APPLIED ENGINEERING (AE)

AE 100 Technology Orientation (2)
Orientation to the department of Technology. Topics include: Personal and social skills, academic/study skills, Technology career planning, advising, program requirements, university organization. Field trips to various local industries required.

AE 201 Microcomputers: Applications and Techniques (3)
Two hours lecture and two hours lab per week. An introduction to microcomputer hardware and applications of the microcomputer in industry. Hands on experience with computer system hardware and software.

AE 207 Electrical, Fluid Power, and Mechanical Systems (3)
An introduction to electrical, mechanical and fluid power systems found in manufacturing. Topics include: safety, basic electricity, circuits, inductors and capacitors, AC basic, transformers and three phase power, relays, and motor starters, switches and sensors, hydraulics and pneumatics, mechanics and power transmissions. For Industrial Leadership majors only.

AE 210 Manufacturing Fundamentals (3)
An introduction to the fundamental practices of manufacturing, providing students with a foundational understanding of material processing, tools, and equipment.

AE 211 AC/DC Circuits (3)
Prerequisite(s): MS 112, MS 113, or MS 125 with minimum grade of C required.
Two hours lecture and two hours lab. Scientific and engineering notation; voltage, current, resistance and power, inductors, capacitors, network theorems, phase analysis of AC circuits.

AE 225 Solid State Devices I (4)
Prerequisite(s): MS 112, MS 113, or MS 125 with minimum grade of C required; and AE 211 with minimum grade of C required.
Three hours lecture and two hours lab. The first course in solid-state devices. Course topics include solid-state fundamentals, diodes, BJTs, amplifiers, and FETs.

AE 251 Computer-Aided Design (3)
Prerequisite(s): MS 112, MS 113, or MS 125 with minimum grade of C required.
Two hours lecture and two hours lab. Interpreting engineering drawings and the creation of computer graphics as applied to two-dimensional drafting and design.

AE 252 Programmable Controllers (3)
Prerequisite(s): AE 201 or CS 201 with minimum grade of C required and sophomore status.
Two hours lecture and two hours lab. Study of basic industrial control concepts using modern PLC systems.

AE 305 Industrial Supervision (3)
Prerequisite(s): Sophomore or higher standing.
Focus on the basic elements of supervision required to effectively supervise employees. Emphasis is on the application and practical skills necessary to be a successful supervisor using applied management techniques.

AE 307 Industrial Training (3)
Prerequisite(s): AE 201 or CS 201; EH 141; minimum grade of C required.
Study of time analysis methods used to determine training requirements, assessing personnel and training resources as well as planning, coordinating and evaluating training.

AE 311 Digital Circuits (4)
Prerequisite(s): AE 201 or CS 201 with minimum grade of C required.
Three hours lecture and two hours lab per week. Introduction to digital logic, binary numbers and codes, Boolean algebra, gating networks, flip flops and registers, combinational and sequential logic circuits, and semiconductor memories. Characteristics of modern digital integrated circuit components, introduction to state logic, and transmission lines.

AE 316 Advanced Electronics (4)
Prerequisite(s): AE 225, 311, or equivalents.
Three hours lecture and two hours lab per week. In-depth study of selected electronic concepts. Topics include: computer analysis of major digital logic families, introduction to state logic, transmission lines, and A/D conversion.

AE 317 Industrial Networking I (3)
Prerequisite(s): AE 201 or equivalent.
Network fundamentals, routing, LAN switching, wireless and wide area networks.

AE 318 Problems in Robotics Design and Programming (3)
Prerequisite(s): EG 255 and approval of instructor.
Problems involving the application and integration of robotic design, remote control of robots, and programming robots for autonomous control.

AE 319 Advanced Problems in Robotics Design and Programming (3)
Prerequisite(s): EG 255 and MS 112/113/125 or permission of instructor.
Problems involving the application and integration of robotic design, remote control of robots, and programming robots for autonomous control. This is the second of two courses that constructs and programs a robot to compete in the ATMAE annual robotics contest. The educational objectives are to gain proficiency in research, design, team work and project management.

AE 326 Solid State Devices II (3)
Prerequisite(s): AE 225.
Corequisite(s): AE 327.
Second course in solid state devices. Topics include: amplifier frequency characteristics, UJT, SCR, OPTO devices, operational amplifiers, filters, and voltage regulators.

AE 327 Solid State Devices II Lab (1)
Corequisite(s): AE 326.
Three hours lab per week. Experiments involving basic electronic devices.

AE 330 Production and Inventory Control (3)
Prerequisite(s): Sophomore Status.
Examines the issues involved in effective manufacturing, production and inventory control and shows their interrelatedness.

AE 341 Work Measurement and Methods (3)
Prerequisite(s): MS 112, MS 113, or MS 125 with a minimum grade of C required.
Analysis of motions necessary to perform industrial operations; motion economy; development of ratings, allowances, standard data, formula construction, work sampling, wage payment and performance training.

