

# DEPARTMENT OF ENGINEERING TECHNOLOGY

## Overview

Dr. Jinwen Zhu, Chairperson  
jzhu@missouriwestern.edu  
(816) 271-5820  
missouriwestern.edu/EngTech (<http://www.missouriwestern.edu/EngTech/>)

The Department of Engineering Technology offers four-year degree programs in Engineering Technology with majors in Construction Engineering Technology and Manufacturing Engineering Technology as well as its two concentrations: Bio-Manufacturing and Design & Technical Graphics. In addition, the Department offers a two-year (AAS) degree in Manufacturing Engineering Technology with three concentrations: General, Instrumentation and Automation, and Precision Machining. The Department works in collaboration with regional universities to provide engineering transfer programs, a one-year architecture transfer program and 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."

## Dual Degree Program in Engineering Technology & Engineering

Missouri Western Engineering Technology majors have the opportunity to be admitted to a dual degree program between the Missouri Western State University (MWSU) Department of Engineering Technology and The University of Missouri-Kansas City School of Computing and Engineering. This program is designed for students interested in both a B.S. in Engineering Technology and a B.S. in Engineering (Civil Engineering or Mechanical Engineering). Students in the program complete the first three years of study in Engineering Technology at Missouri Western State University and two additional years at the University of Missouri-Kansas City in Engineering to earn two B.S. degrees in five years. To be eligible for the dual degree option, students must complete the designated course series outline in the articulation agreement and must maintain a cumulative GPA of 3.0 or higher. For more information on this dual degree opportunity, please contact the dual degree liaison in the MWSU Department of Engineering Technology.

## 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 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.

## Majors

- Construction Engineering Technology (Bachelor of Science, B.S.) (<http://catalog.missouriwestern.edu/undergraduate/business-professional-studies/engineering-technology/construction-engineering-technology-bs/>)
- Manufacturing Engineering Technology (Bachelor of Science, B.S.) (<http://catalog.missouriwestern.edu/undergraduate/business-professional-studies/engineering-technology/manufacturing-engineering-technology-bs/>)
- Manufacturing Engineering Technology, Bio-Manufacturing Option (Bachelor of Science, B.S.) (<http://catalog.missouriwestern.edu/undergraduate/business-professional-studies/engineering-technology/manufacturing-engineering-technology-bs-bio-manufacturing-option/>)
- Manufacturing Engineering Technology, Design & Technical Graphics Option (Bachelor of Science, B.S.) (<http://catalog.missouriwestern.edu/undergraduate/business-professional-studies/engineering-technology/manufacturing-engineering-technology-bs-design-technical-graphics-option/>)
- Manufacturing Engineering Technology (Associate of Applied Science, A.A.S.) (<http://catalog.missouriwestern.edu/undergraduate/business-professional-studies/engineering-technology/manufacturing-engineering-technology-aas/>)

## Minors

- Cognitive Science Minor (<http://catalog.missouriwestern.edu/undergraduate/interdisciplinary-studies/cognitive-science-minor/>)
- Construction Management Minor (<http://catalog.missouriwestern.edu/undergraduate/business-professional-studies/engineering-technology/construction-management-minor/>)
- Entrepreneurship Minor (<http://catalog.missouriwestern.edu/undergraduate/business-professional-studies/craig-school-of-business/entrepreneurship-minor/>)
- Manufacturing Technology Minor (<http://catalog.missouriwestern.edu/undergraduate/business-professional-studies/engineering-technology/manufacturing-technology-minor/>)

## Courses

# Construction Engineering Technology (CET)

### 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 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):** EGT 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 EGT 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. Same as MET 260. **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):** EGT 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 Engineering 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 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 and MAT 147.

### 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):** Credit or concurrent enrollment in CET 308.

### CET 360 Construction Management Credits: 3

**Typically Offered:** Fall.

**Course Description:** Introduction to the business of construction including professional responsibilities and roles of the contractor, superintendent, designer, owner and inspector; study of bid package, issues during construction phase, and project delivery methods. Includes construction contracts, procurement, planning, scheduling, safety, cash flow, value of diversity in the construction industry, and risk management.

