

# DEPARTMENT OF APPLIED ENGINEERING TECHNOLOGY

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## Department Overview

The Department of Applied Engineering Technology at Virginia State University offers dynamic and hands-on academic degree programs leading to the **Bachelor of Science in Electrical and Electronics Engineering Technology**, the **Bachelor of Science in Mechanical Engineering Technology**, and the **Bachelor of Science in Information Logistics Technology**. These programs are designed to equip students with the theoretical knowledge and practical skills necessary to excel in a variety of technological and industrial settings. The department also provides opportunities for advanced professional development through a **Graduate Certificate in Project Management**, an **Undergraduate Certificate in Enterprise Systems**, and a **Wireless Technology Certificate**.

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## Mission Statement

The mission of the Department of Applied Engineering Technology is to graduate lifelong learners through the provision of quality education, research opportunities, and technical skills that prepare them for gainful employment in the private and public sectors of the economy for sustainable growth and development.

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## Degree Highlight Information

### Applied Engineering Technology: A Collaborative Discipline

As Engineers, graduates with an Engineering Technology degree work very closely with other engineering team members: scientists, technicians and artisans. The applied engineers typically organize the manpower, materials and equipment to design, construct, operate, maintain and manage technical engineering projects.

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## Accreditation Information

### Ensuring Program Quality

Electrical and Electronics Engineering Technology (ELET) program is accredited by the Engineering Technology Accreditation Commission of ABET, under the commission's General Criteria and Program Criteria for Electrical/Electronic(s) Engineering Technology and Similarly Named Programs.

Mechanical Engineering Technology (MCET) program is accredited by the Engineering Technology Accreditation Commission of ABET, under the commission's General Criteria and Program Criteria for Mechanical Engineering Technology and Similarly Named Programs.

Information Logistics Technology (INLT) program is accredited by the Applied and Natural Science Accreditation Commission of ABET, under the commission's General Criteria with no applicable program criteria.

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## Department Goals

### Shaping Future Leaders and Innovators

The goals of the Department of Applied Engineering Technology are to prepare graduates:

- Graduates will earn advanced degrees or advanced certificates in engineering, engineering technology, business, or related fields.
- Graduates will advance professionally in leadership both within a chosen technical field and more broadly within the community
- Graduates will contribute as entrepreneurs and innovators by adapting to new technology and career challenges
- Graduates will publish scholarly articles, pursue patents, and be responsive to societal, legal, ethical, and environmental challenges

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## Program Listings

### Bachelor of Science (B.S.) in Electrical and Electronics Engineering Technology

The Bachelor of Science in Electrical and Electronics Engineering Technology program provides students with a strong foundation in both the theory and practical application of electrical and electronics systems. Utilizing modern electrical, electronic and microprocessor laboratories, students gain familiarity with a wide range of areas within electrical and electronic systems, including power system, analog and digital integrated circuits, instrumentation, electronic communications and control devices. This hardware-oriented program emphasizes established design methodologies and laboratory techniques. Learning is enhanced through the use of video resources, microprocessor trainers, power training systems, and computers-based tools for problem solving and system design.

**Course Requirements:** Students must earn a grade of "C" or higher in all major courses and in MATH 150.

### Bachelor of Science (B.S.) in Mechanical Engineering Technology

The Bachelor of Science in Mechanical Engineering Technology program centers on the principles of mechanics and thermal processes. Mechanics focuses on the forces acting on machines and the analysis of potential failure modes. Thermodynamics explores the principles of energy conversion as applied to engines, refrigeration, and other thermal systems. The program features significant laboratory experiences, including mechanical measurements, computer-aided drafting, materials testing, and the study of hydraulic and pneumatic systems. Strong emphasis is placed on the integration of computer tools and techniques. Overall, the program provides students with a practical, application-oriented approach to problem-solving in areas such as machine design, production, and manufacturing.

**Course Requirements:** Students must earn a grade of "C" or higher in all major courses and in MATH 150.

### Bachelor of Science (B.S.) in Information Logistics Technology

The Bachelor of Science in Information Logistics Technology program prepares graduates to work collaboratively within engineering and

business teams, including scientists, engineers, technicians, skilled workers, marketers, trainers, and managers, across diverse industries and government sectors. Graduates develop the skills to effectively process information and manage logistics functions in areas such as training, production management, quality management, facilities management, industrial sales and marketing, manufacturing management, supply chain management, distribution, and material handling.

The curriculum is designed to cultivate technical and management professionals who are proficient in:

- Applying theories, concepts, and principles from information systems, industrial engineering, and the social and behavioral sciences, with a strong emphasis on communication skills.
- Understanding and applying the principles and concepts of mathematics and science, along with fundamental computer skills.
- Utilizing concepts and developing current skills in a variety of technical and related disciplines, which may include materials and production processes, industrial management and human relations, marketing, communications, electronics, graphics, distribution, and logistics management.
- Completing a focused area of specialization, such as integrated information systems applications, big data processing, computer-aided design, computer-integrated manufacturing, supply chains, or transportation.

## Major(s)

- Electrical and (<http://catalog.vsu.edu/undergraduate/college-engineering-technology/department-technology/electronics-engineering-technology-major-bs/>) Electronics Engineering Technology, (<http://catalog.vsu.edu/undergraduate/college-engineering-technology/department-technology/electronics-engineering-technology-major-bs/>) Bachelor of Science (B.S.) (<http://catalog.vsu.edu/undergraduate/college-engineering-technology/department-technology/electronics-engineering-technology-major-bs/>)
- Mechanical Engineering Technology, Bachelor of Science, (B.S.) (<http://catalog.vsu.edu/undergraduate/college-engineering-technology/department-technology/mechanical-engineering-technology-major-bs/>)
- Information Logistics Technology, Bachelor of Science, (B.S.) (<http://catalog.vsu.edu/undergraduate/college-engineering-technology/department-technology/information-logistics-technology-major-bs/>)

## Minor(s)

- Information and Logistics Technology Minor (<http://catalog.vsu.edu/undergraduate/college-engineering-technology/department-technology/information-logistics-technology-minor/>)

## Other

- Lean Six-Sigma Certificate (<http://catalog.vsu.edu/undergraduate/college-engineering-technology/department-technology/lean-six-sigma-certificate/>)

### ELECTRONICS ENGINEERING TECHNOLOGY Course Descriptions

#### ELET 101 CIRCUIT ANALYSIS I - 4 semester

A beginning course in electric circuit analysis with emphasis on direct-current applications. Topics include: SI units and scientific notation, electrical quantities, measuring electrical quantities, power and energy, resistive circuits, methods of analysis, network theorems and capacitance.

**Corequisites:** ENGT 100 Introduction to Engineering Technology; MATH 150 Precalculus or equivalent

**Corequisite:** ELET 103 Circuit Analysis I Lab

#### ELET 102 CIRCUIT ANALYSIS II - 4 semester hours

A beginning course in electric circuit analysis with emphasis on alternating-current applications. Topics include: magnetic circuits, inductors, sinusoidal waveforms, basic elements and phasors, series and parallel ac circuits, series-parallel networks, ac power, resonance, and three-phase systems.

**Prerequisites:** ELET 101 Circuit Analysis I; MATH 150 Precalculus or equivalent

**Corequisite:** ELET 104 Circuit Analysis II Lab

#### ELET 103 CIRCUIT ANALYSIS I LAB - 1 semester hour

Laboratory experiments in DC theory with emphasis on breadboarding electric circuits, using meters, and using electronic simulation software to complement ELET 101 Circuit Analysis I.

**Corequisites:** ENGT 100 Introduction to Engineering Technology; Math 150 Precalculus or equivalent; ELET 101 Circuit Analysis I

#### ELET 104 CIRCUIT ANALYSIS II Lab - 1 semester hour

Laboratory experiments in AC theory with emphasis on breadboarding electric circuits, using meters and other test equipment to measure and troubleshoot AC circuits and devices. Develops skills in measuring AC circuit parameters.

**Prerequisites:** ELET 101 Circuit Analysis I; MATH 150 Precalculus or equivalent

**Corequisite:** ELET 102 Circuit Analysis II

#### ELET 203 INTRODUCTION TO ELECTRONICS - 4 semester hours

An introductory course in solid-state electronic devices and their applications. Topics include the following: diodes and their applications, Zener diodes, the junction transistor, CE, CB, and CC configurations of junction transistors, the SCR and other thyristors, and field-effect transistors.

**Prerequisite:** ELET 101 Circuit Analysis I

**Corequisite:** ELET 205 Introduction to Electronics Lab

#### ELET 204 ELECTRONIC CIRCUITS - 4 semester hours

An introductory course in solid-state electronic circuits and their applications. Topics include the following: amplifier frequency response, power amplifiers, oscillators, differential and operational amplifiers, operational amplifier applications, power supplies, and voltage regulators.

