systems, heating, ventilation and air conditioning. Two hours lecture, three hours lab. **Prerequisite(s):** CET 105.

CET 351 Construction Estimating I Credits: 3
Typically Offered: Spring.
Course Description: An introduction to estimating techniques in construction projects. The course will focus on quantity take-offs such as earthwork, concrete, masonry, metals, woods, finishes, thermal and moisture protection, HVAC, and electrical. Includes overview of the estimating and bidding process, estimate development, labor rates, material pricing, and errors in estimates. Includes computer applications and ethical issues in bidding. Two hours lecture, three hours lab. **Prerequisite(s):** CET 105 and EGT 205.

CET 358 Structural Steel and Wood Design Credits: 3
Typically Offered: Fall.
Course Description: Introduction to elementary structural steel and wood design; design of individual members and their connections as dictated by various specifications (AISC, AITC, AASHTO, etc.). Includes computer techniques in the areas of structural analysis/design. **Prerequisite(s):** CET 308.

CET 362 Construction Safety Credits: 3
Typically Offered: Fall.
Course Description: Review of existing safety requirements pertaining to Construction and Industrial Works, and discusses practices utilized to comply with these regulations. All OSHA regulations pertaining to construction as well as CFR documents are discussed. **Prerequisite(s):** CET 105.

CET 390 Technological Projects Credits: 1-3
Typically Offered: Fall, Spring, Summer.
Course Description: Intended for the advanced student whose project would enrich the educational experience. Approval by the Department Chairperson is required at least two weeks before the end of the previous term. May be taken for up to 4 credit hours.

CET 408 Design of Concrete and Masonry Structures Credits: 3
Typically Offered: Spring.
Course Description: Introduction to the design of reinforced concrete and masonry structures. Designs are based on the current ACI codes. Class assignments or projects will require integration, knowledge from preceding courses and application of problem-solving skills acquired throughout the entire curriculum. **Prerequisite(s):** CET 308.

CET 451 Advanced Construction Estimating and Bidding Credits: 2
Typically Offered: Fall.
Course Description: Advanced study of estimating and bidding procedures for construction projects. Includes unit price estimating, conceptual estimating, lump sum estimating, detailed estimating, production rates, subcontract pricing, overhead allocation, markups, bidding strategies, and presentation of the bid. Use of computer software and research skills for continuous improvement. One hour lecture, three hours lab. **Prerequisite(s):** CET 254 and CET 351.

CET 458 Soil Mechanics and Foundations Credits: 3
Typically Offered: Fall.
Course Description: Studies advanced topics in the properties of soils with applications in civil engineering design and construction. Class assignments or projects will require integration, knowledge from preceding courses and application of problem-solving skills acquired throughout the entire curriculum. Two hours lecture, three hours lab. **Prerequisite(s):** CET 256 and CET 260.

CET 480 Construction Planning and Scheduling Credits: 3
Typically Offered: Spring.
Course Description: Principles and techniques used to plan construction and schedule project activities. Networks, bar charts, computer techniques, productivity, construction time and cost parameters. Cash flow analysis, resource planning and control, and preparation of cost-to-complete reports will be discussed. Class assignments or projects will require integration, knowledge from preceding courses and application of problem-solving skills acquired throughout the entire curriculum. **Prerequisite(s):** CET 451.

CET 484 Construction Management Credits: 3
Typically Offered: Fall.
Course Description: Comprehensive study of construction management principles and professional practice integrating project organization, contracts, procurement, planning and scheduling, cost control, safety, quality control, resource allocation, and risk management. Emphasis is placed on the roles and responsibilities of the contractor, superintendent, owner, designer, and inspector throughout the project lifecycle. Students complete a senior capstone project applying construction design, methods, cost analysis, specifications, contracts, and computer-based planning and control tools. **Prerequisite(s):** CET 480, EGT 350, and EGT 370.

CET 485 Selected Topics in Construction Credits: 3
Typically Offered: Spring.
Course Description: Study of selected topics, such as underground construction, underpinning, formwork and other project support requirements; evaluation and review of current practices in construction. The course includes study and research in a specific area that combines major elements from previous construction engineering technology courses culminating in an integrating experience through individual and/or group projects, technical reports and presentations. **Prerequisite(s):** CET 105 and CET 254.

CET 488 Construction Contracts Administration Credits: 3
Typically Offered: Spring.
Course Description: Emphasis is given to the interpretation and preparation of construction project documents. Subjects such as contract agreement, breach of contract, termination of agreements, materials specifications, workmanship specifications, general conditions, insurance, bonds, arbitration, labor law, disadvantaged business requirements, and cases related to finance are discussed. **Prerequisite(s):** CET 484.

CET 490 Building Codes, Standards, and Practices Credits: 3
Typically Offered: Departmental Discretion.
Course Description: Emphasis on content of the four main U.S. Building Codes and the interpretation of these codes from the contractors perspective. Also covers code enforcement procedures used by administration offices of municipal governments. Class exercises involve the review of plans and specifications to determine code compliance. **Prerequisite(s):** CET 451 and CET 480.