AE 342 Employer-Employee Relations (3)
Prerequisite(s): Sophomore Status.
Theory and policy to perform industrial relations; organization and administration, theories of work, labor relations, commitment and morale, communications, employee benefits and services.

AE 343 Engineering and Technology Management (3)
Prerequisite(s): Sophomore Status.
Examination and planning of manufacturing operations, personnel, control methods, equipment and supplies.

AE 344 Engineering Economy and Cost Analysis (3)
Prerequisite(s): MS 112, MS 113, or MS 125; and AE 201 or CS 201; minimum grade of C required.
Technical and economic evaluation of manufacturing operations to determine cost and feasibility.

AE 355 Advanced Computer-Aided Design (3)
Prerequisite(s): AE 251 with minimum grade of C required.
Two hours lecture and two hours lab each week. A parametric, feature-based, solid modeling 3D computer-aided design course for mechanical design.

AE 361 Materials and Processes of Industry (3)
Prerequisite(s): AE 210 or equivalent with minimum grade of C required, and sophomore status.
Selection/altering of industrial materials to increase their value, and how they are used in manufacturing. Emphasis on metal and plastics but other materials are discussed.

AE 365 Strength of Industrial Materials (3)
Prerequisite(s): MS 113 or MS 125 with minimum grade of C required.
Internal stresses and deformation of bodies resulting from action of external forces; concepts and techniques of testing tensile, compression, shear, transverse, hardness, elasticity on various materials and fasteners.

AE 366 Control Systems Technology (3)
Prerequisite(s): AE 211 with a minimum grade of C required.
Coverage of control systems fundamentals to include: open and closed loop systems, measuring instruments characteristics, sensors in control systems, manipulation methods, and types of control systems.

AE 370 Continuous Quality Improvement0 (3)
Prerequisite(s): AE 210 or equivalent.
An introduction to the concept of continuous quality improvement and its implementation using process improvement teams.

AE 371 Quality Control in Industry (3)
Prerequisite(s): MS 112.
Methods and procedures employed in industrial quality control, theories of measurement, error, prediction, sampling, tests of significance and models.

AE 372 Statistical Analysis for Quality Control (3)
Prerequisite(s): MS 112, MS 113, or MS 125; AE 201 or CS 201; and AE 210; minimum grade of C required.
The use of applied statistics as employed in organizations for continuous quality control and improvement; theories of measurement; error, prediction, sampling, tests of significance, and models.

AE 380 Industrial Safety and Health (3)
Prerequisite(s): Sophomore status and AE 210 with minimum grade of C.
Principles of hazard identification.
Engineering and administrative controls and personal protective equipment. Accident analysis and corrective action.

AE 384 Construction Safety (3)
Prerequisite(s): AE 380 with a minimum grade of C required.
Concepts of construction safety and health and an in-depth coverage of federal and state construction safety regulations. Recognition and control of construction hazards, fall protection, scaffolding, excavation, and crane safety.

AE 388 Industrial Hygiene I (3)
Prerequisite(s): AE 380; CY 105 and CY 107; and MS 112, MS 113, or MS 125; minimum grade of C required.
Fundamental principles of anticipation, recognition, evaluation, and control of hazards in the work environment that impair health and well-being. Acute and chronic systemic effects of environmental & health hazards and toxins in the workplace.

AE 390 Hazard Analysis and Control (3)
Prerequisite(s): AE 210, AE 211, and AE 380, with a minimum grade of C required.
Principles and methods for the analysis and design of processes, equipment, products, facilities, operations and environment.

AE 392 Fire Prevention and Protection (3)
Prerequisite(s): MS 112, MS 113, or MS 125, with a minimum grade of C required.
Fire chemistry and propagation. Recognition and control of fire hazards, fire codes, risk, reports and records, and emergency response.

AE 393 Applied Engineering Junior Seminar (1)
Prerequisite(s): Junior standing and EH 322 or CBA 350 with minimum grade of C required.
Coverage of terms, concepts, tools, and skills needed (industrial business, ethics, technical presentations) to succeed as a professional in technological and engineering environments.

AE 405 Industrial Leadership (3)
Prerequisite(s): AE 305 with a minimum grade of C. Focus on leadership styles and the analysis and development of leadership knowledge and skills to form an effective team.
Emphasis on personal and organizational leadership and change management.

AE 407 Industrial Organization and Function (3)
Prerequisite(s): AE 305 with a minimum grade of C. Application of the leadership role in the understanding of human behavior within an organization.
Emphasis on group dynamics, team building, quality of work-life, job design, organizational structure, and organizational change management.

AE 416 Manufacturing Automation and Robotics (3)
Prerequisite(s): AE 201 or CS 201, with minimum grade of C required.
Examination of how industrial controls, and industrial robots function in an automated manufacturing environment. Students learn the theory of operation, how to program, and the practical application of robotic systems. Topics will also include software applications and the integration of control systems for manufacturing.