**Prerequisite:** ELET 203 Introduction to Electronics

**Corequisite:** ELET 206 Electronics Circuits Lab

#### ELET 205 Introduction to Electronics Lab -1 Semester hour

Laboratory experiments with semiconductor junction devices, with emphasis on diodes, bipolar junction transistors and field-effect transistors including DC biasing and stability to complement ELET 203 Introduction to Electronics.

**Prerequisite:** ELET 101 Circuit Analysis I  
**Corequisite:** ELET 203 Introduction to Electronics

**ELET 206 Electronics Circuits Lab - 1 semester hour**  
 Laboratory experiments on power amplifiers, operational amplifiers, oscillators, voltage regulators, and other semiconductor devices, and frequency response analysis to complement ELET 204 Electronic Circuits.

**Prerequisite:** ELET 203 Introduction to Electronics;  
**Corequisite:** ELET 206 Electronic Circuits

**ELET 207 DIGITAL CIRCUITS - 4 semester hours**  
 An introductory course in digital-circuit concepts, applications, and design. Topics include the following: number systems and codes, logic gates, Boolean algebra, Karnaugh mapping, combinational logic design, sequential logic circuits, sequential logic design, and IC logic families.  
**Prerequisite:** ELET 101 Circuit Analysis I  
**Corequisite:** ELET 209 Digital Circuits Lab

**ELET 208 MICROPROCESSORS - 4 semester hours**  
 Introduction to 16-bit microprocessors with emphasis on programming. Topics include the following: data control, memories, data transmission, addressing modes, subroutines, and introduction to hardware.  
**Prerequisite:** ELET 207 Digital Circuits  
**Corequisite:** ELET 211 Microprocessors Lab

**ELET 209 DIGITAL CIRCUITS Lab - 1 semester hour**  
 Laboratory experiments in combinational logic circuits designed to complement ELET 207 Digital Circuits; analyze, measure and troubleshoot logic circuits and devices using general test equipment.  
**Prerequisite:** ELET 101 Circuit Analysis I  
**Corequisite:** ELET 207 Digital Circuits

**ELET 211 MICROPROCESSORS Lab - 1 semester hour**  
 Microprocessor-based laboratory utilizing computer programming language. Emphasis is on writing and running programs on 8086/8088 based microprocessor systems. Laboratory experience includes both software and hardware. This is the laboratory that accompanies ELET 208 Microprocessors.  
**Prerequisite:** ELET 207 Digital Circuits  
**Corequisite:** ELET 208 Microproces

**ELET 304 ADVANCED CIRCUIT ANALYSIS – 3 semester hours**  
 An advanced course in electric circuit analysis. Topics include the following: review of analysis methods for dc and ac networks, waveforms, differential equations, Laplace transforms and applications, and transfer functions.  
**Prerequisites:** ELET 102 Electronic Circuits; MATH 260 Calculus I

**ELET 306 ADVANCED ELECTRONICS - 4 semester hours**  
 An advanced course in the design and applications of linear integrated circuit devices. Topics include the following: power supply regulators, op-amp characteristics, single-supply operation, signal generator circuits, and active filters.  
**Prerequisites:** ELET 204 Electronic Circuits; MATH 260 Calculus I  
**Corequisite:** ELET 307 Advanced Electronics Lab

**ELET 307 ADVANCED ELECTRONICS Lab - 1 semester hour**  
 Hands-on experience with the design and applications of more advanced electronic circuits including linear integrated electronic circuit devices. This laboratory course is designed to complement ELET 306 Advanced Electronics.  
**Prerequisites:** ELET 204 Electronic Circuits; MATH 260 Calculus I

**Corequisite:** ELET 306 Advanced Electronics

**ELET 309 ADVANCED DIGITAL CIRCUITS - 4 semester hours**  
 A design course for digital computer circuits using integrated circuit devices. Topics include the following: shift registers, counters, encoders, multiplexers, arithmetic circuits, D/A and A/D converters, and memory circuits.

**Prerequisite:** ELET 207 Digital Circuits  
**Corequisite:** ELET 311 Advanced Digital Circuits Lab

**ELET 311 ADVANCED DIGITAL CIRCUITS Lab - 1 semester hour**  
 This laboratory course complements ELET 309 Advanced Digital Circuits. Students design, construct and troubleshoot digital circuits that include shift registers, memory ICs, PLDs, DACs/ADCs. Design and simulation tools are utilized.  
**Prerequisite:** ELET 207 Digital Circuits  
**Corequisite:** ELET 309 Advanced Digital Circuits

**ELET 399 SPECIAL TOPICS - 3 semester hours**  
 A course which can be designated by the department to cover some aspect of Engineering Technology as needed by a class or group of students in lieu of another technical elective or as independent study to upgrade their skills and knowledge in a particular area.  
**Prerequisite:** Permission of the instructor

**ELET 401 ELECTRIC MACHINERY - 3 semester hours**  
 A course in electric machines designed for students majoring in electronics engineering technology. Topics include the following: fundamentals of electromagnetics, dynamo construction, dc generators and motors, ac dynamos, synchronous machines, ideal and practical transformers, polyphase and single-phase induction motors, and other single-phase motors.  
**Prerequisites:** ELET 102 Circuit Analysis II; MATH 260 Calculus I; PHYS 106 Introduction to Physics II or equivalent

**ELET 403 CONTROL SYSTEMS - 3 semester hours**  
 A course in control theory and applications. Topics include the following: feedback control, servo components, mathematical techniques, transfer functions, block diagrams, analysis of second-order servo systems, stability and frequency response analysis, and compensation.  
**Prerequisites:** ELET 304 Advanced Circuit Analysis; MATH 261 Calculus II; PHYS 105 Introduction to Physics I or equivalent

**ELET 406 COMMUNICATION SYSTEMS - 3 semester hours**  
 Introduction to the theory and practice of communication systems. Covers communication system theory, analog and digital communication techniques. Topics include the following: amplitude, phase, analog, pulse and digital modulation, design and analysis of modulation systems.  
**Prerequisites:** ELET 208, ELET 306, ELET 309 and PHYS 106 (or equivalent)

**ELET 408 ADVANCED MICROPROCESSORS I - 4 semester hours**  
 An advanced course in microprocessors with emphasis on the hardware of a 16-bit processor. Topics include the following: introduction to the 8086/8088 microprocessor, arithmetic and logic instructions, program control instructions, 8086/8088 hardware specifications, memory interfacing, input/output interfacing, and interrupt circuits.  
**Prerequisite:** ELET 208 MICROPROCESSORS  
**Corequisite:** ELET 411 Advanced Microprocessors I Lab

**ELET 409 ADVANCED MICROPROCESSORS II - 4 semester hours**  
 An advanced course in microprocessors with emphasis on the hardware interfacing of the 8086/8088 to compatible chips. Topics include the

following: basic I/O interfacing (using the 8255A PPI), interrupts (using the 8259A PIC), direct memory access, the 8089 I/O coprocessor, the 8087 arithmetic coprocessor, and other 8086/8088 family members.

**Prerequisite:** ELET 408 Advanced Microprocessors I

**Corequisite:** ELET 412 Advanced Microprocessors II Lab

**ELET 410 INTRODUCTION TO ELECTRICITY/ELECTRONICS - 3 semester hours**

A course in electrical circuits and electrical machines for students NOT majoring in electronics engineering technology. Topics include the following: resistors, dc circuits, magnetism, electromagnetic forces, ac voltage and current, inductance and capacitance, dc generators and motors, ac circuits, single-phase and three-phase circuits, transformers, 3-phase induction motors, synchronous motors and generators, single-phase motors, motor controls, and electrical distribution.

**Prerequisites:** PHYS 106 Introduction to Physics II or equivalent; MATH 150 Precalculus or Equivalent

**ELET 412 ADVANCED MICROPROCESSORS II Lab - 1 semester hour**

Project oriented laboratory course in the areas of microprocessor based systems.

**Prerequisite:** ELET 408 Advanced Microprocessors I

**Corequisite:** ELET 409 Advanced Microprocessors II

**ELET 499 SPECIAL TOPICS - 3 semester hours**

A course which can be designated by the department to cover some aspect of Engineering Technology as needed by a class or group of students in lieu of another technical elective or as independent study to upgrade their skills and knowledge in a particular subject area.

**Prerequisite:** Permission of instructor

**ENGINEERING TECHNOLOGY**

**ENGT 100 INTRO TO ENGINEERING TECHNOLOGY - 2 semester hours**

Introduction to professional field of engineering technology; professional ethics and responsibilities of technologists; application of hand calculator to engineering problem solving; systems of units and their conversions; engineering problem-solving techniques.

**Corequisite:** MATH 150 Precalculus or equivalent

**ENGT 105 ENGINEERING PROBLEM SOLVING -2 semester hour**

Introduction to use of computers for solving engineering problems. Topics include: Computer Systems, Mathematics and Engineering Technology/Engineering Software Packages.

