The Ingram School of Engineering Vision Statement

The Ingram School of Engineering will be a nationally recognized institution of higher education, serving students and employers with a complete set of accredited engineering programs supported by a faculty which maintains high standards of teaching, research, and service. To accomplish this vision, we will:

1. Engage undergraduate and graduate students with innovative, multidisciplinary, and nationally recognized funded research programs,
2. Emphasize quality undergraduate and graduate education using a practical, interactive, and contemporary learning environment,
3. Produce first-generation professional college graduates as part of an HSI-designated university; be recognized for exceptional community service; and create tight bonds with alumni who will serve as professional mentors, sponsors, and advisors,
4. Promote a student-centered culture based on collegiality, scholarship, enthusiasm, integrity, and mutual respect among diverse faculty, staff, and students.

The Electrical Engineering Mission Statement, Program Educational Objectives, and Student Outcomes

Our mission is:
To lead students to be innovative, ethical engineering professionals through solid education at the undergraduate level, by providing opportunities to participate in research, and by responding to the needs of the Central Texas region, the state of Texas, and the nation. We achieve this mission by:

- Engaging colleagues and students in new and more effective ways to transmit knowledge to the next generation of electrical and computer engineers.
- Engaging colleagues and students in pioneering, scholarly, multidisciplinary research efforts.
- Creating an inclusive environment which emphasizes ethics and integrity and fosters creativity, appreciation for all ideas, and respect for others.
- Seeking and maintaining bonds with our alumni and the industries which hire them.
- Maintaining a student-centered atmosphere for undergraduate education and research.

The objectives of the program are to produce graduates who, in 3-5 years of receiving the EE degree, attain the necessary skills and abilities to:

1. Analyze, design, develop, optimize, and implement complex systems in the context of modern interdisciplinary engineering work.
2. Contribute to the solution of practical problems in industrial, service, and government organizations by applying skills acquired through formal and lifelong learning.
3. Enjoy fulfilling engineering careers, including professional advancement, entrepreneurship, and the pursuit of graduate studies.
4. Practice engineering while observing appropriate technological, organizational, societal, global, and ethical contexts.
Each graduate is expected to have:
(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multidisciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in lifelong learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
(l) a knowledge of probability, statistics, and mathematics through differential and integral calculus, differential equations, linear algebra, complex variables, and discrete mathematics
(m) a knowledge of sciences and engineering topics (including computer science) necessary to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components.

The Industrial Engineering Mission Statement, Program Educational Objectives, and Student Outcomes

Our mission is:
To provide an excellent and innovative education setting to our students so they can learn and discover how complex systems work better. The IE program strives to maintain a comprehensive curriculum that enables students to become leading engineers and/or creative researchers in the global marketplace and/or in graduate studies. The program seeks to collaborate with private and public sectors in the search of methodologies and creative solutions to problems that contribute to the advancement of education, technology, and professional development. Through plans and activities that search to embrace a student population of strong diversity, the program attempts to be a significant provider of global workforce.

Within 3-5 years after graduation, graduates of our IE program are expected to be able to attain the following educational objectives:
1. Perform as industry leaders in the global marketplace, capable of successfully planning, controlling, and implementing large-scale projects.
2. Understand and apply the principles of science, technology, engineering, and math involving industry-relevant problems.
3. Contribute to the profitable growth of industrial economic sectors by using IE analytical tools, effective computational approaches, and systems thinking methodologies.
4. Maintain high standards of professional and ethical responsibility.
5. Work effectively in diverse, multicultural environments emphasizing the application of teamwork and communication skills.
6. Practice life-long learning to sustain technical currency and excellence throughout one’s career. Promote the profession and its benefits to society.

Each student is expected to demonstrate:
(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multidisciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
(l) an ability to design, develop, implement, and improve integrated systems that include people, materials, information, equipment, and energy and to accomplish the integration of systems using appropriate analytical, computational, and experimental practices.

The Manufacturing Engineering Mission Statement, Program Educational Objectives, and Student Outcomes

Our mission is:
• To sustain a quality, student-centered, industry-oriented engineering curriculum.
• To attract students and prepare them with the knowledge, practical skills, and abilities to perform as highly competent engineers in the global marketplace and/or in graduate studies.

• To produce graduates skilled in materials and manufacturing processes; process, assembly and product engineering; manufacturing competitiveness and systems design.

