Industrial, Manufacturing, and Systems Engineering Courses

Courses

IE 1205. Graphic Fundmtls for IE Majors.
Fundamentals of multi-view projections, auxiliaries, sections, pictorial drawings, dimensioning; introduction to CAD, decision processes, and geographical information systems.
Department: Industrial Engineering
2 Credit Hours
4 Total Contact Hours
3 Lab Hours
1 Lecture Hour
0 Other Hours

IE 1333. Computational Methods.
Computational Methods: Computational methods and algorithms for industrial, manufacturing and systems engineering applications.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

IE 2126. Manufacturing Engr Lab.
Introduction to basic machining and automated manufacturing concepts such as CNC and robotics. Shop demonstrations and visits to area factories.
Department: Industrial Engineering
1 Credit Hour
3 Total Contact Hours
3 Lab Hours
0 Lecture Hours
0 Other Hours

IE 2303. Materls & Manufng Processes.
Introduction to properties of engineering materials and relationships to their structure, behavior, and processing; materials testing and measurement of properties. Selection of materials for engineering applications considering interrelationships between structure, properties, processing, and performance. Prerequisite: CHEM 1305 with a grade of "C" or better.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours
Prerequisite(s): (CHEM 1305 w/C or better)

IE 2315. Statics for IE Majors.
a first course in Newtonian mechanics using vectors. Equilibrium of particles and rigid bodies, forces in space, centroids, moments of inertia, study of stress and strain; use of stress-load equations to determine the state of stress in specific structural elements; study of combined stresses. Prerequisites: MATH 1411 with a grade of "C" or better.
Department: Industrial Engineering
3 Credit Hours
5 Total Contact Hours
3 Lab Hours
2 Lecture Hours
0 Other Hours
IE 2316. Ergonomics.
Ergonomics (2-3) Introduction to design of man-machine systems; application of ergonomics to manufacturing environment; use of anthropometrics
data in design; limitations of human performance; effects of environmental stress on work performance, safety and health. Prerequisites: CS 1420 and
CE 2315, each with a grade of "C" or better. 
Department: Industrial Engineering
3 Credit Hours
5 Total Contact Hours
2 Lecture Hours
0 Other Hours

IE 2326. Eng Economy for IE Majors.
Application of economics to engineering and industrial problems which require knowledge of engineering for their solution. Prerequisite: MATH 1411 with
a grade of "C" or better.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Decision Support Systems: Decision support systems for industrial, manufacturing and systems engineering applications.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

IE 2336. Manufacturing Processes.
Manufacturing Processes (2-3) Theory and practice of metal cutting, finishing, product measurement and inspection; shop demonstrations and visits to
area factories. 
Department: Industrial Engineering
3 Credit Hours
5 Total Contact Hours
2 Lecture Hours
0 Other Hours

Principles of electrical circuits, generators, and motors. Introduction to electronics and introduction to micro- processors for data acquisition. Prerequisite:
MATH 2312 with a grade of "C" or better.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours
Prerequisite(s): (MATH 1312 w/C or better)

IE 3126. Industrial Engr. Lab.
Industrial Engineering Laboratory (0-3) Introduction to basic machining and automated manufacturing concepts such as CNC and robotics. Shop
demonstrations and visits to area factories. Prerequisites: None .
Department: Industrial Engineering
1 Credit Hour
3 Total Contact Hours
0 Lecture Hours
0 Other Hours
IE 3326. Engineering Economy.
Engineering Economy (3-0) Application of economics to engineering and industrial problems which require knowledge of engineering for their solution. Prerequisite: MATH 1312 with a grade of "C" or better.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

IE 3330. Prob Models & Eng Data Anal.
Probability Models and Engineering Data Analysis (3-0) Fundamental concepts of probabilistic engineering systems and random event, engineering data analysis, and applications in engineering systems design and industrial quality control. Prerequisites: MATH 2313 and CS 1420, each with a grade of "C" or better.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