**Prerequisite:** ENGT 100 Introduction to Engineering Technology

**ENGT 401 TECHNICAL INTERNSHIP - 3 Semester hours**

This course requires the student to work in a company for a semester. The internship provides practical experience in a closely supervised environment. A written Report is required at the end of the internship program. Nine contact hours per week.

**Prerequisite:** Junior Standing and Consent of Instructor

**ENGT 420 SENIOR PROJECT I - 3 semester hours**

Student will design a project to illustrate basic knowledge and skills in one phase of his/her major field. Proposal development, library research, project management and computer usage are stressed.

**Prerequisite:** Senior Standing and Consent of Instructor

**ENGT 421 SENIOR PROJECT II - 2 semester hours**

This portion of the project includes complete design specifications, computer analysis and/or simulation, library research, oral and written reports. It may also include construction, trouble-shooting and demonstration of a working prototype.

**Prerequisite:** ENGT 420 Senior Project I

**MECHANICAL ENGINEERING TECHNOLOGY**

**MCET 102 MACHINES LABORATORY - 1 semester hour**

Basic hand tools, shop safety procedures; fundamental machine operations of drilling, sawing, milling, turning; inspection tools, gauges, measuring instruments.

**Prerequisite:** None

**MCET 200 STATICS - 3 semester hours**

Force systems, resultants, and equilibrium; trusses, method of joints, method of sections; friction; centroids, moments of inertia.

**Prerequisites:** MATH 150 Precalculus or equivalent and ENGT 100 Introduction to Engineering Technology

**MCET 201 STRENGTH OF MATERIALS - 3 semester hours**

Stress and deformation; axial, tensile and compressive stresses, torsion; shear and moment in beams; stresses in beams; and design of beams.

**Prerequisite:** MCET 200 Statics

**MCET 202 STRENGTH OF MATERIALS LAB - 1 semester hour**

Tensile, compressive, torsional, bending, impact, hardness, and fatigue tests of materials; use of electrical resistance strain gages; statistical evaluation of data.

**Prerequisites:** MCET 200 Statics and MCET 102 Machines Lab

**Corequisite:** MCET 201 Strength of Materials

**MCET 301 INTRODUCTION TO THERMODYNAMICS - 3 semester hours**

An introduction to fundamentals of thermodynamics; including work and heat; first and second laws; properties of gases, gas mixtures; compression and expansion of gas steam tables are covered.

**Prerequisite:** MATH 260 Calculus I

**MCET 305 MANUFACTURING MATERIALS AND PROCESSES - 3 semester hours**

The study of the physical and mechanical properties of various materials as applied to design, processing, and fabrication methods.

**Prerequisite:** MCET 201 Strength of Materials

**MCET 306 MACHINE DESIGN I - 3 semester hours**

The design of basic elements used in machines, including machine columns, welds, rivets, screws, springs, flexible couplings, belt and chain drives. Design for fatigue strength is included.

**Prerequisites:** MCET 201 Strength of Materials, ENGR 200 Engineering Graphics and MATH 260 Calculus I

**MCET 307 KINEMATICS OF MACHINES - 3 semester hours**

The study of techniques for the analysis of displacement, velocity, and acceleration of machine elements; emphasis on graphical kinematics of linkages; introduction to cams.

**Prerequisites:** ENGR 200 Engineering Graphics and MCET 311 Dynamics

**MCET 311 DYNAMICS - 3 semester hours**

The kinematics and kinetics of particles and rigid bodies; rectilinear and curvilinear motion, work, energy, impulse and momentum. Use of computers for problem solving is included.

**Prerequisites:** MCET 200 Statics, MATH 261 Calculus II and PHYS 105 Physics I

**MCET 313 FLUID MECHANICS - 3 semester hours**

Properties of fluids; fluid statics and dynamics, including momentum, energy, Bernoulli's equation, fluid flow in pipes, fluid machinery, and open

channels: study of the siphon, pitot tube, venturi meter, orifices, nozzles, diffusers, weirs, etc.

**Prerequisites:** MCET 200 Statics and MATH 260 Calculus I

**MCET 314 FLUID MECHANICS LABORATORY - 1 semester hour**

Laboratory demonstrations, experiments, and exercises dealing with the verification of fluid equations, and principles and characteristics of fluid machinery.

**Co-requisite:** MCET 313 Fluid Mechanics

**MCET 401 APPLIED THERMODYNAMICS - 3 semester hours**

Study of thermodynamic cycles; includes Carnot, Rankine, Sterling and Application of thermodynamic principles to turbines and compressors.

**Prerequisites:** MCET 301 Introduction to Thermodynamics and MATH 261 Calculus II

**MCET 403 QUALITY CONTROL - 3 semester hours**

A study of the principles and techniques of quality control and its applications to industrial processes. Topics include: An overview of Total Quality Management (TQM), statistics, process control charts, and probability. The relationship between process capability and product specifications is analyzed.

**Prerequisite:** ENGT 105 Engineering Problem Solving

**MCET 404 ENERGY LABORATORY - 1 semester hour**

A study of heat transfer equipment; shell and tube heat exchangers, energy conversion from chemical to mechanical energy; calorimeters; internal combustion engines (diesel and Otto cycles).

**Corequisite:** MCET 401 Applied Thermodynamics

**MCET 406 MACHINE DESIGN II - 3 semester hours**

A further development of the principles and techniques of machine element design with particular regard to gears, axles and shafts, bearings, clutches, brakes, gaskets and seals. Design projects are included.

**Prerequisite:** MCET 306 Machine Design I

**MCET 415 INSTRUMENTATION AND CONTROLS - 3 semester**

A study of the basic concepts and principles associated with the operation and use of sensors and instruments for the measurement and for the control of various properties (temperature, pressure, liquid level, fluid flow, etc.); accuracy and reliability of instruments and their role in control systems.

**Prerequisite:** ELET 410 Introduction to Electricity and Electronics

**MCET 416 MEASUREMENTS LABORATORY - 1 semester hour**

Experiments are conducted to reinforce and expand on concepts learned in MCET 415 lecture course; emphasis is on electrical and electronic devices used in mechanical measurements; included as various types of transducers, bridge circuits, and operational amplifiers.

**Co-requisite:** MCET 415 Instrumentation and Controls

**MCET 421 HYDRAULICS AND PNEUMATICS - 3 semester hours**

Fundamentals of hydraulic and pneumatic system design and troubleshooting; topics include circuit diagrams, valves, rotary activators, cylinders, pumps, piping and fitting losses.

**Prerequisite:** MCET 313 Fluid Mechanics

**MCET 422 HYDRAULICS AND PNEUMATICS LAB - 1 semester hour**

Selected design problems and projects dealing with principles and methods discussed in MCET 421. Preparation of circuit diagrams, flow charts, and detailed designs; circuits are set up and analyzed.

**Corequisite:** MCET 421 Hydraulics And Pneumatics

**MCET 441 HEAT TRANSFER - 3 semester hours**

A course on the fundamental principles of heat transfer with a broad range of engineering applications. The classic modes of heat transfer, steady state and transient conduction, natural and forced convection, and radiation, will be emphasized. Both numerical and analytical solutions are discussed and illustrated. Application to problems associated with both mechanical and electronic engineering will be demonstrated through problems such as those related to the heating and cooling of buildings and the cooling of electronic equipment.

**Prerequisite:** Math 261 Calculus II and permission of instructor

**MCET 499 SPECIAL TOPICS IN ENGINEERING TECHNOLOGY - 3 semester hours**

A course or independent study covering some topic in Engineering Technology as technical elective. Goal is to enhance student skill and knowledge in relevant topic.

**Prerequisite:** Permission of instructor

**INFORMATION LOGISTICS TECHNOLOGY**

**INLT 141 INTRODUCTION TO LOGISTICS – 3 semester hours**

This course will cover topics related to logistics in a systems approach to managing activities associated with transportation, inventory management and control, forecasting, and integration of logistics with other functional areas, cross functional teams, supplier, distributor, and customer partnerships.

**INLT 161 ENGINEERING GRAPHICS I – 3 semester hours**

Introduction to basic 2D technical drawing and drafting, including sketching, lines, points, geometry, orthographic projection, auxiliary views, section views, basic dimensioning, introduction to GD&T, visualization, basic drawing standards. Student projects required (sketching, drawing, and CAD software)

**INLT 201 TECHNOLOGY AND SOCIETY - 3 semester hours**

A survey of the technology field as it relates to the academic background and opportunities for industrial technology graduates is covered. Advancing technology and its impact on industry, business, and society is reviewed

**INLT 212 PRINCIPLES OF TECHNOLOGY – 3 semester hours**

Provide students with experience in the application of the principles of physics and mathematics as they relate to the modern technological systems, including robotics in a unified systems approach to explore mechanical, electrical, fluid, and thermal systems dealing with force, work, rate, resistance, energy, power, force transformers, momentum, wave, energy converters, transducers, radiation, optical systems, and time constants.