Within 3-5 years after graduation, graduates of the Manufacturing Engineering program are expected to be able to attain the following educational objectives:

1. Perform as engineering leaders in the global marketplace.
2. Understand and apply the principles of math, science, and engineering in design and manufacturing related activities.
3. Contribute to the profitable growth of manufacturing businesses.
4. Maintain high standards of professional and ethical responsibility.

Each student is expected to demonstrate:

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multidisciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Bachelor of Science (B.S.)

• Major in Electrical Engineering (Computer Engineering Concentration) (http://mycatalog.txstate.edu/undergraduate/science-engineering/ingram-school/electrical-engineering-computer-specialization-bs)

• Major in Electrical Engineering (Micro and Nano Devices and Systems Concentration) (http://mycatalog.txstate.edu/undergraduate/science-engineering/ingram-school/electrical-engineering-micro-nano-devices-systems-specialization-bs)

• Major in Electrical Engineering (Networks and Communication Systems Concentration) (http://mycatalog.txstate.edu/undergraduate/science-engineering/ingram-school/electrical-engineering-networks-communication-systems-specialization-bs)

• Major in Industrial Engineering (http://mycatalog.txstate.edu/undergraduate/science-engineering/ingram-school/industrial-engineering-bs)

• Major in Manufacturing Engineering (General Manufacturing Concentration) (http://mycatalog.txstate.edu/undergraduate/science-engineering/ingram-school/manufacturing-engineering-general-concentration-bs)

• Major in Manufacturing Engineering (Mechanical Systems Concentration) (http://mycatalog.txstate.edu/undergraduate/science-engineering/ingram-school/manufacturing-engineering-mechanical-systems-concentration-bs)

• Major in Manufacturing Engineering (Semiconductor Manufacturing Concentration) (http://mycatalog.txstate.edu/undergraduate/science-engineering/ingram-school/manufacturing-engineering-semiconductor-concentration-bs)

Information about graduate programs can be found in the Graduate Catalog (http://mycatalog.txstate.edu/graduate).

Subjects in this school include: EE (p. 3), ENGR (p. 6), IE (p. 7), MFGE (p. 8)

Courses in Electrical Engineering (EE)

EE 2400. Circuits I.
This course provides an introduction to the profession of Electrical Engineering and its specialties. Fundamental DC and sinusoidal steady-state circuit analysis techniques include Ohm’s law, power, Kirchhoff’s laws, and Thevenin and Norton equivalent circuits. Prerequisites: MATH 2471. 4 Credit Hours. 3 Lecture Contact Hours. 2 Lab Contact Hours.

EE 2420. Digital Logic.
An introduction to fundamental computer technologies, including Boolean logic design, logic circuits and devices, and basic computer hardware are studied. Laboratories provide hands-on experience with electricity, combinational and sequential digital circuits, and computer hardware. Prerequisite: CS 1428 with a grade of "C" or higher. 4 Credit Hours. 3 Lecture Contact Hours. 2 Lab Contact Hours.

EE 2420. Digital Logic.
An introduction to fundamental computer technologies, including Boolean logic design, logic circuits and devices, and basic computer hardware are studied. Laboratories provide hands-on experience with electricity, combinational and sequential digital circuits, and computer hardware. Prerequisite: CS 1428 with a grade of "C" or higher. 4 Credit Hours. 3 Lecture Contact Hours. 2 Lab Contact Hours.

Course Attribute(s): Lab Required
Grade Mode: Standard Letter about Digital Logic

EE 3340. Electromagnetics.
Wave propagation, Maxwell’s equations, transmission lines, wave guides, and antennas. Prerequisites: MATH 3373 and PHYS 2435 with grades of "C" or higher. Co-requisite: EE 3300 or EE 3400. 3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter about Electromagnetics
EE 3350. Electronics I.
Analysis and design of active device equivalent circuits with emphasis on transistors, switching circuits, and operational amplifiers. Prerequisites: EE 3300 or EE 3400.

3 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

EE 3355. Solid State Devices.
Semiconductor materials, principles of carrier motion, operating principles and circuit models for diodes, bipolar transistors and field-effect transistors. Introduction to integrated circuits. Prerequisites: EE 3300 or EE 3400.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

EE 3370. Signals and Systems.
Frequency domain representation of signals and systems and frequency domain concepts for circuit analysis and design. Transfer function and frequency response, Laplace and z-transforms, Fourier series, Fourier transform, and sampling. Prerequisites: EE 3300 or EE 3400.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

EE 3400. Circuits II.
This course includes a brief review of EE 2400, transient analysis, application of Laplace transforms, Bode plots, and network principles. Materials learning in EE 2400 is extended and applied here. Prerequisites: EE 2400 and MATH 3323.