**Prerequisite(s):** CET 105

**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 and ENG 104.**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.**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):** Credit or concurrent enrollment in CET 308.**CET 451 Construction Estimating II 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 456 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 360 and credit or concurrent enrollment in 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 360 and credit or concurrent enrollment in 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 heavy 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 254.**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.

## Electronics and Computer Engineering Technology (ECT)

**ECT 362 Computer Hardware Repair Credits: 3****Typically Offered:** Spring.**Course Description:** Study of computer hardware assembly, and the techniques utilized for troubleshooting and repair. Two hours lecture, three hours lab. **Prerequisite(s):** EET 206 and EET 212.**ECT 432 Computer Hardware Troubleshooting Credits: 3****Typically Offered:** Spring.**Course Description:** Study of computer hardware assembly and troubleshooting, including computer hardware, motherboard, embedded systems, power, monitor, analyzing and repairing, hardware installation and configuration. Two hours lecture, three hours lab. **Prerequisite(s):** EET 402.

## Electronics Engineering Technology (EET)

**EET 100 Electrical Circuits I Credits: 3****Typically Offered:** Fall, 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.**EET 200 Electrical Circuits II 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), j operators, phasors, reactances, phase relationships, power, network theorems, sinusoidal AC voltages, currents, impedances and admittances (RL, RC & RLC), resonance, frequency response, polyphase systems, transformers and circuit analysis applications using PSpice computer simulation program. Laboratory exercises using AC sources, dual-trace oscilloscope, frequency generator, spectrum analyzer, and circuit prototyping reinforce the lecture concepts. Three hours lecture, three hours lab. **Prerequisite(s):** EET 100 and credit or concurrent enrollment in MAT 119.

**EET 202 Digital Logic Credits: 4****Typically Offered:** Spring.**Course Description:** Studies of number systems, logic gates, combinational logic using Small scale (SSI) and Medium scale (MSI) integrated circuits such as TTL, CMOS and ECL, Boolean algebra, mapping, flip-flops, counters, timers, adders, comparators, decoders, encoders, multiplexers, demultiplexers, arithmetic logic units (ALU's), programmable logic devices (PLD's) and input-output devices. Three hours lecture, three hours lab. **Prerequisite(s):** EET 100.**EET 206 Introduction to Microcomputers Credits: 4****Typically Offered:** Fall.**Course Description:** A study of microcomputer and microprocessor architectures, ALU's, memory devices, interfacing, communications, and software programming applications using assembly language and high-level programming language such as C/C++. Three hours lecture, three hours lab. **Prerequisite(s):** EGT 102 or CSC 184 and EET 202.**EET 212 Introduction to Semiconductor Devices Credits: 4****Typically Offered:** Fall.**Course Description:** Studies of basic semiconductor theory, principles, characteristic curves and applications of semiconductor devices such as various types of diodes, BJT, FET transistors and biasing, and thyristors. Circuit applications including power supply rectification and filtering, voltage regulation, clippers, clampers and amplifiers, circuit modeling and analysis using electronic circuit design and analysis software such as Electronics Work Bench and PSpice. Three hours lecture, three hours lab. **Prerequisite(s):** Credit or concurrent enrollment in both EET 200 and CHE 101.**EET 290 Engineering 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.**EET 312 Electronic Amplifiers and Integrated Circuits Credits: 4****Typically Offered:** Spring.**Course Description:** A study of principles and analysis of small and large signal amplifiers circuits of classes -A, -B, and -C using BJT, FET and MOSFET transistors; amplifier coupling methods, frequency response and Bode plots; introduction to active filters and operational amplifiers with applications as signal amplifiers, comparators, summers, voltage regulators, integrators and differentiators; thyristor principles, operational amplifiers, multistage amplifiers, integrated differential and operational amplifier circuits, Op-Amp theory and applications such as comparators, instrumentation amplifiers, signal generators, power amplifiers and active filters, D/A and A/D converters and applications. Circuit modeling programs, such as Electronics Work Bench, are used throughout the course. Three hours lecture, three hour lab. **Prerequisite(s):** EET 206 and EET 212.**EET 342 Analog Communications Systems Credits: 4****Typically Offered:** Fall.**Course Description:** A study of information theory, bandwidth, and noise; spectral analysis, principles and analysis of AM, FM modulation, detection, receivers, transmitters, networks, filters, antennas; principles and circuits of single-sideband communications; electromagnetic wave propagation; analog telephone systems; broadcast TV systems and transmission lines through VHF frequency. Laboratory experiences include exercises in basic analog communication circuits, and transmission and reception experiments. Three hours lecture, three hours lab. **Prerequisite(s):** EET 312.**EET 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):** EET 206 and EET 212.**EET 374 Robotics Controls Credits: 4****Typically Offered:** Spring.**Course Description:** Introduction to various types of robot anatomy and drive systems, robotics control systems and components, motion analysis, types of end-effectors, robotics sensors and machine vision. Robot classifications, geometry and path control techniques, end-of-arm tooling, gripper selection system intelligence and compliance, robot programming, safety and safeguarding considerations and operator training, acceptance and problems. Laboratory experiments focus on interfacing lab robots to I/O devices using industrial grade PLC's of the major manufacturers and programming the lab robots to perform basic tasks. Three hours lecture, three hours lab. **Prerequisite(s):** EET 372.**EET 382 Electronics Fabrication Credits: 2****Typically Offered:** Spring.**Course Description:** Students are required to construct an electronic project approved by the instructor; this includes selection of a suitable project, its design and construction, and testing of the completed project. Lab may also require construction of small projects. 5 hours lab, including discussion periods. **Prerequisite(s):** EET 206 and EET 312.**EET 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.**EET 402 Microcomputer Systems Credits: 4****Typically Offered:** Fall.**Course Description:** Advanced study in the architecture and design of modern computers and imbedded systems; design of microprocessor-based systems including memory, I/O interfacing, interrupts, and DMA. Design embedded systems with soft core micro controllers on programmable chips. Develop software with assembly and C programming language for an embedded system. Three hours lecture, three hours lab. **Prerequisite(s):** EET 206.