CET 492 Computer Tools for Construction Credits: 3
Typically Offered: Fall.
Course Description: This course equips students with the skills to leverage computer tools for solving practical challenges in the construction industry. Key topics include computer-integrated quantity takeoff, scheduling, supply chain management, process monitoring and control, and payment tracking. The weekly lecture introduces essential theoretical concepts, providing a foundation in the principles of construction management technologies. In the lab sessions, students will apply these concepts using industry-standard software, gaining hands-on experience with real-world scenarios. By the end of the course, students will be proficient in utilizing computer tools to optimize construction processes and improve project efficiency. Must be taken concurrently with CET 480.

Computer Science (CSC)

CSC 184 Introduction to Computer Programming Credits: 3
Typically Offered: Fall.
Course Description: Introduction to problem solving utilizing the Python programming language. Topics include algorithm and program development, syntax of Python, file input/output, variables, program control structures, functions, and collections. **Prerequisite(s):** Credit or concurrent enrollment in ACT 101.

CSC 187 Java Programming Fundamentals Credits: 3
Typically Offered: Fall, Spring.
Course Description: Introduction to problem solving utilizing the Java programming language. Topics include algorithm and program development, syntax of Java, input/output, assignment operations, program control structures, character data manipulation, functions, and single dimension arrays. Emphasis is placed on program design techniques and program modularity. **Prerequisite(s):** An ACT math sub score of 22 or higher, a sufficient score on the math placement exam, or a grade of C or higher in either ACT 101 or a general studies math course.

CSC 208 Discrete Structures I Credits: 3
Typically Offered: Spring.
Course Description: This course is a study of mathematical reasoning including the nature and methods of proof, relations and functions, combinatorics and graph theory, Boolean algebra, and applications of these topics. Attention will be given to the direct applications to computer science. **Prerequisite(s):** CSC 187, MAT 147, or MAT 167.

CSC 245 Enterprise Systems Computing: COBOL I Credits: 3
Typically Offered: Departmental Discretion.
Course Description: This course explores the structure of the COBOL programming language, to include basic syntax, flow control, record and memory structures, input/output and report writing. A real-world enterprise system environment will be used to provide exposure to JCL and various tools that support business processes and information flow. **Prerequisite(s):** A grade of C or higher in CSC 254.

CSC 246 Programming Languages and Paradigms Credits: 3
Typically Offered: Fall.
Course Description: This course explores major programming paradigms (including the functional, object-oriented, and logic programming paradigms) and principles of the design of programming languages. Students will learn to adapt quickly to new programming languages, select appropriate programming languages for projects, compare and contrast languages, and make the best use of features of languages they have learned. **Prerequisite(s):** A grade of C or higher in CSC 254.

CSC 254 Object Oriented Programming Credits: 3
Typically Offered: Fall, Spring.
Course Description: This course is a continuation of CSC 187 and introduces the Java programming language. Java is used to introduce Object Oriented Programming concepts including data abstraction, classes, inheritance, and polymorphism. Other programming topics covered include multidimensional arrays and array processing, elementary sorting and searching techniques, dynamic memory allocation, linked lists, and GUI interface creating. **Prerequisite(s):** A grade of C or higher in CSC 187.

CSC 264 Computer Architecture and Assembly Language Programming Credits: 3
Typically Offered: Fall.
Course Description: This course is an investigation of the logical basis of computers at the machine language level. Machine representation of numbers and characters, instruction formats, machine operations, addressing techniques, and assembly level programming techniques will be covered. **Prerequisite(s):** A grade of C or higher in CSC 184 or CSC 187.

CSC 274 Introduction to Unix/Linux Credits: 3
Typically Offered: Fall.
Course Description: An introductory course on UNIX/Linux and its applications. Topics covered include: basic commands, connecting to remote machines, basic system structures, system tools, output redirection, command line text editing, file system basics, security basics, and basic shell scripting. The course material is intended to prepare students for versatile use of any UNIX/Linux system and as a foundation for numerous UNIX/Linux certification programs. **Prerequisite(s):** Previous computer experience recommended.

CSC 283 Introduction to Research Methods in Computer Science Credits: 1-2
Typically Offered: Departmental Discretion.
Course Description: Introduction to basic research methods in Computer Science. Individual and team projects involving methods for solving computer science-related research problems. May be taken for up to 2 credit hours. **Prerequisite(s):** Departmental approval.

CSC 285 Data Structures Credits: 3
Typically Offered: Fall.
Course Description: Topics include algorithm analysis and the implementation of stacks, queues, linked lists, trees, and other data structures. Principles of data abstraction are emphasized throughout the course. **Prerequisite(s):** A grade of C or higher in both CSC 254 and MAT 112, MAT 116, or higher.

CSC 289 Computational Methods for Computer Science Credits: 3
Typically Offered: Fall.
Course Description: This course provides the underlying mathematical foundations and applied algorithms that are used across the basic fields in Computer Science. The course will focus on the computational algorithms in the fields of semantic search, data encryption and computer security, computer graphics, gaming and simulation. Further the course will consider the impact/computational limitations of current hardware on the application of these algorithms. **Prerequisite(s):** A grade of C or higher in CSC 254.

CSC 294 Networking and Telecommunications Credits: 3
Typically Offered: Fall.
Course Description: An examination of current computer communication technologies and their protocol structures as applied to computer networks and telecommunication systems. Topics include the physical layers, architectural elements, and information layers of a communication network; protocols; switching; routing; LANs; and WANs. **Prerequisite(s):** Credit or concurrent enrollment in CSC 184 or CSC 187.