4 Credit Hours. 3 Lecture Contact Hours. 2 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

EE 3420. Microprocessors.
Introduction to microprocessors, principles of operation, assembly language programming, timing analysis, and I/O interfacing. Prerequisites: EE 2420.

4 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Writing Intensive
Grade Mode: Standard Letter

EE 4321. Digital Systems Design Using HDL.
This course will cover the design of digital systems using HDL including implementation of custom microprocessor and peripheral architectures. Prerequisite: EE 3420 with a grade of "C" or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

This course provides the necessary fundamental techniques to analyze and process digital images. It covers principles, concepts, and techniques of digital image processing and computer vision. Prerequisites: CS 1428 and EE 3420 with grades of "C" or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

EE 4350. Electronics II.
Analysis and design of integrated circuits, feedback, and frequency response. Prerequisites: EE 3350.

3 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

EE 4351. Fundamentals of Electroceramics.
Introduction to binary and ternary phase diagrams, non-centro-symmetric crystal structures and symmetry groups, nonlinear dielectrics (including ferroelectricity, piezoelectricity, pyroelectricity), nonlinear magnetics, oxide wideband gap semiconductors, detectors and sensors, brief introduction to MEMS, radhard electronics, and spintronics technology. Research oriented labs related to materials processing, characterization, fabrication, and testing. Prerequisite: ENGR 2300 or equivalent; Co-requisite: EE 3355; GPA of 2.25 or higher.

3 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Grade Mode: Standard Letter

EE 4352. Introduction to VLSI Design.
Analysis of design of CMOS integrated circuits. Introduction to CAD tools for VLSI design. Prerequisites: CS 2420, EE 2420, and EE 3350 with grades of "C" or higher.

3 Credit Hours. 3 Lecture Contact Hours. 1 Lab Contact Hour.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

EE 4353. Fundamentals of Advanced CMOS Technology.
Key concepts of advanced semiconductor technology including Moore's law, transition from NMOS to CMOS, CMOS scaling, high-K gate dielectrics, metal electrodes, source/drain scaling technology, new channel materials replacing silicon, and three dimensional device structures. Prerequisite: EE 3355 with a grade of "C" or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

Semiconductor materials, principles of carrier motion, operating principles and circuit models for diodes, bipolar transistors and field-effect transistors. Introduction to integrated circuits. Prerequisites: EE 3300 or EE 3400.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

EE 4357. Fundamentals of Electroceramics.
Introduction to binary and ternary phase diagrams, non-centro-symmetric crystal structures and symmetry groups, nonlinear dielectrics (including ferroelectricity, piezoelectricity, pyroelectricity), nonlinear magnetics, oxide wideband gap semiconductors, detectors and sensors, brief introduction to MEMS, radhard electronics, and spintronics technology. Research oriented labs related to materials processing, characterization, fabrication, and testing. Prerequisite: ENGR 2300 or equivalent; Co-requisite: EE 3355; GPA of 2.25 or higher.

3 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.
Grade Mode: Standard Letter

Key concepts of advanced semiconductor technology including Moore's law, transition from NMOS to CMOS, CMOS scaling, high-K gate dielectrics, metal electrodes, source/drain scaling technology, new channel materials replacing silicon, and three dimensional device structures. Prerequisite: EE 3355 with a grade of "C" or higher.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter
EE 4354. Flexible Electronics.
This course will cover the materials systems, processes, device physics and applications of flexible electronics. The materials range from amorphous and nanocrystalline silicon, organic and polymeric semiconductors to solution cast films of carbon nanotubes. Real device discussions include high speed transistors, photovoltaics, flexible flat-panel displays, medical image sensors, etc. Prerequisites: EE 3350, EE 3355, and EE 4350 with grades of "C" or higher, or permission of the instructor.

Lab Required

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

About Flexible Electronics

Grade Mode: Standard Letter

Lab Required

EE 4355. Analog and Mixed Signal Design.
Operational amplifier design applications, feedback, offset, stability, and compensation. Introduction to random signals and noise, discrete time circuity analog-to-digital converters, and digital-to-analog converters. Prerequisites: EE 3370 and EE 4350.

Lab Required|Writing Intensive

3 Credit Hours. 3 Lecture Contact Hours. 2 Lab Contact Hours.

Course Attribute(s): Lab Required

Grade Mode: Standard Letter

About Analog and Mixed Signal Design

Lab Required

EE 4358. Introduction to Microelectromechanical Systems.
This course will cover fabrication techniques for microelectromechanical devices and systems as well as provide an introduction to the design of micromechanical transducers. Co-requisite: MFGE 4392.