**INLT 217 TECHNICAL GRAPHICS COMMUNICATION – 3 semester hours**

Introduction to the use of various technical graphics media and methods of presentation of technical information. Topics include; electronic slide shows, graphic file formats, basic editing of graphic data, user interface design, graphic presentation, and interpreting graphic data.

**INLT 245 DISTRIBUTION SYSTEMS – 3 semester hours**

The course is designed to provide students with an introduction to the methods and strategies used in distributing products and managing the inventory in supply chain. Topics covered include the design of channels and activities performed by node members to facilitate efficient movement of goods.

**Prerequisite:** INLT 141 Introduction to Logistics

**INLT 247 MATERIALS HANDLING AND INVENTORY CONTROLS – 3 semester hours**

The principles of quantitative and operational approaches to the design of handling system including receiving, storage, retrieval, packaging, palletizing, material handling, order picking, shipping, facility sizing and layout. Information systems and operating policies of material handling and warehousing will be covered.

**Prerequisite:** INLT 141 Introduction to Logistics

**INLT 249 MATERIAL PROCESSES AND SAFETY ANALYSIS – 3 semester credits**

This course provides a strong foundation of knowledge of manufacturing materials, standards and standard organizations; properties and nature of materials, materials testing and applications. Safety engineering and program management of specific construction and industrial hazards and other safety documents dealing with accident investigations.

**Prerequisite:** INLT 212 Principles of Technology

**INLT 250 INDUSTRIAL MATERIALS – 3 semester hours**

This course provides a strong foundation of knowledge of industrial materials, ranging from traditional metals, wood, ceramics, and polymers to advanced engineered materials and composites. Standards and standard organizations; properties and nature of materials, materials testing and applications.

**Prerequisite:** INLT 212 Principles of Technology

**INLT 261 ENGINEERING GRAPHICS II – 3 semester hours**

Introduction to 3D modeling including visualization skills, basic parametric modeling, CSG modeling, primitives, Boolean operators, view extraction, file management, assembly, dimensioning, and drawing standards. Student projects required (sketching, CAD software).

**Prerequisite:** ENGR 200 Engineering Graphics

**INLT 280 INDUSTRIAL ERGONOMICS – 3 semester hours**

This course focuses on work design and ergonomics in manufacturing. Specific attention will be on introducing the terminology and the techniques used in work design, and the fundamental concepts embodied in industrial ergonomics. Community based projects may be required.

**Prerequisite:** MATH 122 Finite Mathematics

**INLT 281 INDUSTRIAL SAFETY - 3 semester hours**

OSHA and its administration. Safety engineering and program management of specific construction and industrial hazards; standards, codes, and other safety documents. Accident investigation and safety analysis. Topics in occupational safety and environmental health are widely covered in the course.

**Prerequisite:** INLT 249 Material Processes and Safety Analysis

**INLT 290 INTRODUCTION TO DATABASE APPLICATIONS - 3 semester hours**

This course introduces the underlying concepts behind data modeling and database systems using relational database management systems (RDBMS), the structured query language (SQL), and web applications (Perl DBI in CGI).

**INLT 292 INTRODUCTION TO ENTERPRISE RESOURCE PLANNING– 3 semester hours**

ERP approaches to design, plan, and control of logistics management. Core aspects of enterpriser resources planning (ERP) infrastructure and application with extensive hands on practice example s applications will be covered.

**INLT 320 INTRODUCTION TO ERP and FINANCIAL ACCOUNTING – 3 semester hours**

Studies the need for integration and the challenges of managing complex interfaces of functional areas of business with its financial accounting. Activities that lead to integration of information funds and material flows across multiple organizations are discussed.

**Prerequisite:** INLT 292 Introduction to Enterprise Resource Planning

**INLT 330 SALES AND PROCUREMENT– 3 semester hours**

A realistic perspective on the role of industrial sales and the nature of the sales task in our business. Identification of critical influences on organizational buyer behavior, both internal and external, definition of various types of buying situations, and organizational purchasing processes.

**Prerequisite:** INLT 245 Distribution Systems

**INLT 335 LEAN PROCESS MANAGEMENT– 3 semester hours**

A systematic approach to eliminating non-value added activities throughout a production system. Lean principles and techniques will be applied to improve organizations ability to provide added customer value on products. Community based projects may be required.

**Prerequisite:** INLT 212 Principles of Technology

**INLT 345 TRANSPORTATION LOGISTICS – 3 semester hours**

Introduction to the theory and applications of transportation, logistics, and associated costs is covered. Topics include modes of transportation and their networks; optimization of transportation systems across networks; flow across networks; supply, demand, and forecasting for transportation services; costs and benefits of specific modes and transportation policy analysis.

**Prerequisite:** INLT 141 Introduction to Logistics and INLT 245 Distribution Systems

**INLT 350 INDUSTRIAL CONTROLS – 3 semester hours**

Study of the devices, procedures, and techniques essential to industrial measurement and transmission of data in the areas of machine control, process control, and automated testing. Topics include: switches, transformers, relays, actuators, solenoids, transducers, timers, counters, motor starters, ladder diagrams, and power factor correction.

**Prerequisite:** INLT 212 Principles of Technology

**INLT 353 FLUID POWER – 3 semester hours**

Provides students with experience in the application of the principles of physics and mathematics as they relate to problem solving in modern technological systems, including robotics in a unified systems approach to explore mechanical, electrical, fluid, and thermal systems dealing with force, work, rate, resistance, energy, power, force transformers, and time constants as it relates to fluid power.

**Prerequisite:** INLT 212 Principles of Technology

**INLT 359 INDUSTRIAL ORGANIZATION AND MANAGEMENT– 3 semester hours**

This course is a survey of organizational structures, operational, financial, marketing, and accounting management. Emphasis is places on planning, control, personnel, safety, wages, policies, and leadership for an effective industrial management.

**INLT 362 ENGINEERING GRAPHICS III – 3 semester hours**

Continuation of INLT 261. Advanced parametric modeling, product development and design, technical animation of assemblies – group project required (sketching, CAD software)

**Prerequisite:** INLT 261 Engineering Graphics II

**INLT 365 MECHANICAL PRINT READING – 3 semester hours**

Reading prints as related to current common practices in engineering and technology. Emphasis on standardization and quality real world

manufacturing industry print examples. Application of national (ANSI Y – 14) and international standards and related documentation practices, including geometric tolerance.

**Prerequisite:** ENGR 200 Engineering Graphics and INLT 249 Material Processes and Safety Analysis

#### **INLT 370 ARCHITECTURAL DRAFTING AND DESIGN I – 3 semester hours**

Introduction to residential architecture, plots plans, footings and foundations, residential structures, building codes, schedules, basic interiors. Student projects required (sketching, CAD software).

**Prerequisite:** ENGR 200 Engineering Graphics

#### **ARCHITECTURAL DRAFTING AND DESIGN II – 3 semester hours**

Continuation of INLT 370, focus on material, schedules, HVAC, plumbing, and electrical details. Student projects required (sketching, CAD software)

**Prerequisite:** INLT 370 Architectural Drafting and Design I

#### **INLT 374 STATICS AND STRENGTH OF MATERIALS – 3 semester hours**

Structural principles and concepts linked to real buildings and components. Elementary statics and strength of materials as they related to the basic principles of mechanics. Gravity and lateral load tracings; determinate structural frame-works. Concept of stress and strain, and material properties; cross-sectional properties; Beam and column analysis and design; steel connections. Use of structural software to generate graphically display outlook.

**Prerequisite:** MATH 212 Introduction to Calculus, INLT 372 Architectural Drafting and Design II or permission of instructor

#### **INLT 383 QUALITY MANAGEMENT - 3 semester hours**

Quality management philosophies of Deming, Juran, and Cosby; total quality management (TQM); quality improvement and problem solving, with practical examples of quality problem tools; sampling techniques. The Taguchi loss function, quality function and policy deployment, materials control and just-in-time; quality audits; ISO 9000 inspection standards; charts for statistical process control and interpretation.

**Prerequisite:** STAT 210 Elementary Statistics I

#### **INLT 385 COST ESTIMATING - 3 semester hours**

Principles and techniques necessary for the economic analysis and cost evaluation of construction and industrial design projects. Interpretation of construction and engineering drawings and specifications; estimating, operations, products, projects, and systems. Estimate assurance and contract considerations.

**Prerequisite:** INLT 249 Material Processes and Safety Analysis

#### **INLT 443 ENGINEERING AND TECHNOLOGY ENTREPRENEURSHIP – 3 semester hours**

This course covers concepts related to entrepreneurship relevant to engineering and technology applications. Major topics include entrepreneurial risk taking, startup strategies, innovative idea evaluation, business plan writing, financing and venture capital, managing growth and introducing and sustaining innovative products and services. Through case studies and guest speakers, the course introduces students to the knowledge and skills needed to recognize and seize technological entrepreneurial opportunities.

**Prerequisite:** Junior or Senior standing

#### **INLT 444 ENTERPRISE RESOURCE PLANNING – 3 semester hours**

Analytical approaches to design, planning, and control of logistics management. Core aspects of enterprise resource planning (ERP) infrastructure and applications in industry. ERP planning strategies and

implementation, including domestic and international manufacturing and service operations.