CSC 305 Database Architecture and Concepts Credits: 3
Typically Offered: Spring.
Course Description: An introduction to Database Concepts and Architecture, with an emphasis on the Relational Database Model. **Prerequisite(s):** A grade of C or higher in ACT 301.

CSC 318 Simulation and Modeling Credits: 3
Typically Offered: Spring.
Course Description: An introduction to computerized simulations. Focus is on the architecture and development of time-step and event-sequenced models used extensively by industry and government. Other topics include process generators for random events, the development of computerized games for management training, and current simulation research. **Prerequisite(s):** A grade of C or higher in CSC 285.

CSC 324 Software Testing and DevOps Credits: 3
Typically Offered: Spring.
Course Description: This course covers fundamentals of software testing and DevOps important to software developers, system administrators, and quality assurance / software testing engineers. A vendor neutral approach will be taken, focusing on popular open source tools for unit testing, integration testing, system testing, version control, build automation, configuration management, virtualization, continuous integration, and deployment management. Relevant software development principles and philosophies such as test-driven development and agile software development will also be discussed. **Prerequisite(s):** A grade of C or higher in CSC 187 and CSC 274.

CSC 328 Computer Graphics Credits: 3
Typically Offered: Fall.
Course Description: A course in the techniques for picture transformation, curve and surface approximation; study and implementation of graphical languages and data structure; organization of graphical systems; use of the microcomputer as tools for displaying graphical data. **Prerequisite(s):** A grade of C or higher in CSC 285.

CSC 345 Enterprise Systems Computing: COBOL II Credits: 3
Typically Offered: Departmental Discretion.
Course Description: This course explores the advanced features of COBOL, to include validation and exception handling, table control processing, sorting, master/transaction indexed file processing and management of large-scale software development. Students will continue using a real-world enterprise system environment to integrate their business driven software packages. This is a continuation of CSC 245. **Prerequisite(s):** A grade of C or higher in CSC 245.

CSC 346 Enterprise Systems with Java Credits: 3
Typically Offered: Spring.
Course Description: This course covers the front and back end development of large software systems. The course includes data exchange and the use of APIs. Use of frameworks and professional development tools is emphasized. **Prerequisite(s):** ACT 301 with a grade of C or higher and either ACT 211 or CSC 254 with a grade of C or higher.

CSC 374 UNIX/Linux System Administration Credits: 3
Typically Offered: Spring (odd-numbered years).
Course Description: This course covers the essential skills needed to administer a mainstream linux distribution such as Fedora, Ubuntu, SUSE, etc. The key topics include hardware and system configuration, system operation and maintenance, security, troubleshooting and diagnostics, automation and scripting. **Prerequisite(s):** CSC 274.

CSC 386 Operating Systems Concepts Credits: 3
Typically Offered: Spring.
Course Description: This course is an introduction to operating system principles. Students will become familiar with the function and implementation of modern operating systems from the perspectives of a user, designer, and developer. Topics include user interfaces, programming interfaces, system resource management, multiprocessing, concurrent programming, and system security. **Prerequisite(s):** CSC 264 and a grade of C or higher in CSC 274.

CSC 400 Systems Analysis and Design Credits: 3
Typically Offered: Fall.
Course Description: Study of structured systems development. Emphasis on strategies and techniques of structured analysis and object oriented design for producing logical methodologies for dealing with the development of information systems. **Prerequisite(s):** Credit or concurrent enrollment in CSC 305.

CSC 406 Object Oriented Applications and Program Development Credits: 3
Typically Offered: Spring.
Course Description: This course emphasizes the application of Object Oriented Programming (OOP) concepts in the java programming language to large-scale programming problems. The course includes application of techniques such as the Unified Modeling Language (UML). **Prerequisite(s):** A grade of C or higher in CSC 285 and credit or concurrent enrollment in CSC 305.

CSC 410 Network Security Technologies Credits: 3
Typically Offered: Departmental Discretion.
Course Description: This course covers various facets of network security and the tools that are available to secure and monitor networks. Topics include commercial and open source security tools, public-key cryptography, firewalls, authentication, intrusion detection, control of malicious code, OS hardening fundamentals, and security assessment. **Prerequisite(s):** A grade of C or higher in CSC 294.

CSC 445 Mobile Device Application Development Credits: 3
Typically Offered: Departmental Discretion.
Course Description: This course focuses on developing applications for modern Smartphone operating systems. Most of the course is dedicated to some specific mobile device OS at the discretion of the instructor. Rapid application development techniques are covered, as well as setup of the development environment, real-world testing, and deployment. **Prerequisite(s):** A grade of C or higher in CSC 254.

CSC 450 Independent Research/Project Credits: 1-3
Typically Offered: Fall, Spring.
Course Description: Investigation of a research problem, project, or topic on an individual conference basis. May be repeated for credit. **Prerequisite(s):** Minimum of 2.5 GPA in major field and departmental approval.