Lab Required

3 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.

Course Attribute(s): Lab Required

Grade Mode: Standard Letter

About Introduction to Microelectromechanical Systems

Lab Required

Transmission of signals through linear systems, analog and digital modulation, filtering, and noise. Prerequisites: EE 3300, EE 3370, and IE 3320.

Lab Required

3 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours.

Course Attribute(s): Lab Required

Grade Mode: Standard Letter

About Communication Systems

Lab Required

EE 4372. Communication Networks.
Data communication concepts, protocols, algorithms, 7-layer OSI model, physical media, LAN architecture and components, Ethernet, FDDI, TCP/IP, and related standards. Prerequisite: EE 2400 and EE 3420.

Lab Required

3 Credit Hours. 3 Lecture Contact Hours. 1 Lab Contact Hour.

Course Attribute(s): Lab Required

Grade Mode: Standard Letter

About Communication Networks

Lab Required

EE 4374. Introduction to Wireless Communication.
Principles, practice, and system overview of mobile systems. Modulation, demodulation, coding, encoding, and multiple access techniques. Prerequisites: EE 4370.

Lab Required

3 Credit Hours. 3 Lecture Contact Hours. 1 Lab Contact Hour.

Course Attribute(s): Lab Required

Grade Mode: Standard Letter

About Introduction to Wireless Communication

Lab Required

EE 4376. Introduction to Telecommunications.

Lab Required

3 Credit Hours. 3 Lecture Contact Hours. 1 Lab Contact Hour.

Course Attribute(s): Lab Required

Grade Mode: Standard Letter

About Introduction to Telecommunications

Lab Required

EE 4377. Introduction to Digital Signal Processing.
Discrete systems, convolution, spectral analysis, and FIR and IIR filter design. Prerequisites: EE 3370.

Lab Required

3 Credit Hours. 3 Lecture Contact Hours. 1 Lab Contact Hour.

Course Attribute(s): Lab Required

Grade Mode: Standard Letter

About Introduction to Digital Signal Processing

Lab Required

EE 4378. Data Compression and Error Control Coding.
Introduction to information theory, information content of messages, entropy and source coding, data compression, channel capacity data translation codes, and fundamentals of error correcting codes. Corequisite: EE 4370.

Lab Required

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Course Attribute(s): Lab Required

Grade Mode: Standard Letter

About Data Compression and Error Control Coding

Lab Required

EE 4390. Electrical Engineering Design I.
This course is a team-based design of a system or component, which will include oral presentations and written reports. Prerequisites: EE 3350, EE 3370, and EE 3420 with grades of "C" or higher. Co-requisites: EE 4352 or EE 4370. (WI).

Lab Required

3 Credit Hours. 1 Lecture Contact Hour. 3 Lab Contact Hours.

Course Attribute(s): Lab Required|Writing Intensive

Grade Mode: Standard Letter

About Electrical Engineering Design I

Lab Required

EE 4391. Electrical Engineering Design II.
Advanced team-based design of a system or component, which will include oral presentations and written reports. Prerequisites: EE 4390. (WI).

Lab Required

3 Credit Hours. 1 Lecture Contact Hour. 3 Lab Contact Hours.

Course Attribute(s): Lab Required|Writing Intensive

Grade Mode: Standard Letter

About Electrical Engineering Design II

Lab Required
EE 4399A. Dynamic Data Acquisition and Analysis.
Methods for acquiring and analyzing dynamic (time-varying) data. Frequency domain analysis, analog-to-digital conversion, windowing, and digital filtering taught in the context of various industrial applications. Prerequisite: EE 3370 Signals and Systems.

about Dynamic Data Acquisition and Analysis
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter

EE 4399B. Overview of Information Theory and Coding.
Fundamentals of Information Theory, Huffman coding, image encoding techniques, Hamming and BCH error control codes, Reed-Solomon coding, convolutional codes and the Viterbi decoding algorithm. About Overview of Information Theory and Coding
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter

Courses in Engineering (ENGR)

An introductory communications course in the tools and techniques utilized to produce various types of working drawings. Principles of multiview projections, geometric relationships, shape and size description, and pictorial methods are included with emphasis on technical applications and design problem solving. About Engineering Design Graphics
3 Credit Hours. 2 Lecture Contact Hours. 2 Lab Contact Hours.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