**EET 412 Operational Amplifiers and Linear Integrated Circuits Credits: 3****Typically Offered:** Fall.**Course Description:** Advanced study of operational amplifiers, multistage amplifiers, integrated differential and operational amplifier circuits, Op-Amp theory and applications such as comparators, instrumentation amplifiers, signal generators, power amplifiers and active filters, D/A and A/D converters, and PSpice modeling program applied for circuit analysis examples. Two hours lecture, three hours lab. **Prerequisite(s):** EET 312, EET 372, and MAT 147.**EET 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, and converters; principles of three-phase power systems; transformers; generation, transmission, motors/generators, and three-phase power relationships. Same as MET 422. **Prerequisite(s):** EET 212 and MAT 147.**EET 442 Digital Communications Systems Credits: 3****Typically Offered:** Spring.**Course Description:** Principles and methods of digital modulation including A/D and D/A converters, frequency-shift keying, frequency-division multiplexing, delta and pulse-code modulation; error detection and correction techniques; UART's and modems; integrated services digital network (ISDN); networking architecture and protocols; fiber optics and satellite communications; and microwaves. **Prerequisite(s):** EET 206 and EET 342.**EET 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. Same as MET 452. **Prerequisite(s):** EET 202 and EET 212.**EET 472 Automatic Control Systems Credits: 4****Typically Offered:** Spring.**Course Description:** Study of the transfer function approach and Laplace transforms to the analysis of feedback control systems in the time and frequency domains, and associated compensation techniques; concepts of block diagrams, and open- and closed-loop control systems. Laboratory exercises include PLC's and MATLAB software and associated Toolboxes. Three hours lecture, three hours lab. **Prerequisite(s):** EET 372, EET 452, and MAT 147.**EET 482 Integrated System Project Credits: 3****Typically Offered:** Fall, Spring.**Course Description:** Electronic design project constructed in the laboratory and/or research project on selected electronics topics or problems. Requires a written notebook, periodic progress reports and a project final report. Class assignments or projects will require integration, knowledge from preceding courses and application of problem-solving skills acquired throughout the entire curriculum. **Prerequisite(s):** EET 342 and EET 452.**EET 485 Senior Seminar Credits: 2****Typically Offered:** Spring (odd-numbered years).**Course Description:** Designed for seniors majoring in electronics engineering technology; emphasizes the development of research in the field of electronics engineering technology, selected topics for group discussion of current areas of interest, guest speakers, and the exploration of career options. **Prerequisite(s):** Senior standing and declared engineering technology major.**EET 490 Advanced Topics in Electronics Engineering Technology Credits: 3****Typically Offered:** Departmental Discretion.**Course Description:** Selected new/emerging topics in the field of Electronics Engineering Technology. **Prerequisite(s):** Junior or Senior standing, declared Electronics Engineering Technology major, a minimum of 2.5 GPA, and departmental approval.