CSC 451 Internship in Computer Science Credits: 1-3
Typically Offered: Fall, Spring, Summer.
Course Description: An academic program which offers Computer Science majors an opportunity to integrate theory with practice. Students work full-time or part-time for a company in a position related to the Computer Science major. Anticipated learning objectives are established in a contract agreed to by the student, the company supervisor, and the departmental faculty sponsor. May be repeated for credit, but at most 3 hours may count towards the total number of hours required for the major. **Prerequisite(s):** Declared Computer Science or Computer Information Systems major or declared CIS minor, a minimum of 2.5 GPA, and permission of the faculty sponsor.

CSC 452 Professional Certification in Computing Credits: 3
Typically Offered: Departmental Discretion.
Course Description: This course provides an opportunity for students to prepare for a professional certification exam at the intermediate and advanced levels while being tutored by a faculty member holding the certification they are seeking. Students will meet individually with their instructor to develop a study plan, review study materials, and make other preparations for the exam. May be taken up to two times for credit.

CSC 475 Advanced Topics in Computer Science Credits: 3
Typically Offered: Departmental Discretion.
Course Description: Selected advanced topics in computer science. May be repeated for credit. **Prerequisite(s):** Departmental approval.

CSC 484 Compiler Theory Credits: 3
Typically Offered: Departmental Discretion.
Course Description: An introduction to the basic structures of compilers and their design. Course topics include computer language structure, translation/recognition techniques of lexical analysis, parsing and syntax-directed translation. The course will also consider the impact of run-time environments on the design of computer languages and the constraints of code optimization on code generation. A small compiler will be developed. **Prerequisite(s):** A grade of C or higher in CSC 264.

CSC 487 Digital Animation and Production Credits: 3
Typically Offered: Fall (even-numbered years).
Course Description: This class will concentrate on the methods used to build digital animated characters. Subjects will include character design and development, animation of characters, lighting, camera shots, sound and production editing. **Prerequisite(s):** Junior standing and declared Computer Information Systems, Computer Science, or Communication Studies and Theatre major.

CSC 490 CS Career Preparation Credits: 1
Typically Offered: Fall.
Course Description: In this course students will begin applying their MWSU education towards building a career in CS. Students will learn how to navigate a career path in CS, explore alternative career paths, and explore opportunities for continuing education and professional development. Students will develop application materials and attempt entrance, exit, and / or certification exams in preparation for graduation, applying to jobs, and applying to graduate schools. Graded pass/fail. **Prerequisite(s):** Senior status and a declared major in CSC.

Cybersecurity (SEC)

SEC 100 Introduction to Cybersecurity Credits: 3
Typically Offered: Spring (odd-numbered years).
Course Description: This course covers the fundamental issues and principles of computer-and-network security through studying theory and through hands-on assignments and lab exercises. The course will look at the capabilities of modern cryptographic systems and the NIST Cybersecurity Framework. Students will learn how to secure a computer, or a network, by analyzing its security requirements and applying common techniques to enforce them. **Prerequisite(s):** ACT 101.

SEC 200 Computer Hardware and Peripherals Credits: 3
Typically Offered: Fall (odd-numbered years).
Course Description: This course explores the fundamentals of computer hardware, including processors, memory storage devices, and input/output peripherals. Students will be introduced to basic skills required to troubleshoot, maintain, and repair computes. Emphasis will be placed on selecting, assembling, and maintaining computer systems and peripherals.

SEC 260 Introduction to Digital Forensics Credits: 3
Typically Offered: Spring (even-numbered years).
Course Description: An overview of digital forensics and computer-related issues facing government and businesses. Specific focus on forensic examinations and methodologies used in the field. Students will also explore the legal, ethical, and technical challenges involved in collecting and preserving digital evidence. **Prerequisite(s):** SEC 100.

SEC 305 Applied Cryptography Credits: 3
Typically Offered: Fall (even-numbered years).
Course Description: This course provides students with a comprehensive understanding of cryptographic algorithms, protocols, and techniques essential for securing modern applications. It emphasizes both foundational concepts and recent advancements in applied cryptography, equipping students to design, implement, and apply cryptographic solutions effectively in real-world scenarios. The curriculum focuses on both theoretical principles and practical implementations critical to security-critical systems. **Prerequisite(s):** CSC 386 and a grade of C or higher in MAT 110/110E or higher MAT class.

SEC 310 Securing and Defending Networks Credits: 3
Typically Offered: Fall (even-numbered years).
Course Description: In this course, students will master their skills in securing an endpoint, which can be a computer or an IoT device, through hardening its software components, physical/software interfaces, and the networks and endpoints will be discussed together with the threats that exploit those vulnerabilities, the attach vectors for various hardware and software components, and countermeasures that thwart the attacks. Students will also learn about documenting for the purpose of securing computer systems and networks. **Prerequisite(s):** SEC 100.

SEC 325 Cybercrime Credits: 3
Typically Offered: Fall (odd-numbered years).
Course Description: This course explores cybercrime and computer intrusions, focusing on prevention, detection, and investigation, particularly in workplace settings. Students will study crimes like hacking, fraud, and identity theft while gaining hands-on experience with forensic tools, digital evidence collection, and OSINT techniques. The course prepares students to handle incidents, mitigate risks, and secure critical assets, equipping them for careers in cybersecurity, forensics, or corporate security. **Prerequisite(s):** SEC 310.