AE 436 Inventory Management (3)
Prerequisite(s): AE 330.
Prepares students for positions in the field of production and inventory management through understanding of production scheduling, implementation and design.

AE 440 Lean Manufacturing (3)
Prerequisite(s): AE 343 or MGT 301 with minimum grade of C required.
The analysis, design, and implementation of world class manufacturing systems for the manufacture of superior, low cost parts. Topics include lean manufacturing, cellular manufacturing, manufacturing teams, integrated quality systems, and other current manufacturing management strategies.

AE 441 Project Management (3)
Prerequisite(s): AE 201 or CS 201 with minimum grade of C required, and AE 343 or MGT 301 with minimum grade of C required.
Prepare students for managing projects in manufacturing and service industries through understanding of how to plan, manage, and deliver projects on time and within budget and how to effectively contribute in project teams.

AE 442 Facilities Planning (3)
Prerequisite(s): AE 343 or MGT 301 with minimum grade of C required.
Macro and micro level examination of facility planning. Course includes techniques and procedures for developing an efficient facility layout, including collection, analysis, and development of vital and relevant data with emphasis on manufacturing facilities.

AE 451 Advanced Programmable Controllers (3)
Prerequisite(s): AE 252 with a minimum grade of C required.
Two hours lecture and two hours lab. Study of advanced control concepts using modern programmable controllers with detailed study of selected controllers. Study of recent controller architectures with emphasis on data communications.

AE 460 Computer-Aided Manufacturing (3)
Prerequisite(s): AE 251 with minimum grade of C required.
Three hours lecture and one-hour lab. Utilization of computer technology in the automation of manufacturing systems.

AE 477 Additive Manufacturing (3)
Prerequisite(s): AE 355 and AE 361 with a minimum grade of C required.
A conceptual overview of additive manufacturing technologies. Course content covers process fundamentals, equipment, capabilities, materials, safety, and emerging applications, such as medical and aerospace applications.

AE 484 Industrial Ergonomics (3)
Prerequisite(s): MS 125 with a minimum grade of C required.
Concepts and techniques of work measurements, human factors, and industrial safety and hygiene are merged to provide a comprehensive view of the workplace.

AE 485 Industrial Safety Management (3)
Prerequisite(s): AE 380 and AE 343 or MGT 301 with minimum grade of C required.
Planning, implementation, and evaluation of industrial safety programs.

AE 486 Safety Performance Management (3)
Prerequisite(s): PSY 201 and AE 485 with a minimum grade of C required.
Concepts and methodologies for evaluating performance of safety programs with emphasis on human behavior and the role of management in influencing safety performance.

AE 487 Systems Safety (3)
Prerequisite(s): AE 372 and either AE 390 or AE 384 with a minimum grade of C required.
Principles and techniques of systems safety analysis to assure safe operation of systems and facilities throughout the life cycle from design to disposal.

AE 489 Environmental Law and Hazardous Materials (3)
Prerequisite(s): AE 380 with a minimum grade of C required.
Practical management and control of hazardous materials and wastes for the safety professional.

AE 490 Industrial Hygiene II (3)
Prerequisite(s): AE 388 with a minimum grade of C required.
Anticipation, recognition, evaluation, and control of hazards in the work environment that impair health and well-being. Focus on quantitative assessment, sampling methods, and instrumentation to determine employee exposure.

AE 491 Industrial Leadership Seminar (WI) (3)
Prerequisite(s): EH 322 or CBA 350; AE 405 or AE 407; minimum grade of C. Senior standing required.
Students relate modern leadership practices to practical industrial situations. (Writing Intensive Course)

AE 493 Senior Seminar (WI) (1)
Prerequisite(s): EH 322 or equivalent, Senior Standing and consent of instructor.
Corequisite(s): AE 494.
Coverage of terms, concepts, tools, and skills needed (industrial business, ethics, tech presentations) to succeed as a professional in technological and engineering environments. Grades: Pass/Fail. (Writing Intensive Course)

AE 494 Applied Engineering Senior Internship (WI) (2)
Prerequisite(s): AE 393, and EH 322 or CBA 350 with a minimum grade of C. Senior Standing and instructor approval.
Provides Applied Engineering majors with practical industrial experiences via an approved internship arrangement. Grades: Pass/Fail. (Writing Intensive Course)

AE 495 Special Topics in Technology (3)
Prerequisite(s): Senior status and approval of department head.
Special topics of current interest to groups of students in the Technology program concerning content not presented in regular course offerings.

AE 496 Advanced Problems in Technology (3)
Prerequisite(s): Senior status, approval of department head and EH 322 or CBA 350.
Problems involving the application and integration of electronics, industrial safety, quality, industrial management, and/or computer integrated manufacturing technology. This may include an industrial practicum and/or internship.

AE 498 SME Prep (2)
Prerequisite(s): Senior status.
An in-depth and thorough coverage of the terms, concepts, tools and skill needed to obtain the certification of Certified Manufacturing Technologist.