IE 3331. Systems Engineering.
Systems Engineering (3-0) This course covers all basic concepts of systems engineering. The objective is to provide the basic knowledge and tools for transforming an operational need into a well-defined system configuration, through an interactive design process of issue formulation, analysis, optimization, design synthesis, system integration, and testing.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours
Prerequisite(s): (BE 3373 w/C or better ) OR (IE 3373 w/C or better)

IE 3332. Safety Engineering.
Safety Engineering (3-0) A study of man-machine environment and the accident cause-effect relationship. Provides an analytic structure through which safety decision-making can be performed in light of changes in the legal, management, and technical aspects of industrial safety. Prerequisite: (BE 3373 or IE 3373) and (CE 2315 or IE 2315 or MECH 1321 or BE 2434) with a grade of C or better
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

IE 3334. Intro to Work Design.
Introduction to Work Design: Work design and measurement, applied to manufacturing and service industries, so as to improve worker performance, health, safety, and maintain productivity.
Department: Industrial Engineering
3 Credit Hours
5 Total Contact Hours
3 Lab Hours
2 Lecture Hours
0 Other Hours
Prerequisite(s): (IE 3373 w/C or better ) AND (CE 2315 w/C or better ) OR (MECH 1321 w/C or better)
IE 3352. Design of Experiments.
Review of the statistical approach to experimental designs. Analysis of variance is introduced as the appropriate method of statistical analysis. Design of experiments is presented with a single factor, with randomized blocks, and with Latin squares. Introduction to factorial designs. Prerequisite: BE 3373 or IE 3373 with a grade of C or better.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours
Prerequisite(s): (IE 3373 w/C or better)

Fundamental concepts of discrete and continuous random variables, distribution functions, moments, moment generating functions, statistical dependence, stochastic modeling and random events, graphical and numerical methods, descriptive and inferential statistics, point and interval estimation, hypothesis testing and regression analysis. The creation and proper utilization of statistical decision models for engineering analysis and design are stressed. Emphasis is on measurement, formulation analysis, and design of physical problems.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours
Prerequisite(s): (MATH 2313 w/C or better ) OR (MATH 2326 w/C or better)

IE 3377. Methods Engineering.
Methods Engineering (2-3) Study of operations analysis, methods analysis, and work design techniques used in manufacturing and service industries. Macro and micro motion analyses, systematic time standards, labor standard data development, and their relations to line balancing, machine loading, and management control are studied. Prerequisite: IE 2336 and IE 3330, each with a grade of "C" or better.
Department: Industrial Engineering
3 Credit Hours
5 Total Contact Hours
3 Lab Hours
2 Lecture Hours
0 Other Hours

Deterministic Operations Research (3-0) An introduction to deterministic optimization models. These include the concepts of operations research modeling, classical optimization, linear and dynamic programming, network analysis. Current topics in deterministic modeling are included. Prerequisite: MATH 3323.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

IE 3390. Oper Research I: Deter Models.
Operations Research I: Deterministic Models: An introduction to deterministic optimization models. These include the concepts of operations research modeling, classical optimization, linear and dynamic programming, and network analysis. Current topics in deterministic modeling are included.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours
Prerequisite(s): (MATH 3323 w/C or better)
IE 3477. Methods and Indust. Ergonomics.
Methods and Industrial Ergonomics (3-3) Introduction to the design and analysis of human-machine systems and interfaces. Application of biomechanics, anthropometry, and work physiology to the design of work. Study of operations and process analysis, methods analysis, and work design techniques used in manufacturing and service industries. Macro and micro motion analyses, work measurement, and the relation to line balancing, machine loading, scheduling and sequencing, management control. Prerequisites: (BE 3373 or IE 3373) and (CE 2315 or IE 2315 or MECH 1321 or BE 2434) with a grade of C or better.

Department: Industrial Engineering
4 Credit Hours
6 Total Contact Hours
3 Lab Hours
3 Lecture Hours
0 Other Hours

IE 4175. Undergrad Research in IE.
Undergraduate Research in Industrial Engineering (0-0-1) Supervised individual private instruction on research project. May be repeated for credit as topic varies. Prerequisite: Permission of the faculty member who is to supervise the research and departmental approval.