SEC 335 Network and Endpoint Security I Credits: 3
Typically Offered: Departmental Discretion.
Course Description: This course will introduce students to system security in terms of securing software components, physical/software interfaces, and networks. Vulnerabilities of common network protocols, threats that exploit those vulnerabilities, and attack models will be discussed. Students will learn about the basics of software security, software vulnerabilities, and cloud administration. Students will learn the underlying security theory and will gain hands on experience through lab exercises. **Prerequisite(s):** SEC 100.

SEC 350 Emerging Technologies in Cybesecurity Credits: 3
Typically Offered: Spring (odd-numbered years).
Course Description: This course focuses on how organizations adopt new technologies, preparing for associated risks and challenges. Students will compare evolving technologies to address an organization's security needs and explore the principles necessary for secure network operations. By the end of the course, students will understand the strategies required to implement new technologies while maintaining robust cybersecurity practices. **Prerequisite(s):** SEC 100.

SEC 360 Laws and Ethics in Cybersecurity and AI Credits: 3
Typically Offered: Spring (even-numbered years).
Course Description: This course explores the legal frameworks and ethical considerations surrounding cybersecurity and emerging technologies, with a focus on AI. Students will examine privacy laws, cybercrime regulations, and compliance standards while addressing the ethical challenges involved in data protection and surveillance. Topics include the role of AI in cybersecurity, ethical dilemmas such as bias and accountability, and the application of frameworks like the trolley problem to real-world scenarios. Through case studies and hands-on projects, students will develop the skills to navigate complex legal landscapes and make informed, ethical security decisions. **Prerequisite(s):** SEC 100.

SEC 380 Critical Infrastructure Threats and Security Credits: 3
Typically Offered: Spring (odd-numbered years).
Course Description: This course examines major threats, protection strategies, and technologies related to critical infrastructure sectors, including telecommunications, energy, banking and finance, transportation, supply chains, industrial control systems (ICS), operational technology (OT), and emergency services. Emphasis is placed on identifying vulnerabilities and implementing security measures to safeguard essential services. **Prerequisite(s):** SEC 100.

SEC 400 Cyber Investigations Credits: 3
Typically Offered: Spring (even-numbered years).
Course Description: This course presents students with concepts and processes required to develop and execute an incident response and forensic investigation plan. The student will experiment with basic understanding of incident response capabilities, evidence handling procedures, and remediation. Students will test security tools and technologies through hands-on practical exercises and research presentations. This course builds foundational knowledge for incident response and network forensics practitioners. **Prerequisite(s):** SEC 310.

SEC 415 Data Security and Identity Management Credits: 3
Typically Offered: Departmental Discretion.
Course Description: This course will cover techniques used to protect data from unauthorized access or corruption, and techniques used to identify, authenticate, and authorize individuals or groups to access protected resources. Students will work with open-source tools for cryptography and identity management. **Prerequisite(s):** SEC 100.

SEC 425 Ethical Hacking Credits: 3
Typically Offered: Spring (odd-numbered years).
Course Description: This course will cover how to identify different vulnerabilities from an attacker's point of view, what they might do with these vulnerabilities, and what measures you can take to mitigate these risks. Students will gain practical skills through red-team exercises and penetration labs. **Prerequisite(s):** SEC 310.

SEC 435 Network and Endpoint Security II Credits: 3
Typically Offered: Departmental Discretion.
Course Description: In this course, students will master their skills in securing an endpoint, which can be a computer or an IoT device, through hardening its software components, physical/software interfaces, and the networks and endpoints will be discussed together with the threats that exploit those vulnerabilities, the attach vectors for various hardware and software components, and countermeasures that thwart the attacks. Students will also learn about documenting for the purpose of securing computer systems and networks. **Prerequisite(s):** SEC 335.

SEC 445 Security Program Governance Credits: 3
Typically Offered: Fall (odd-numbered years).
Course Description: This course introduces the development and management of cybersecurity programs within organizations. Governance frameworks and regulations will be studied through development of policy, implementation of controls and audits, analysis of risks, and response to simulated incidents. Students will gain skill with management tools, analyze security concerns with employees and vendors, and implement communication strategies with a variety of stakeholders. **Prerequisite(s):** SEC 100.

SEC 450 Independent Research/Project Credits: 1-3
Typically Offered: Departmental Discretion.
Course Description: Investigation of a research problem, project, or topic on an individual conference basis. May be repeated for credit.

SEC 455 Cyberlaw and Investigations Credits: 3
Typically Offered: Departmental Discretion.
Course Description: This course introduces the US and international laws on cybersecurity, including law related to privacy, data security, crime, and intellectual property. Students will also explore the implications of culture and international agreements on policy and critical infrastructure. Students will learn the essentials of computer investigations through the application of forensic tools. **Prerequisite(s):** SEC 100.

SEC 490 Cybersecurity Career Preparation Credits: 1
Typically Offered: Fall (even-numbered years).
Course Description: In this course students will begin applying their MWSU education towards building a career in Cybersecurity. Students will learn how to navigate a career path in IT, explore alternative career paths, and explore opportunities for continuing education and professional development. Students will develop application materials and attempt entrance, exit, and/or certification exams in preparation for graduation, applying to jobs, and applying to graduate schools. **Prerequisite(s):** Admission to the Cybersecurity program.