**Prerequisite:** Consent of Instructor

#### **INLT 445 PROCUREMENT MANAGEMENT – 3 semester hours**

The role of procurement in business and industry; relationships with other departments, procedures, and basic policies. Planning, organization, budgeting, negotiations, purchasing ethics, procurement control, strategic purchasing management, and impact of research and value analysis.

**Prerequisite:** INLT 345 Transportation Logistics

#### **INLT 446 ELECTRONICS LOGISTICS – 3 semester hours**

Reviews several E-Business trends related to logistics management; the impact of E-Business on creating a business plan and discussing E-Business architecture. CRM core competencies, organizational challenges, implementation trends, and planning strategies.

**Prerequisite:** INLT 320 Introduction to ERP and Financial Accounting

#### **INLT 447 SUPPLY CHAIN MANAGEMENT – 3 semester hours**

planning and implementation of supply chain management, reverse logistics, integrated production. Inventory and distribution problems, multi-partner pricing analysis, and supply chain distribution network designs will be covered.

**Prerequisite:** INLT 345 Transportation Logistics

#### **INLT 448 GLOBAL LOGISTICS – 3 semester hours**

It covers topics related to global logistics as key component of supply chains that coordinates the movement of raw materials, work-in-process in a global network of shippers, forwarders, third party transportation providers, warehouses, customs agencies, and consignees to coordinate the activities that provide the logistics product.

**Prerequisite:** INLT 345 Transportation Logistics

#### **INLT 451 ANALYTICS/BUSINESS INTELLIGENCE– 3 semester hours**

This course is an introduction to business analytics that uses extensive data, statistical and qualitative analysis, exploratory and predictive models, and fact-based management to drive decisions and actions. The development and use of data warehouses and data marts to support business analytics is discussed. The use of key performance indicators, dashboards and scorecards for performance management and opportunity assessment are addressed. Text and web mining are discussed, and the application of selected data mining techniques to business decision making situations is illustrated. Hands-on exercises will be provided for active participation.

**Prerequisite:** INLT 320 Introduction to ERP and Financial Accounting

#### **INLT 473 ARCHITECTURAL DRAFTING AND DESIGN III – 3 semester hours**

Focus on commercial structures and codes, various international styles of architecture, green construction, alternative building materials and energy sources. Student projects required. (sketching, CAD software)

**Prerequisite:** INLT 372 Architectural Drafting and Design II

#### **INLT 480 FACILITIES MANAGEMENT – 3 semester hours**

Facilities planning strategies, product, process, and schedule design; flow space and activity relationships; design of material handling system. Facilities functions and systems; quantitative facilities planning models, including the use of software applications. Industrial facility management.

**Prerequisite:** ENGR 200 Engineering Graphics and INLT 245 Distribution Systems

#### **INLT 481 MECHANICAL INSPECTION – 3 semester hours**

Inspection points, personnel, and planning, using various graphical inspection techniques. Inspection as an appraisal activity in business/industry. Dimensional metrology-application of common and special gages; surface plate tools and techniques. Inspection planning and procedures; sampling and testing methods; nondestructive testing. Laboratory activities are included. Industrial visitation is required.

**Prerequisite:** INLT 383 Quality Management or permission of instructor

#### **INLT 485 PROJECT MANAGEMENT - 3 semester hours**

The principles and techniques of managing engineering and construction projects from the conception phase through design and construction, to completion. Working with project teams, early estimates, and design proposals; project budgeting, scheduling, and aggregate planning. Case study approach is emphasized.

**Prerequisite:** INLT 385 Cost Estimating

#### **INLT 486 PLANNING AND SCHEDULING - 3 semester hours**

Principles of planning and scheduling in manufacturing and service industries; the conversion of a project plan into an operating time-table. Application areas to cover project, job-shop, workforce, supply chain, and economic lot scheduling. Methodologies to include PERT, WBS, and GANTT chart. Utilization of current and emerging technologies and global dynamics with project management will be emphasized.

**Prerequisite:** INLT 485 Project Management

#### **INLT 499 SPECIAL TOPICS – 3 semester hours**

A course or independent study covering a topic in Information Logistics Technology that may be used in lieu of a technical elective. The goal of this course is to enhance students' skills and knowledge in an area relevant to their area of study.

**Prerequisite:** Permission of instructor

ELET (p. 8), ENGT (p. 9), MCET (p. 10), INLT (p. 11)

## **Electronics Engineering Technology (ELET)**

#### **ELET 101. Circuit Analysis I. (3 Credits)**

A beginning course in electric circuit analysis with emphasis on direct-current applications. Topics include: SI units and scientific notation, electrical quantities, measuring electrical quantities, power and energy, resistive circuits, methods of analysis, network theorems and capacitance. Corequisites: ENGT 100 Introduction to Engineering Technology; MATH 150 Precalculus or equivalent; ELET 103 Circuit Analysis I Lab.

#### **ELET 102. Circuit Analysis II. (3 Credits)**

A beginning course in electric circuit analysis with emphasis on alternating-current applications. Topics include: magnetic circuits, inductors, sinusoidal waveforms, basic elements and phasors, series and parallel ac circuits, series-parallel networks, ac power, resonance, and three-phase systems. Prerequisites: ELET 101 Circuit Analysis I; MATH 150 Precalculus or equivalent Corequisite: ELET 104 Circuit Analysis II Lab.

#### **ELET 103. Circuit Analysis I Lab. (1 Credit)**

Laboratory experiments in DC theory with emphasis on breadboarding electric circuits, using meters, and using electronic simulation software to complement ELET 101 Circuit Analysis I. Corequisites: ENGT 100 Introduction to Engineering Technology; Math 150 Precalculus or equivalent; ELET 101 Circuit Analysis I.

#### **ELET 104. Circuit Analysis II Lab. (1 Credit)**

Laboratory experiments in AC theory with emphasis on breadboarding electric circuits, using meters and other test equipment to measure and troubleshoot AC circuits and devices. Develops skills in measuring AC circuit parameters. Prerequisites: ELET 101 Circuit Analysis I; MATH 150 Precalculus or equivalent Corequisite: ELET 102 Circuit Analysis II.

#### **ELET 203. Intro to Electronics. (3 Credits)**

An introductory course in solid-state electronic devices and their applications. Topics include the following: diodes and their applications, Zener diodes, the junction transistor, CE, CB, and CC configurations of junction transistors, the SCR and other thyristors, and field-effect transistors. Prerequisite: ELET 101 Circuit Analysis I Corequisite: ELET 205 Introduction to Electronics Lab.

#### **ELET 204. Electronic Circuits. (3 Credits)**

An introductory course in solid-state electronic circuits and their applications. Topics include the following: amplifier frequency response, power amplifiers, oscillators, differential and operational amplifiers, operational amplifier applications, power supplies, and voltage regulators. Prerequisite: ELET 203 Introduction to Electronics Corequisite: ELET 206 Electronics Circuits Lab.

#### **ELET 205. Intro to Electronics Lab. (1 Credit)**

Laboratory experiments with semiconductor junction devices, with emphasis on diodes, bipolar junction transistors and field-effect transistors including DC biasing and stability to complement ELET 203 Introduction to Electronics. Prerequisite: ELET 101 Circuit Analysis I Corequisite: ELET 203 Introduction to Electronics.

#### **ELET 206. Electronics Circuits Lab. (1 Credit)**

Laboratory experiments on power amplifiers, operational amplifiers, oscillators, voltage regulators, and other semiconductor devices, and frequency response analysis to complement ELET 204 Electronic Circuits. Prerequisite: ELET 203 Introduction to Electronics; Corequisite: ELET 206 Electronic Circuits.

#### **ELET 207. Digital Circuits. (3 Credits)**

An introductory course in digital-circuit concepts, applications, and design. Topics include the following: number systems and codes, logic gates, Boolean algebra, Karnaugh mapping, combinational logic design, sequential logic circuits, sequential logic design, and IC logic families. Prerequisite: ELET 101 Circuit Analysis I Corequisite: ELET 209 Digital Circuits Lab.

#### **ELET 208. Microprocessors. (3 Credits)**

Introduction to 16-bit microprocessors with emphasis on programming. Topics include the following: data control, memories, data transmission, addressing modes, subroutines, and introduction to hardware. Prerequisite: ELET 207 Digital Circuits Corequisite: ELET 211 Microprocessors Lab.

#### **ELET 209. Digital Circuits Lab. (1 Credit)**

Laboratory experiments in combinational logic circuits designed to complement ELET 207 Digital Circuits; analyze, measure and troubleshoot logic circuits and devices using general test equipment. Prerequisite: ELET 101 Circuit Analysis I Corequisite: ELET 207 Digital Circuits.