## Engineering Technology (EGT)

**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 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.

**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 283 Introduction to Research Methods in Engineering Technology Credits: 1-2****Typically Offered:** Departmental Discretion.**Course Description:** Introduction to basic research in engineering technology. Individual and team projects involving methods for solving engineering technology related research problems. **Prerequisite(s):** Department chairperson's approval.**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 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):** EGT 202 and credit or concurrent enrollment in EGT 205.**EGT 310 Environmental Regulations and Pollution Abatement Technology Credits: 3****Typically Offered:** Fall.**Course Description:** Studies existing and upcoming environmental regulations and pollution abatement technology as it pertains to soil, solid waste, air, and water. Laboratory exercises include case studies at pollution abatement facilities and the degree of efficiency and effectiveness of these systems. Two hours lecture, three hours lab. **Prerequisite(s):** EGT 102, CET 105, and CHE 104.**EGT 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.**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 Technical Report Writing 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 and credit or concurrent enrollment in MAT 147.**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: 3-4**

**Typically Offered:** Fall, Spring.

**Course Description:** Investigation of a research problem, project, or topic on an individual conference basis. **Prerequisite(s):** Declared engineering technology major, a 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 repeated for a maximum of 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 131 Machine Workshop Credits: 3**

**Typically Offered:** Fall.

**Course Description:** Practice basic operations of the lathe, milling machine, and grinder. Learning the use of hand tools, metrology, metal sawing, drilling and tapping. Two hours lecture, three hours lab.

**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 131.

**MET 231 PLC and Automation Credits: 3**

**Typically Offered:** Spring.

**Course Description:** Introduction to Programmable Logic Controllers and various components for automated manufacturing, including switches, relays, logic diagrams, inputs, and outputs. Two hours lecture, three hours lab. **Prerequisite(s):** MET 100.

**MET 232 Automated 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 131.

**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. Same as CET 260. **Prerequisite(s):** EGT 260.

**MET 285 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 Electrical Circuits II 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 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 Design Projects/Industrial Internship Credits: 2-4****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. Same as EET 422.**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. Same as EET 452. **Prerequisite(s):** MET 372.

## Faculty

**Dennis Merritt** (2019) Instructor, Engineering Technology. A.A.S., Missouri Western State University; B.A., MidAmerica Nazarene University; M.S., University of Central Missouri; Ph.D., State Louis University.**Wes Moore** (2017) Assistant Professor, Engineering Technology. B.S.Ed., B.S.C., M.U., M.S., University of Missouri-Columbia.**Long Qiao** (2009) Associate Professor, Engineering Technology. B.S., Xian University of Architecture & Technology; M.S., Texas Tech University; Ph.D., Kansas State University.**Xiaoqing Yang** (1998) Professor, Engineering Technology. B.S., M.S., Zhejiang University; Ph.D., Kansas State University.**Zhao Zhang** (1998) Professor, Engineering Technology. B.S., Tsinghua University; M.S., Peking Union Medical College; Ph.D., University of Missouri-Rolla.**Jinwen Zhu** (2005) Chairperson and Professor, Engineering Technology. B.S., Southwest Jiaotong University; M.S., Sichuan University; M.S., Ph.D., University of North Carolina.