SEC 495 Cybersecurity Capstone Credits: 3
Typically Offered: Spring (even-numbered years).
Course Description: This is the capstone course for the Cybersecurity degree students. The capstone course is used to research, document and implement current and advanced IT topics using knowledge and skills developed from networking courses. **Prerequisite(s):** Credit or concurrent enrollment in SEC 490.

Engineering Technology (EGT)

EGT 101 Manufacturing Industry Introduction Credits: 3
Typically Offered: Fall, Spring.
Course Description: This course provides a comprehensive introduction to the manufacturing industry, exploring a variety of career paths and opportunities within the field. Students will gain insights into different manufacturing sectors, company types, and project structures. The course covers various manufacturing systems and the application of engineering principles to improve processes by reducing cycle times, maintaining quality, enhancing safety, and controlling costs. Through an understanding of the roles and responsibilities of key participants in manufacturing projects, students will develop foundational knowledge essential for a successful career in manufacturing. This course is ideal for anyone aspiring to enter the manufacturing industry.

EGT 102 Programming for Engineering Technology Credits: 3
Typically Offered: Fall, Spring.
Course Description: Fundamental concepts about computers and approaches to computer programming including top-down design, selection control structures (if else, switch statements), repetition control structures (while, for, and do while loops), simple data types, arrays, strings, etc. Study of selected computer programming language.

EGT 103 Electronics Engineering Technology Fundamentals Credits: 1
Typically Offered: Fall, Spring.
Course Description: Introduction to electronics engineering technology concepts, OSHA safety, ethics, and career potentials. Study of teamwork, diversity and globalization, quality, timeliness, continuous improvement and lifelong learning.

EGT 105 Introduction to Architecture Credits: 3
Typically Offered: Fall, Spring.
Course Description: This course introduces to the student and understanding and appreciation of architecture and human built environment through a broad examination of cultural and aesthetic paradigms. The student will be informed of the historic legacy and value of architecture; how it impacts society today and daily lives. Three hours lecture.

EGT 110 ET Fundamentals and Critical Thinking Credits: 3
Typically Offered: Fall.
Course Description: Introduction to engineering technology concepts, ethics, career potentials, and critical thinking. Study of teamwork, diversity and globalization, quality, timeliness, continuous improvement and lifelong learning, methodology of critical thinking and required mathematics and physics knowledge. Three hours lecture.

EGT 205 Computer-Aided Drafting I Credits: 3
Typically Offered: Fall, Spring.
Course Description: Techniques in drafting with computer applications. Students will use a CAD software to produce mechanical, electrical and/or architectural drawings and will explore other software with their applications. The emphasis is on orthographic projections, sections, auxiliary views, dimensioning, component libraries and the applications of drafting using descriptive geometry. Two hours lecture, three hours lab.

EGT 215 Computer-Aided Drafting II Credits: 3
Typically Offered: Fall, Spring.
Course Description: Advanced techniques in drafting with computer applications. Students expand their drafting skills by creating computer generated multi-detailed drawings using 3-D techniques. Architectural, structural, mechanical, and/or electrical applications will be discussed with emphasis in detailing, tolerances, and symbol libraries. Importing/exporting of files, customizing the CAD software, and productivity techniques will be used. Principles of drawing for residential structures using various construction materials and methods will be included. Two hours lecture, three hours lab. **Prerequisite(s):** EGT 205.

EGT 220 Engineering Materials Credits: 3
Typically Offered: Fall.
Course Description: An introduction to the relationship between structure, processing and properties of materials; including atomic structure, strain hardening and annealing, solidification, ferrous and non-ferrous alloys, ceramic materials, polymers, composite materials, behavior of materials, and protection against deterioration of materials.

EGT 225 Computer-Aided Manufacturing Credits: 3
Typically Offered: Spring.
Course Description: Application of computer assistance in manufacturing process; machine process control, inventory and material handling, robotics and automated assembly, product design and part grouping in relation to total manufacturing operation. **Prerequisite(s):** EGT 215.

EGT 260 Statics Credits: 3
Typically Offered: Fall.
Course Description: Fundamentals of statics; static equilibrium; topics of study include elements of statics in two and three dimensions; laws of equilibrium applied to structures and machines. **Prerequisite(s):** MAT 119.

EGT 265 Engineering Statics Credits: 3
Typically Offered: Fall.
Course Description: Composition and resolution of forces; equilibrium of force systems; application of the principles of statics to problems, including force analyses of simple structures. Centroids; moments of inertia. **Prerequisite(s):** MAT 167 and PHY 210.

EGT 290 ET Practicum/Co-op Credits: 3
Typically Offered: Spring.
Course Description: Intended for advanced students working full-time or part-time for a company in a job related to their major, which reinforces and extends knowledge and skills. Requires periodic progress reports, supervisor evaluation and a formal final report addressing the experience and the educational benefits derived.

EGT 345 3D Modeling and Design Processes Credits: 3
Typically Offered: Spring.
Course Description: This course will investigate the creation and manipulation of three-dimensional forms and environments using experimental methods - primarily digitally based methods coupled with new forms of output such as 3D printing. Two hours lecture, three hours lab. **Prerequisite(s):** EGT 215.