ENGR 2300. Materials Engineering.
Structure, properties and behavior of engineering materials including metals, polymers, composites and ceramics. Mechanical, electrical, magnetic, thermal, and optical properties are covered. Prerequisites: CHEM 1341 or CHEM 1335; CHEM 1141. About Materials Engineering
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 3190. Cooperative Education.
This course provides special problems in engineering for cooperative education students. Problems are related to the student’s work assignment and culminate in a technical report. Three hours may be used as technical elective, and one additional hour may be used as free elective; 4 hours may be used toward graduation. Prerequisite: Overall GPA 2.5 or above and approval of department head. About Cooperative Education
1 Credit Hour. 0 Lecture Contact Hours. 40 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter

This course covers the principles of mechanic materials and includes the following topics: stress and strain; elastic modulus and Poisson's ratio; constitutive equations; torsion; bending; axial, shear and bending moment diagrams; deflection of beams; and stability of columns. Prerequisite: ENGR 3375 or MATH 3375. About Mechanics of Materials
3 Credit Hours. 3 Lecture Contact Hours. 1 Lab Contact Hour.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

ENGR 3315. Engineering Economic Analysis.
Interest formulas, economic equivalence, rate of return analysis, techniques of economic analysis for engineering decisions and an introduction to cost estimation. Prerequisite: MATH 1315. About Engineering Economic Analysis
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 3360. Structural Analysis.
Structural engineering fundamentals to include design loads, reactions, force systems, functions of a structure, and the analysis of statically determinate and indeterminate structures by classical and modern techniques. Prerequisite: ENGR 3311. About Structural Analysis
3 Credit Hours. 3 Lecture Contact Hours. 1 Lab Contact Hour.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

ENGR 3373. Circuits and Devices.
DC and AC circuit analysis, network theorems, electromechanical devices, electronic devices and an introduction to amplifiers, oscillators and operational amplifiers. Prerequisite: PHYS 2425. About Circuits and Devices
3 Credit Hours. 3 Lecture Contact Hours. 1 Lab Contact Hour.
Course Attribute(s): Lab Required
Grade Mode: Standard Letter

ENGR 3375. Mechanics for Engineers.
This course covers statics, using a vector approach to mechanics. Prerequisite: PHYS 1430. Co-requisite: MATH 2472. About Mechanics for Engineers
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 4390. Internship.
Supervised on-the-job professional learning experience in engineering and other technical areas. This course provides practical work experience in their particular field of interest. About Internship
3 Credit Hours. 0 Lecture Contact Hours. 20 Lab Contact Hours.
Grade Mode: Standard Letter
Open to undergraduate students on an independent basis by arrangement with the faculty member concerned. Requires school director’s approval. Repeatable for credit with different emphasis. Prerequisite: junior or senior standing.

Grade Mode: Standard Letter about Independent Studies in Engineering

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter about Independent Studies in Engineering

Courses in Industrial Engineering (IE)

IE 3310. Project Management for Engineers.
Basic principles governing the efficient and effective management of engineering projects. Topics include project planning, scheduling, and cost estimation procedures. Prerequisite: ENGR 3315. (WI).

Grade Mode: Standard Letter about Project Management for Engineers

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Writing Intensive
Grade Mode: Standard Letter about Project Management for Engineers

Fundamentals of probability and statistical inference for engineering applications, probability distributions, parameter estimation, hypothesis testing, and analysis of variance. Prerequisite: MATH 2472.

Grade Mode: Standard Letter about Engineering Statistics

3 Credit Hours. 3 Lecture Contact Hours. 1 Lab Contact Hour.

IE 3330. Quality Engineering.
Quality assurance systems, quality costs, statistical quality control, and approaches for engineering quality into products and processes. Prerequisite: IE 3320.

Grade Mode: Standard Letter about Quality Engineering

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

This course teaches models in operations research including linear programs, the simplex method, duality theory, sensitivity analysis, integer programs, and network flows. The emphasis is in learning to recognize, formulate, solve, and analyze practical industrial problems. The course also teaches commercial mathematical programming languages. Prerequisites: CS 1428, MATH 3377, ENGR 3315.

Grade Mode: Standard Letter about Operations Research

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

IE 3360. Methods Engineering and Ergonomics.
This course is a survey of methods for assessing and improving performance of individuals and groups in organizations. Techniques include various basic industrial engineering tools, work analysis, data acquisition and application, performance evaluation and appraisal, and work measurement procedures. Prerequisite: IE 3320.