#### **ELET 211. Microprocessors Lab. (1 Credit)**

Microprocessor-based laboratory utilizing computer programming language. Emphasis is on writing and running programs on 8086/8088 based microprocessor systems. Laboratory experience includes both software and hardware. This is the laboratory that accompanies ELET 208 Microprocessors. Prerequisite: ELET 207 Digital Circuits Corequisite: ELET 208 Microproces.

**ELET 304. Advanced Circuit Analysis. (1-4 Credits)**

An advanced course in electric circuit analysis. Topics include the following: review of analysis methods for dc and ac networks, waveforms, differential equations, Laplace transforms and applications, and transfer functions. Prerequisites: ELET 102 Electronic Circuits; MATH 260 Calculus I.

**ELET 306. Advanced Electronics. (3 Credits)**

An advanced course in the design and applications of linear integrated circuit devices. Topics include the following: power supply regulators, op-amp characteristics, single-supply operation, signal generator circuits, and active filters. Prerequisites: ELET 204 Electronic Circuits; MATH 260 Calculus I Corequisite: ELET 307 Advanced Electronics Lab.

**ELET 307. Advanced Electronics Lab. (1 Credit)**

Hands-on experience with the design and applications of more advanced electronic circuits including linear integrated electronic circuit devices. This laboratory course is designed to complement ELET 306 Advanced Electronics. Prerequisites: ELET 204 Electronic Circuits; MATH 260 Calculus I Corequisite: ELET 306 Advanced Electronics.

**ELET 309. Advanced Digital Circuit. (3 Credits)**

A design course for digital computer circuits using integrated circuit devices. Topics include the following: shift registers, counters, encoders, multiplexers, arithmetic circuits, D/A and A/D converters, and memory circuits. Prerequisite: ELET 207 Digital Circuits Corequisite: ELET 311 Advanced Digital Circuits Lab.

**ELET 311. Adv Digital Circuits Lab. (1 Credit)**

This laboratory course complements ELET 309 Advanced Digital Circuits. Students design, construct and troubleshoot digital circuits that include shift registers, memory ICs, PLDs, DACs/ADCs. Design and simulation tools are utilized. Prerequisite: ELET 207 Digital Circuits Corequisite: ELET 309 Advanced Digital Circuits.

**ELET 399. Special Topics. (3 Credits)**

A course which can be designated by the department to cover some aspect of Engineering Technology as needed by a class or group of students in lieu of another technical elective or as independent study to upgrade their skills and knowledge in a particular area. Prerequisite: Permission of the instructor.

**ELET 401. Electric Machinery. (3 Credits)**

A course in electric machines designed for students majoring in electronics engineering technology. Topics include the following: fundamentals of electromagnetics, dynamo construction, dc generators and motors, ac dynamos, synchronous machines, ideal and practical transformers, polyphase and single-phase induction motors, and other single-phase motors. Prerequisites: ELET 102 Circuit Analysis II; MATH 260 Calculus I; PHYS 106 Introduction to Physics II or equivalent.

**ELET 403. Control Systems. (3 Credits)**

A course in control theory and applications. Topics include the following: feedback control, servo components, mathematical techniques, transfer functions, block diagrams, analysis of second-order servo systems, stability and frequency response analysis, and compensation. Prerequisites: ELET 304 Advanced Circuit Analysis; MATH 261 Calculus II; PHYS 105 Introduction to Physics I or equivalent.

**ELET 406. Communication Systems. (3 Credits)**

Introduction to the theory and practice of communication systems. Covers communication system theory, analog and digital communication techniques. Topics include the following: amplitude, phase, analog, pulse and digital modulation, design and analysis of modulation systems. Prerequisites: ELET 208, ELET 306, ELET 309 and PHYS 106 (or equivalent)

**ELET 408. Advanced Microprocessors I. (3 Credits)**

An advanced course in microprocessors with emphasis on the hardware of a 16-bit processor. Topics include the following: introduction to the 8086/8088 microprocessor, arithmetic and logic instructions, program control instructions, 8086/8088 hardware specifications, memory interfacing, input/output interfacing, and interrupt circuits. Prerequisite: ELET 208 MICROPROCESSORS Corequisite: ELET 411 Advanced Microprocessors I Lab.

**ELET 409. Advance Microprocessors II. (3 Credits)**

An advanced course in microprocessors with emphasis on the hardware interfacing of the 8086/8088 to compatible chips. Topics include the following: basic I/O interfacing (using the 8255A PPI), interrupts (using the 8259A PIC), direct memory access, the 8089 I/O coprocessor, the 8087 arithmetic coprocessor, and other 8086/8088 family members. Prerequisite: ELET 408 Advanced Microprocessors I Corequisite: ELET 412 Advanced Microprocessors II Lab.

**ELET 412. Advan Microprocessors II Lab. (1 Credit)**

Project oriented laboratory course in the areas of microprocessor based systems. Prerequisite: ELET 408 Advanced Microprocessors I Corequisite: ELET 409 Advanced Microprocessors II.

**ELET 415. Power System Fundamentals. (3 Credits)**

This course offers an overview of power system fundamentals with an emphasis on industry-relevant material. Topics include: an introduction to electrical power systems, circuit solving, components of a power system, and power system analysis. Prerequisite (s): ELET 102 Circuit Analysis II or ENGT 290 Introduction to Electricity and Electronics or equivalent.

**ELET 499. Special Topics. (3 Credits)**

A course which can be designated by the department to cover some aspect of Engineering Technology as needed by a class or group of students in lieu of another technical elective or as independent study to upgrade their skills and knowledge in a particular subject area. Prerequisite: Permission of instructor.

## Engineering Technology (ENGT)

**ENGT 100. Introduction Engineering Tech. (2 Credits)**

Introduction to professional field of engineering technology; professional ethics and responsibilities of technologists; application of hand calculator to engineering problem solving; systems of units and their conversions; engineering problem-solving techniques. Corequisite: MATH 150 Precalculus or equivalent.

**ENGT 105. Engineering Problem Solving. (2 Credits)**

Introduction to use of computers for solving engineering problems. Topics include: Computer Systems, Mathematics and Engineering Technology/Engineering Software Packages. Prerequisite: ENGT 100 Introduction to Engineering Technology.

**ENGT 261. Fundamentals of ENGR Graphics. (3 Credits)**

Introduction to basic 2D technical drawing and 3D modeling, including sketching, lines, points, geometry, orthographic projection, auxiliary views, section views, basic dimensioning, introduction to GD&T, visualization, basic drawing standards, and assembly. Student projects required (sketching, drawing, and CAD software)

**ENGT 290. Intro to Elect/Electronics. (3 Credits)**

A course in electrical circuits and electrical machines for students NOT majoring in electronics engineering technology. Topics include the following: resistors, dc circuits, magnetism, electromagnetic forces, ac voltage and current, inductance and capacitance, dc generators and motors, ac circuits, single-phase and three-phase circuits, transformers, 3-phase induction motors, synchronous motors and generators, single-phase motors, motor controls, and electrical distribution. Prerequisites: PHYS 106 Introduction to Physics II or equivalent; MATH 150 Precalculus or Equivalent.

**ENGT 301. Computer Programming. (3 Credits)**

Basic engineering methods of problem solving using C/C++ or other high-level programming 253 languages. Prerequisite: ENGT 105.

**ENGT 321. Engineering Economy. (3 Credits)**

Analysis of the time value of money as applied to the production environment, Economic analysis of engineering decisions. Determining rates of return on investments. Effects of inflation, depreciation and income taxes. Sensitivity, uncertainty, and risk analysis. Application of basic principles and tool of analysis using case studies. Prerequisite: MATH 260 Calculus I.

**ENGT 401. Technical Internship. (3 Credits)**

This course requires the student to work in a company for a semester. The internship provides practical experience in a closely supervised environment. A written Report is required at the end of the internship program. Nine contact hours per week. Prerequisite: Junior Standing and Consent of Instructor.

**ENGT 420. Senior Project I. (3 Credits)**

Student will design a project to illustrate basic knowledge and skills in one phase of his/her major field. Proposal development, library research, project management and computer usage are stressed. Prerequisite: Senior Standing and Consent of Instructor.

**ENGT 421. Senior Project II. (2 Credits)**

This portion of the project includes complete design specifications, computer analysis and/or simulation, library research, oral and written reports. It may also include construction, trouble-shooting and demonstration of a working prototype. Prerequisite: ENGT 420 Senior Project I.

## Mechanical Engineering Technology (MCET)

**MCET 102. Machines Laboratory. (1 Credit)**

Basic hand tools, shop safety procedures; fundamental machine operations of drilling, sawing, milling, turning; inspection tools, gauges, measuring instruments. Prerequisite: None.

**MCET 200. Statics. (3 Credits)**

Force systems, resultants, and equilibrium; trusses, method of joints, method of sections; friction; centroids, moments of inertia. Prerequisites: MATH 150 Precalculus or equivalent and ENGT 100 Introduction to Engineering Technology.