EGT 350 Engineering Documentation Credits: 3
Typically Offered: Spring.
Course Description: Studies various forms of reports; includes practical projects in preparing reports of various lengths and degrees of complexity and oral presentation of report material; emphasizes clear communication of technical ideas. **Prerequisite(s):** ENG 104.

EGT 356 Fluids and Hydraulics Credits: 3
Typically Offered: Spring.
Course Description: Introduction to fluid mechanics including fluid statics and elementary fluid dynamics; includes energy equations of steady flow, steady flow of incompressible fluids in pipes, and open channel flow. Three hours lecture. **Prerequisite(s):** PHY 110.

EGT 370 Financial Aspects of Engineering Projects Credits: 2
Typically Offered: Spring.
Course Description: Principles of engineering decision making process, including simple and compound interest calculations, equivalence, present worth, uniform annual cost, rate of return, depreciation, equipment replacement, and competing projects. **Prerequisite(s):** MAT 116.

EGT 390 ET Seminar Credits: 2
Typically Offered: Fall.
Course Description: Provide the students with the basic knowledge and skills needed as an employee and prepare them to be workforce ready. The course covers personal finance, time management, job hunting skills, basic business structure, employee characters, etc.

EGT 400 Dynamics Credits: 3
Typically Offered: Departmental Discretion.
Course Description: Motion of a particle; kinetics of rigid bodies; work and energy; impulse and momentum; impact. **Prerequisite(s):** EGT 265.

EGT 440 Thermodynamics Credits: 3
Typically Offered: Departmental Discretion.
Course Description: Fluid properties, work and heat, first law, second law, entropy, applications to vapor, and ideal gas processes. **Prerequisite(s):** EGT 260 or PHY 210.

EGT 450 Independent Research/Project Credits: 1-4
Typically Offered: Fall, Spring, Summer.
Course Description: Investigation of a research problem, project, or topic on an individual conference basis. May be taken for up to 4 credit hours. **Prerequisite(s):** Minimum of 2.5 GPA in major field and department chairperson's approval.

EGT 490 Engineering Technology Internship Credits: 1-4
Typically Offered: Fall, Spring, Summer.
Course Description: Intended for advanced students working full-time or part-time for a company in a job related to their major, which reinforces and extends knowledge and skills. Requires periodic progress reports, supervisor evaluation and a formal final report addressing the experience and the educational benefits derived. May be taken for up to 4 credit hours. **Prerequisite(s):** Junior or Senior standing, declared engineering technology major, a minimum of 2.5 GPA, and department chairperson's approval.

Manufacturing Engineering Technology (MET)

MET 100 Electrical Circuits for Manufacturing Credits: 3
Typically Offered: Fall.
Course Description: Studies fundamentals of electricity, solution of DC and AC circuits, motors and generators, three-phase industrial power, power generation, distribution, transmission, and transformers. Includes laboratory sessions to demonstrate and reinforce understanding of these topics. Two hours lecture, three hours lab.

MET 101 Electronic Instrumentation for Manufacturing Credits: 3
Typically Offered: Spring.
Course Description: Studies electronic devices used in manufacturing and control equipment, such as diodes, transistors, SCR's, triacs, and integrated circuits. Also studies electronic circuits including power supplies, amplifiers, oscillators, digital electronics, basic principles of electronic communications, and electronic control circuits. **Prerequisite(s):** MET 100.

MET 111 Manufacturing Processes Credits: 2
Typically Offered: Spring.
Course Description: Introduction to manufacturing engineering. OSHA safety regulations, GMP, quality control, SPC, Lean manufacturing and Six-sigma.

MET 132 Manufacturing Methods Credits: 3
Typically Offered: Spring.
Course Description: Machine shop practices using hand tools, precision measuring equipment, and machine tools. Topics include metal casting and forming, machining of materials, and inspection. Operating traditional machine tools such as engine lathe, milling machines, drill presses and grinders. Two hours lecture, three hours lab.

MET 223 Machines and Tooling Credits: 3
Typically Offered: Fall.
Course Description: Introduction to tooling for different machining processes, machining fixtures, jigs, and dies. Study and practice manufacturing and inspection procedures and the necessary equipment needed to manufacture specific products or components. **Prerequisite(s):** MET 132.

MET 232 Computer Integrated Manufacturing Credits: 2
Typically Offered: Fall.
Course Description: Study of the various components and operations in automated manufacturing systems including material handling, robotics, tooling, inspection, and quality control. Study of PLC programming and operation. One hour lecture, two hours lab. **Prerequisite(s):** MET 101.

MET 241 CNC Machining Credits: 3
Typically Offered: Spring.
Course Description: Basic theory and laboratory work in basic programming, operation and maintenance of CNC machines. Two hours lecture, three hours lab. **Prerequisite(s):** MET 132.

MET 242 CNC Machining Processes Credits: 2
Typically Offered: Fall.
Course Description: Study and practice of CNC machine operation including setup, programming, coordinate system, tool change, tool compensation, work-hold, and machine-computer interface. One hour lecture, two hours lab. **Prerequisite(s):** MET 132.

MET 260 Mechanics of Materials Credits: 4
Typically Offered: Spring.
Course Description: Axial, torsional, bending, and combined stress and strain analysis; mechanical properties and applications for static, fatigue, creep, and impact conditions; emphasizes beam stresses and deflections, columns, and riveted and welded connections. There will be specific emphasis on quality and accuracy for reports and assignments. Three hours lecture, three hours lab. **Prerequisite(s):** EGT 260.