Grade Mode: Standard Letter about Methods Engineering and Ergonomics

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

IE 4310. Statistical Design of Experiments.
Statistically designed experiments for engineering applications. Topics include analysis of variance, randomized complete designs, factorial designs, empirical models generated from controlled experiments, and response surfaces. Prerequisite: IE 3320.

Grade Mode: Standard Letter about Statistical Design of Experiments

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

IE 4320. Integrated Production Systems.
Basic concepts in the design and control of integrated production systems to include forecasting, inventory models, material requirements planning, scheduling, planning, and shop floor control. Coverage will include both traditional and kanban systems. Prerequisite: IE 3340.

Grade Mode: Standard Letter about Integrated Production Systems

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

IE 4330. Reliability Engineering.
Reliability of components and systems, reliability models, life testing, failure analysis, and maintainability. Prerequisite: IE 3320.

Grade Mode: Standard Letter about Reliability Engineering

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

IE 4340. Optimization Techniques.
Mathematical modeling and computational methods for linear, integer, and nonlinear programming problems. Prerequisite: IE 3340.

Grade Mode: Standard Letter about Optimization Techniques

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

IE 4350. Supply-Chain Engineering.
The analysis of supply chain problems to include facility location, customer assignment, vehicle routing, inventory management, and the role of information and decision support systems in supply chains. Prerequisite: IE 3340.

Grade Mode: Standard Letter about Supply-Chain Engineering

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

IE 4355. Facilities Planning.
Planning, design, and analysis of facilities. Emphasizes the principles and methods used for solving plant layout, facility location, material handling, automation, computer integration, and warehouse operations.

Grade Mode: Standard Letter about Facilities Planning

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

IE 4360. Human Factors Design.
This course will emphasize the applications of human factors engineering to systems design. Prerequisites: IE 3360. (WI).

Grade Mode: Standard Letter about Human Factors Design

3 Credit Hours. 3 Lecture Contact Hours. 1 Lab Contact Hour.
Course Attribute(s): Lab Required|Writing Intensive
Grade Mode: Standard Letter about Human Factors Design
Probabilistic models in operations research to include queuing theory, simulation, and Markov chains. Emphasis will be placed on modeling applications to solve problems in industry and computing. Prerequisite(s): IE 3320 and CS 1428.

Grade Mode: Standard Letter
Course Attribute(s): Probabilistic Operations Research

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

IE 4380. Industrial Safety.
This course is a survey of occupational safety and hazards control. Topics include the history of occupational safety; hazard sources related to humans, environment, and machines; and engineering management of hazards. Prerequisite: Industrial Safety

Grade Mode: Standard Letter

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

IE 4390. Industrial Engineering Capstone Design.
Students form teams and apply industrial engineering principles to develop and implement solutions to industrial problems and/or systems engineering issues. Prerequisites: IE 3310, IE 3330; and at least two of: IE 3360, IE 4310, IE 4310, IE 4355, IE 4370 and MFGE 4396. Corequisites: IE 4320 and IE 4350.

Grade Mode: Standard Letter

about Industrial Engineering Capstone Design

3 Credit Hours. 3 Lecture Contact Hours. 2 Lab Contact Hours.

IE 4399A. Six Sigma Methodologies.
This course covers the principles and methodologies of Six Sigma. Emphasis is on the tools and techniques used in Six Sigma projects, including statistical process control, experimental design, and project management. Students will develop and complete a Six Sigma project in industry. Prerequisite(s): IE 3310, ID 3330, and ID 4310.

Grade Mode: Writing Intensive

about Industrial Engineering Capstone Design

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

IE 4399B. Human Computer Interaction.
Introduces the fundamentals of human-computer interaction relative to interactive computer applications and associated interfaces. Principles and methodologies of usability testing will highlight relationships between human factors, design, and cognitive psychology in the development of computer applications. A variety of assessment and validation methodologies are applied. Prerequisite: Faculty advisor approval.

Grade Mode: Standard Letter

about Human Computer Interaction

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

IE 4399C. Engineering Statistics II.
This course is the continuation of IE 3320 Engineering Statistics I and covers simple and multiple regression analysis, analysis of variance, 2^k Factorial Experiments, and the use of statistical packages. Prerequisite: IE 3320.