**MCET 201. Strength Of Materials. (3 Credits)**

Stress and deformation; axial, tensile and compressive stresses, torsion; shear and moment in beams; stresses in beams; and design of beams. Prerequisite: MCET 200 Statics.

**MCET 202. Strength Of Materials Lab. (1 Credit)**

Tensile, compressive, torsional, bending, impact, hardness, and fatigue tests of materials; use of electrical resistance strain gages; statistical evaluation of data. Prerequisites: MCET 200 Statics and MCET 102 Machines Lab. Corequisite:

**MCET 301. Intro To Thermodynamics. (3 Credits)**

An introduction to fundamentals of thermodynamics; including work and heat; first and second laws; properties of gases, gas mixtures; compression and expansion of gas steam tables are covered. Prerequisites: MATH 260 Calculus I.

**MCET 305. Manufac Materials & Processes. (3 Credits)**

The study of the physical and mechanical properties of various materials as applied to design, processing, and fabrication methods. Prerequisites: MCET 201 Strength of Materials.

**MCET 306. Machine Design I. (3 Credits)**

The design of basic elements used in machines, including machine columns, welds, rivets, screws, springs, flexible couplings, belt and chain drives. Design for fatigue strength is included. Prerequisites: MCET 201 Strength of Materials, ENGR 200 Engineering Graphics and MATH 260 Calculus I.

**MCET 307. Kinematics Of Machines. (3 Credits)**

The study of techniques for the analysis of displacement, velocity, and acceleration of machine elements; emphasis on graphical kinematics of linkages; introduction to cams. Prerequisites: ENGR 200 Engineering Graphics and MCET 311 Dynamics.

**MCET 311. Dynamics. (3 Credits)**

The kinematics and kinetics of particles and rigid bodies; rectilinear and curvilinear motion, work, energy, impulse and momentum. Use of computers for problem solving is included. Prerequisites: MCET 200 Statics, MATH 261 Calculus II and PHYS 105 Physics I.

**MCET 313. Fluid Mechanics. (3 Credits)**

Properties of fluids; fluid statics and dynamics, including momentum, energy, Bernoulli's equation, fluid flow in pipes, fluid machinery, and open channels: study of the siphon, pitot tube, venturi meter, orifices, nozzles, diffusers, weirs, etc. Prerequisites: MCET 200 Statics and MATH 260 Calculus I.

**MCET 314. Fluid Mechanics Laboratory. (1 Credit)**

Laboratory demonstrations, experiments, and exercises dealing with the verification of fluid equations, and principles and characteristics of fluid machinery. Co-requisite: MCET 313 Fluid Mechanics.

**MCET 401. Applied Thermodynamics. (3 Credits)**

Study of thermodynamic cycles; includes Carnot, Rankine, Sterling and Application of thermodynamic principles to turbines and compressors. Prerequisites: MCET 301 Introduction to Thermodynamics and MATH 261 Calculus II.

**MCET 403. Quality Control. (3 Credits)**

A study of the principles and techniques of quality control and its applications to industrial processes. Topics include: An overview of Total Quality Management (TQM), statistics, process control charts, and probability. The relationship between process capability and product specifications is analyzed. Prerequisite: ENGT 105 Engineering Problem Solving.

**MCET 404. Energy Laboratory. (1 Credit)**

A study of heat transfer equipment; shell and tube heat exchangers, energy conversion from chemical to mechanical energy; calorimeters; internal combustion engines (diesel and Otto cycles). Corequisite: MCET 401 Applied Thermodynamics.

**MCET 406. Machine Design II. (3 Credits)**

A further development of the principles and techniques of machine element design with particular regard to gears, axles and shafts, bearings, clutches, brakes, gaskets and seals. Design projects are included. Prerequisite: MCET 306 Machine Design I.

**MCET 412. Tool Design Laboratory. (1 Credit)****MCET 415. Instrumentation And Control. (3 Credits)**

A study of the basic concepts and principles associated with the operation and use of sensors and instruments for the measurement and for the control of various properties (temperature, pressure, liquid level, fluid flow, etc.); accuracy and reliability of instruments and their role in control systems. Prerequisites: ELET 410 Introduction to Electricity and Electronics.

**MCET 416. Measurements Laboratory. (1 Credit)**

Experiments are conducted to reinforce and expand on concepts learned in MCET 415 lecture course; emphasis is on electrical and electronic devices used in mechanical measurements; included as various types of transducers, bridge circuits, and operational amplifiers. Co-requisite: MCET 415 Instrumentation and Controls.

**MCET 421. Hydraulics And Pneumatics. (3 Credits)**

Fundamentals of hydraulic and pneumatic system design and troubleshooting; topics include circuit diagrams, valves, rotary activators, cylinders, pumps, piping and fitting losses. Prerequisite: MCET 313 Fluid Mechanics.

**MCET 422. Hydraulics & Pneumatics Lab. (1 Credit)**

Selected design problems and projects dealing with principles and methods discussed in MCET 421. Preparation of circuit diagrams, flow charts, and detailed designs; circuits are set up and analyzed. Corequisite: MCET 421 Hydraulics And Pneumatics.

**MCET 441. Heat Transfer. (3 Credits)**

A course on the fundamental principles of heat transfer with a broad range of engineering applications. The classic modes of heat transfer, steady state and transient conduction, natural and forced convection, and radiation, will be emphasized. Both numerical and analytical solutions are discussed and illustrated. Application to problems associated with both mechanical and electronic engineering will be demonstrated through problems such as those related to the heating and cooling of buildings and the cooling of electronic equipment. Prerequisite: Math 261 Calculus II and permission of instructor.

**MCET 499. Special Topics In Engr Tech. (3 Credits)**

A course or independent study covering some topic in Engineering Technology as technical elective. Goal is to enhance student skill and knowledge in relevant topic. Prerequisite: Permission of instructor.

## Information and Logistics Technology (INLT)

**INLT 141. Introduction to Logistics. (3 Credits)**

This course will cover topics related to logistics in a systems approach to managing activities associated with transportation, inventory management and control, forecasting, and integration of logistics with other functional areas, cross functional teams, supplier, distributor, and customer partnerships.

**INLT 201. Technology and Society. (3 Credits)**

A survey of the technology field as it relates to the academic background and opportunities for industrial technology graduates is covered. Advancing technology and its impact on industry, business, and society is reviewed.

**INLT 212. Principles of Technology. (3 Credits)**

Provide students with experience in the application of the principles of physics and mathematics as they relate to the modern technological systems, including robotics in a unified systems approach to explore mechanical, electrical, fluid, and thermal systems dealing with force, work, rate, resistance, energy, power, force transformers, momentum, wave, energy converters, transducers, radiation, optical systems, and time constants.

**INLT 217. Tech Graphics Communication. (3 Credits)**

Introduction to the use of various technical graphics media and methods of presentation of technical information. Topics include; electronic slide shows, graphic file formats, basic editing of graphic data, user interface design, graphic presentation, and interpreting graphic data.

**INLT 245. Distribution Systems. (3 Credits)**

The course is designed to provide students with an introduction to the methods and strategies used in distributing products and managing the inventory in supply chain. Topics covered include the design of channels and activities performed by node members to facilitate efficient movement of goods, and Enterprise Resource Planning simulation games. Prerequisite: INLT 141 201608.

**INLT 247. Material Hand & Inven Controls. (3 Credits)**

The principles of quantitative and operational approaches to the design of handling system including receiving, storage, retrieval, packaging, palletizing, material handling, order picking, shipping, facility sizing and layout. Information systems and operating policies of material handling and warehousing will be covered. Prerequisite: INLT 141, INLT161 201608.

**INLT 248. Geog Infor Sysys Logistics. (3 Credits)**

This course will expose students to the concept of spatial analysis using GIS tools. Topics covered will include GIS needs assessment, mapping of spatial entities, linear referencing, development of a GIS-based transportation routing and decision support system, and applications in asset management and planning Prerequisite: INLT 245.

**INLT 249. Material Process & Safety Anal. (3 Credits)**

This course provides a strong foundation of knowledge of manufacturing materials, standards and standard organizations; properties and nature of materials, materials testing and applications. Safety engineering and program management of specific construction and industrial hazards and other safety documents dealing with accident investigations. Prerequisite: INLT 212.

**INLT 250. Manufact Materials & Processes. (3 Credits)**

This course provides a strong foundation of knowledge of industrial materials, ranging from traditional metals, wood, ceramics, and polymers to advanced engineered materials and composites. Standards and standard organizations; properties and nature of materials, materials testing and applications. Prerequisite: INLT 212 201608.

**INLT 261. Engineering Graphics II. (3 Credits)**

Introduction to 3D modeling including visualization skills, basic parametric modeling, CSG modeling, primitives, Boolean operators, view extraction, file management, assembly, dimensioning, and drawing standards. Student projects required (sketching, CAD software). Prerequisite: I.

**INLT 270. Processes Systems & Infor. (3 Credits)**

Introduction to processes and information systems from the point of view of creation, monitoring, and adaptation of processes, systems and information with tutorial exercises of an ERP system is covered in this course.