MET 285 Selected Topics in Manufacturing Credits: 3
Typically Offered: Departmental Discretion.
Course Description: Study of selected topics in manufacturing, including the evaluation and review of specific manufacturing processes and study in a given area that combines previous manufacturing engineering courses culminating in an integrated experience through an individual technical report and presentation. **Prerequisite(s):** MET 101, MET 111, and MET 132.

MET 315 Mechanical Systems Credits: 3
Typically Offered: Fall.
Course Description: Principles of water supply and treatment, plumbing, sanitation systems, heating, ventilation and air conditioning. Two hours lecture, three hours lab. **Prerequisite(s):** EGT 220.

MET 322 Advanced Electrical Circuits for Manufacturing Credits: 4
Typically Offered: Spring.
Course Description: Analysis of series and parallel DC networks by various methods including mesh and nodal analyses, network theorems (Thevenin's, Norton's and Superposition). Analyses of AC series and parallel networks (RL, RC & RLC circuits), phasors, reactances, power, AC network theorems, sinusoidal AC voltages, currents, impedances and admittances, transformers, and circuit analysis applications using computer simulation program. Troubleshooting and maintenance are also discussed. Laboratory exercises using AC sources, dual-trace oscilloscope, frequency generator, and circuit prototyping reinforce the lecture concepts. Three hours lecture, three hours lab. **Prerequisite(s):** MET 100.

MET 324 Industrial Controls Credits: 3
Typically Offered: Fall.
Course Description: Studies of the basic principles and applications of industrial controls. Introduction to industrial control systems, solid state devices in industrial application, using thyristor devices such as SCRs and Triacs, discrete automation sensors and devices, DC and AC motors and their controls, transformers and their applications, microcontrollers control applications, and programmable logic controllers applications. Troubleshooting and maintenance for the control equipment/system are also discussed. **Prerequisite(s):** MET 322.

MET 325 Machine Parts and Mechanical Design Credits: 3
Typically Offered: Spring.
Course Description: Introduction to the design and analysis of machine elements, such as shafting, springs, screws, belts, brakes, clutches, gears, and bearings. Emphasis on materials, loads, stress, strain, deflection, and quality. **Prerequisite(s):** EGT 260.

MET 372 Programmable Logic Controllers Credits: 4
Typically Offered: Spring.
Course Description: Studies programmable logic controllers (PLC's); hardware components, memory structure, I/O modules, PLC ladder logic diagrams and basic programming functions, sequencing, contact and coil programming, fail-safe circuits and applications. Laboratory experiments feature hardware/software applications using industrial-grade PLC's of the major manufacturers interfaced with I/O devices for data acquisition and control experiments. Three hours lecture, three hours lab. **Prerequisite(s):** MET 232.

MET 390 Manufacturing Technology Internship Credits: 1-4
Typically Offered: Fall, Spring, Summer.
Course Description: Analysis, development and implementation of a project or work and study in an approved position in industry to enrich educational experience. **Prerequisite(s):** Department chairperson's approval.

MET 422 Electrical Power Technology Credits: 3
Typically Offered: Spring.
Course Description: Studies the principles and applications of various types of DC and AC generators and motors, methods of power control, using thyristor devices, solid-state AC and DC motor drives and servo mechanisms, microcontrollers control applications for motor drives, interface to programmable logic control systems, inverters, converters, and cycloconverters; principles of three-phase power systems; transformers; generation, transmission, motors/generators, and three-phase power relationships. Three hours lecture. **Prerequisite(s):** MET 322.

MET 452 Automation and Process Control Technology Credits: 4
Typically Offered: Fall.
Course Description: Studies principles of feedback control systems, compensation techniques, major types of sensors, electromechanical components and the interface between mechanics and electronics. Three hours lecture, three hours lab. **Prerequisite(s):** MET 372.

MET 462 Production Planning and Control Credits: 3
Typically Offered: Fall.
Course Description: This course covers models and techniques for designing integrated production systems to manage material, service, and information flows in response to changing market demands. Topics include forecasting, aggregate planning, operations strategy, capacity planning, supply chain management, JIT systems, lean manufacturing, materials requirement planning, inventory management, short-term scheduling, sequencing, and line balancing. **Prerequisite(s):** MET 132.

Faculty

Goksu Avdan (2024) Assistant Professor, Engineering. Ph.D., Southern Illinois University - Edward.

Angela Caw (2006) Professor of Practice, Engineering. B.S., Missouri Western State University.

Tiffany Davis (2016) Professor of Practice, Engineering. M.A.S., Missouri Western State University.

Greg Lawson (2016) Instructor, Computer Science. M.A.S., Missouri Western State University.

Tiffany McClaskey (2023) Professor of Practice, Computer Science. M.S., Utica University.

Dennis Merritt (2012) Professor of Practice, Engineering. Ph.D., Saint Louis University.

Kent Pickett (1980) Assistant Professor, Computer Science. M.S., Missouri University of S&T.

Jinwen Zhu (2005) Professor, Engineering. Ph.D., University of North Carolina - Charlotte.