Grade Mode: Standard Letter

about Engineering Statistics II

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

IE 4399D. Modern Heuristic Optimization Techniques.
Heuristic methods that search beyond local optima such as simulated annealing, tabu search, genetic algorithms, ant-colony systems, and particle swarm. Papers from the literature, problem-specific heuristics, evaluation methods and serial/parallel implementations are discussed. This course is an advanced undergraduate course for students in engineering and related fields. Prerequisites: IE 3340, CS 1428.

Grade Mode: Standard Letter

about Modern Heuristic Optimization Techniques

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Courses in Manufacturing Engineering (MFGE)

MFGE 2132. Manufacturing Processes Lab.
Hands-on experience in variety of material removal processes such as turning, milling, drilling, and CNC machining; joining processes such as gas/arc welding, and soldering; metal casting, polymer and composite processing, and microelectronics manufacturing. Prerequisite or corequisite: MFGE 2332.

Grade Mode: Standard Letter

about Manufacturing Processes Lab

1 Credit Hour. 0 Lecture Contact Hours. 2 Lab Contact Hours.

MFGE 2332. Material Selection and Manufacturing Processes.
Overview of material processing, material selection and process parameter determination. Processes covered include: material removal, forming, casting, polymer processing, semiconductor manufacturing and assembly processes. Laboratory activities provide opportunities for applying the design through manufacture activities of the product cycle. Prerequisite: ENGR 2300. Corequisite: ENGR 2300.

Grade Mode: Standard Letter

about Material Selection and Manufacturing Processes

3 Credit Hours. 3 Lecture Contact Hours. 1 Lab Contact Hour.

Topics include design process, description of wireframe/surface/solid models, transformation and manipulation of objects, finite element analysis, data exchange, process planning, machine elements, fundamentals of numerical control programming for turning and milling processes, fundamentals of CAD/CAM systems, CNC code generation by CAD/CAM software, waterjet, and plasma cutting. Prerequisites: ENGR 1313 and MFGE2332.

Grade Mode: Standard Letter

about Computer Aided Design and Manufacturing

3 Credit Hours. 3 Lecture Contact Hours. 1 Lab Contact Hour.

Topics include design process, description of wireframe/surface/solid models, transformation and manipulation of objects, finite element analysis, data exchange, process planning, machine elements, fundamentals of numerical control programming for turning and milling processes, fundamentals of CAD/CAM systems, CNC code generation by CAD/CAM software, waterjet, and plasma cutting. Prerequisites: ENGR 1313 and MFGE2332.

Grade Mode: Standard Letter

about Computer Aided Design and Manufacturing

3 Credit Hours. 3 Lecture Contact Hours. 1 Lab Contact Hour.
MFGE 4355. Design of Machine Elements. 3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours. Grade Mode: Standard Letter
about Design of Machine Elements

MFGE 4357. Dynamics of Machinery. 3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours. Grade Mode: Standard Letter
about Dynamics of Machinery

MFGE 4363. Concurrent Process Engineering. 3 Credit Hours. 3 Lecture Contact Hours. 2 Lab Contact Hours. Course Attribute(s): Lab Required Writing Intensive
about Concurrent Process Engineering

MFGE 4365. Tool Design. 3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours. Grade Mode: Standard Letter
about Tool Design

MFGE 4367. Polymer Properties and Processing. 3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours. Grade Mode: Standard Letter
about Polymer Properties and Processing

MFGE 4376. Control Systems and Instrumentation. 3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours. Grade Mode: Standard Letter
about Control Systems and Instrumentation

MFGE 4392. Microelectronics Manufacturing I. 3 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours. Course Attribute(s): Lab Required
Grade Mode: Standard Letter
about Microelectronics Manufacturing I

MFGE 4394. Microelectronics Manufacturing II. 3 Credit Hours. 3 Lecture Contact Hours. 3 Lab Contact Hours. Course Attribute(s): Lab Required
Grade Mode: Standard Letter
about Microelectronics Manufacturing II

MFGE 4395. Computer Integrated Manufacturing. 3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours. Grade Mode: Standard Letter
about Computer Integrated Manufacturing

MFGE 4396. Manufacturing Systems Design. 3 Credit Hours. 3 Lecture Contact Hours. 2 Lab Contact Hours. Course Attribute(s): Lab Required Writing Intensive
Grade Mode: Standard Letter
about Manufacturing Systems Design
MFGE 4399A. Reverse Engineering and Rapid Prototyping.
In the course 3D scanning technology for design, analysis, and inspection, is covered. Also, applications of the 3D scanning in reverse engineering and different rapid prototyping processes in a hands-on approach will be explained in this course.