**INLT 280. Industrial Ergonomics. (3 Credits)**

This course focuses on work design and ergonomics in manufacturing. Specific attention will be on introducing the terminology and the techniques used in work design, and the fundamental concepts embodied in industrial ergonomics. Community based projects may be required. Prerequisite: MATH 122.

**INLT 281. Industrial Safety. (3 Credits)**

OSHA and its administration. Safety engineering and program management of specific construction and industrial hazards; standards, codes, and other safety documents. Accident investigation and safety analysis. Topics in occupational safety and environmental health are widely covered in the course. Prerequisite: INLT 249.

**INLT 290. Introd Database Applications. (3 Credits)**

This course introduces the underlying concepts behind data modeling and database systems using relational database management systems (RDBMS), the structured query language (SQL), and web applications (Perl DBI in CGI).

**INLT 292. Introduction to ERP. (3 Credits)**

ERP approaches to design, plan, and control of logistics management. Core aspects of enterpriser resources planning (ERP) infrastructure and application with extensive hands on practice example s applications will be covered.

**INLT 320. Introd ERP & Financial Acct. (3 Credits)**

Studies the need for integration and the challenges of managing complex interfaces of functional areas of business with its financial accounting. Activities that lead to integration of information funds and material flows across multiple organizations are discussed. Prerequisite: INLT 141, INLT 245 201608.

**INLT 330. Sales and Procurement. (3 Credits)**

A realistic perspective on the role of industrial sales and the nature of the sales task in our business. Identification of critical influences on organizational buyer behavior, both internal and external, definition of various types of buying situations, and organizational purchasing processes. Prerequisite: INLT 245.

**INLT 335. Lean Process Management. (3 Credits)**

A systematic approach to eliminating non-value added activities throughout a production system. Lean principles and techniques will be applied to improve organizations ability to provide added customer value on products. Community based projects may be required. Prerequisite: INLT 212.

**INLT 340. Supply Management. (3 Credits)**

Student deeply explore the supply function, including organization, procedures, supplier selection, quality, inventory decisions, and price determination. Prerequisite: INLT 141, INLT 245.

**INLT 345. Transportation Logistics. (3 Credits)**

Introduction to the theory and applications of transportation, logistics, and associated costs is covered. Topics include modes of transportation and their networks; optimization of transportation systems across networks; flow across networks; supply, demand, and forecasting for transportation services; costs and benefits of specific modes and transportation policy analysis. Prerequisite: INLT 141 and INLT 245.

**INLT 346. Plan Cont Syst Supp Chain Mgmt. (3 Credits)**

Topics such as forecasting, capacity planning, inventory planning, MRP and ERP are discussed to provide students with knowledge of planning and control systems for supply chain management. Prerequisite: INLT 247, INLT 340.

**INLT 359. Org'l Mgmt & Supervision. (3 Credits)**

The course is a survey of organizational structures, operational, financial, marketing, and accounting management. Emphasis is places on planning, control, personnel, safety, wages, policies, and leadership for an effective industrial management.

**INLT 374. Statics & Strength of Material. (3 Credits)**

Structural principles and concepts linked to real buildings and components. Elementary statics and strength of materials as they related to the basic principles of mechanics. Gravity and lateral load tracings; determinate structural frame-works. Concept of stress and strain, and material properties; cross-sectional properties; Beam and column analysis and design; steel connections. Use of structural software to generate graphically display outlook. Prerequisite: MATH 212, INLT 372 or consent of instructor 201608.

**INLT 383. Quality Management. (3 Credits)**

Quality management philosophies of Deming, Juran, and Cosby; total quality management (TQM); quality improvement and problem solving, with practical examples of quality problem tools; sampling techniques. The Taguchi loss function, quality function and policy deployment, materials control and just-in-time; quality audits; ISO 9000 inspection standards; charts for statistical process control and interpretation. Prerequisite: CISY 212 or MATH 210, STAT 210 201608.

**INLT 385. Cost Estimating. (3 Credits)**

Principles and techniques necessary for the economic analysis and cost evaluation of construction and industrial design projects. Interpretation of construction and engineering drawings and specifications; estimating, operations, products, projects, and systems. Estimate assurance and contract considerations. Prerequisite: INLT 250 201608.

**INLT 400. Intelligent Transport Systems. (3 Credits)**

This course is designed to expose the student to the role of new technology in transportation and logistics particularly in the areas of travel information, traffic and incident management, public transportation, freight transportation, and inventory control. The history of cross-cutting issues in intelligent transportation systems development in the U.S. will be examined. Prerequisite: INLT 345.

**INLT 443. Engr & Tech Entrepreneurship. (3 Credits)**

This course covers concepts related to entrepreneurship relevant to engineering and technology applications. Major topics include entrepreneurial risk taking, start up strategies, innovative idea evaluation, business plan writing, financing and venture capital, managing growth and introducing and sustaining innovative products and services. Through case studies and guest speakers, the course introduces students to the knowledge and skills needed to recognize and seize technological entrepreneurial opportunities. Prerequisite: Junior or senior standing 201608.

**INLT 444. Enterprise Resource Config. (3 Credits)**

Analytical approaches to design, planning, and control of logistics management. Core aspects of enterprise resource planning (ERP) infrastructure and applications in industry. ERP planning strategies and implementation, including domestic and international manufacturing and service operations. Prerequisite: Consent of Instructor.

**INLT 445. Procurement Management. (3 Credits)**

The role of acquisition in business and industry; relationships with other departments, procedures, and basic policies. Planning, organization, budgeting, negotiations, purchasing ethics, procurement control, strategic purchasing management, and impact of research and value analysis. Prerequisite: INLT 444 201608.

**INLT 446. Electronics Logistics. (3 Credits)**

Reviews several E-Business trends related to logistics management; the impact of E-Business on creating a business plan and discussing E-Business architecture. CRM core competencies, organizational challenges, implementation trends, and planning strategies. Prerequisite: INLT 444 201608.

**INLT 447. Supply Chain Management. (3 Credits)**

The planning and implementation of supply chain management, reverse logistics, integrated production. Inventory and distribution problems, multi-partner pricing analysis, and supply chain distribution network designs will be covered. Prerequisite: INLT 345 201608.

**INLT 448. Global Logistics. (3 Credits)**

It covers topics related to global logistics as key component of supply chains that coordinates the movement of raw materials, work-in-process in a global network of shippers, forwarders, third party transportation providers, warehouses, customs agencies, and consignees to coordinate the activities that provide the logistics product. Prerequisite: INLT 141, INLT 345 201608.

**INLT 449. Supply Chain Strategy. (3 Credits)**

This capstone course provides an opportunity for students to synthesize the knowledge gained in their previous coursework to integrate supply chain management, production, logistics and enterprise solutions to develop supply chain strategies. Prerequisite: INLT 340, INLT 346, INLT 447.

**INLT 451. Analysis/Business Intelligence. (3 Credits)**

This course is an introduction to business analytics that uses extensive data, statistical and qualitative analysis, exploratory and predictive models, and fact-based management to drive decisions and actions. The development and use of data warehouses and data marts to support business analytics is discussed. The use of key performance indicators, dashboards and scorecards for performance management and opportunity assessment are addressed. Text and web mining are discussed, and the application of selected data mining techniques to business decision making situations is illustrated. Hands-on exercises will be provided for active participation. Prerequisite: INLT 320, INLT 444 201608.

**INLT 465. Research and Negotiations. (3 Credits)**

Students expand upon knowledge gained in INLT 340 and discuss current philosophy, methods and techniques for conducting strategic and tactical supply chain negotiations. Prerequisite: INLT 340, INLT 447.

**INLT 480. Facilities Management. (3 Credits)**

Facilities planning strategies, product, process, and schedule design; flow space and activity relationships; design of material handling system. Facilities functions and systems; quantitative facilities planning models, including the use of software applications. Industrial facility management. Prerequisite: ENGR 200 and INLT 245.

**INLT 485. Project Management. (3 Credits)**

The principles and techniques of managing engineering and construction projects from the conception phase through design and construction, to completion. Working with project teams, early estimates, and design proposals; project budgeting, scheduling, and aggregate planning. Case study approach is emphasized. Prerequisite: INLT 385 201608.

**INLT 486. Planning and Scheduling. (3 Credits)**

Principles of planning and scheduling in manufacturing and service industries; the conversion of a project plan into an operating time-table. Application areas to cover project, job-shop, workforce, supply chain, and economic lot scheduling. Methodologies to include PERT, WBS, and Gantt chart. Utilization of current and emerging technologies and global dynamics with project management will be emphasized. Prerequisite: INLT 485 201608.

**INLT 499. Special Topics. (3 Credits)**

A course or independent study covering a topic in Industrial Technology that may be used in lieu of a technical elective. The goal of this course is to enhance students' skills and knowledge in an area relevant to their area of study. Prerequisite: Permission of Instructor 201608.