about Reverse Engineering and Rapid Prototyping
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing|Topics
Grade Mode: Standard Letter
about Reverse Engineering and Rapid Prototyping

MFGE 4399B. Introduction to Reinforced Polymer Nanocomposites in Industrial Applications.
Introductory course in reinforced polymer nanocomposites focusing on materials, manufacturing, characterization, and applications. Include, primarily nanoclay polymer matrix composites. Thrust will be the challenges in low-cost manufacturing for industrial applications, commercial successes, its impact on current material market, and future.

about Introduction to Reinforced Polymer Nanocomposites in Industrial Applications
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing|Topics
Grade Mode: Standard Letter
about Introduction to Reinforced Polymer Nanocomposites in Industrial Applications

MFGE 4399C. Introduction to Industrial Robotics.
This course will cover the basic principles and techniques involved in industrial robotics. Emphasis will be placed on industrial robot applications, analysis of robot manipulators, components of industrial robots, robot programming and control. Prerequisite: MFGE 4376.

about Introduction to Industrial Robotics
3 Credit Hours. 3 Lecture Contact Hours. 1 Lab Contact Hour.
Course Attribute(s): Exclude from 3-peat Processing|Topics
Grade Mode: Standard Letter
about Introduction to Industrial Robotics

Asiabanpour, Bahram, Associate Professor, Engineering, Ph.D., University of Southern California
Aslan, Semih, Assistant Professor, Engineering, Ph.D., Illinois Institute of Technology
Bilgin, Enes, Lecturer, Engineering, Ph.D., Boston University
Casey, Michael L, Senior Lecturer, Engineering, Ph.D., The University of Alabama
Chen, Heiping, Assistant Professor, Engineering, Ph.D., Michigan State University
Chen, Yihong, Associate Professor, Engineering, Ph.D., University of Texas at Austin
Chowdhury, Sarah Hamida, Lecturer, Engineering, M.S., Texas Tech University
Compeau, Cecil Richard, Senior Lecturer, Engineering, Ph.D., University of Mexico
Droopad, Ravindranath, Professor, Engineering, Ph.D., University of London
Dutta, Satyajit, Lecturer, Engineering, M.S., George Washington University
Hein, Jerrell Paul, Lecturer, Engineering, M.S., Stanford University
Jimenez, Jesus, Associate Professor, Engineering, Ph.D., Arizona State University
Jin, Tongdan, Associate Professor, Engineering, Ph.D., Rutgers State Univ New Brunswick
Kim, Namwon, Assistant Professor, Engineering, Ph.D., Louisiana State Univ A&M College
Koutitas, Georgios, Lecturer, Engineering, Ph.D., University of Surrey
Larson, Lawrence, Professor of Practice, Engineering, Ph.D., Washington State University
Londa, Michelle, Senior Lecturer, Engineering, Ph.D., University of Connecticut
McClellan, Stanley A, School Director - Professor, Engineering, Ph.D., Texas A&M University
Novoa, Clara M, Associate Professor, Engineering, Ph.D., Lehigh University
Perez, Eduardo, Assistant Professor, Engineering, Ph.D., Texas A&M University
Phillips, Ronn, Lecturer, Engineering, Ph.D., Texas A&M University
Prejean, Stephen E, Professor of Practice, Engineering, D.Eng., Lamar University
Rab, Muhammad T, Lecturer, Engineering, Ph.D., University of Texas at Austin
Rosas-Vega, Rosario, Senior Lecturer, Engineering, Ph.D., Texas A&M University
Sosa, Edward D, Assoc Professor of Practice, Engineering, Ph.D., University of North Texas
Stapleton, William A, Associate Professor, Engineering, Ph.D., The University of Alabama
Stephan, Karl, Professor, Engineering, Ph.D., University of Texas at Austin
Stern, Harold P, Professor, Engineering, Ph.D., University of Texas at Arlington
Talley, Austin Bates, Senior Lecturer, Engineering, Ph.D., University of Texas at Austin
Tate, Jitendra S, Associate Professor, Engineering, Ph.D., North Carolina Ag & Tech State U
Telang, Nina Kamath, Lecturer, Engineering, Ph.D., University of Notre Dame
Thomas, Patrick L, Lecturer, Engineering, Ph.D., Southern Methodist University
Viswanathan, Vishu Ramamoorthy, Professor, Engineering, Ph.D., Yale University
Yu, Qingkai, Assistant Professor, Engineering, Ph.D., University of Houston
Zare, Khalil, Lecturer, Engineering, Ph.D., University of Texas at Austin