Department: Industrial Engineering
1 Credit Hour
1 Total Contact Hour
0 Lab Hours
0 Lecture Hours
1 Other Hour

IE 4195. Senior Prof Orientation.
Senior Professional Orientation (1-0) Introduction to the engineering profession with emphasis on job placement, professional ethics and an engineering field examination.

Department: Industrial Engineering
1 Credit Hour
1 Total Contact Hour
0 Lab Hours
1 Lecture Hour
0 Other Hours

IE 4266. Senior Design.
Senior Design: Conceptual, preliminary, and final design solutions to engineering problems by students in teams.

Department: Industrial Engineering
2 Credit Hours
10 Total Contact Hours
6 Lab Hours
0 Lecture Hours
4 Other Hours
Prerequisite(s): (IE 3331 w/C or better ) AND (CE 2326 w/C or better)

IE 4332. Safety Engineering.
Safety Engineering (3-0) A study of man-machine environment and the accident cause-effect relationship. Provides an analytic structure through which safety decision-making can be performed in light of changes in the legal, management, and technical aspects of industrial safety. Prerequisite: Senior standing.

Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours
IE 4333. Sup Chain Mgmt I: System Model.
Supply Chain Management I: System Modeling (SCM I) (3-0) This course seeks to provide an understanding of the importance of individual components (supplier, manufacturers, distributors and customers) in the operation of the supply chain. Some of the most recent approaches in design for effective and efficient supply chain will be discussed. Students will also be introduced to two application software packages used for supply chain management, SimFlex and SAP/R3. Restricted to majors: IE, POM or other engineering/business majors.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Work Design- Productivity and Safety: Methods improvement, work measurement, and design, applied to manufacturing and service industries, so as to increase productivity and improve worker health and safety.
Department: Industrial Engineering
3 Credit Hours
5 Total Contact Hours
3 Lab Hours
2 Lecture Hours
0 Other Hours
Prerequisite(s): (IE 3373 w/C or better ) AND (CE 2315 w/C or better ) OR (MECH 1321 w/C or better)

IE 4353. Industrial Systems Simulation.
Industrial Systems Simulation (2-3) Introduction to systems simulation with special emphasis on: logic and methodologies of discrete event simulation, generation of random numbers an random deviates, survey of simulation languages. At the end of the course the student should be able to develop simulation models of industrial systems and to understand the issues involved in simulations studies. Prerequisites: BE 3373 or IE 3373 with a grade of C or better.
Department: Industrial Engineering
3 Credit Hours
5 Total Contact Hours
3 Lab Hours
2 Lecture Hours
0 Other Hours
Prerequisite(s): (BE 3373 w/C or better ) OR (IE 3373 w/C or better)

IE 4360. Intl Manufacturing Mgmt.
International Manufacturing Management (2-3) A comprehensive study of border manufacturing business issues. Includes analyses of the impact of culture on employee recruitment and selection, motivation, attitudes, training, and general labor relations and laws. Technology transfer, international accounting systems, the economics of foreign exchange, international capital budgeting, and the legal environments affecting offshore/border manufacturing are examined. Managerial control functions, materials management/logistics, location analysis, and information flow between manufacturing problems and group projects/presentations are utilized.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

IE 4361. Intl Manufacturing Engineering.
International Manufacturing Engineering (2-3) Practical issues of design, analysis, and integration of international manufacturing engineering components are covered. Emphasis is placed on dynamics of material flow, international planning hierarchies, fundamentals of enterprise resource planning, and the effects of automation on scheduling strategies and materials flow in a labor-intensive environment. Concurrent engineering, function deployment, group technology, process planning, and assembly line design focused on border operations are stressed. A focus on discrete production, with control systems such as MPR, Kanban, JIT, OPT, and synchronous manufacturing are covered. A team project and presentation is required.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours
Prerequisite(s): (IE 3373 w/C or better ) OR (BE 3373 w/C or better)
Engineering Problems (0-0-3) Original investigation of special problems in the student's field; the problem to be selected by the student with approval of the head of the department. May be repeated for credit.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
0 Lecture Hours
3 Other Hours

IE 4384. Industrial Layout.
Industrial Layout (2-3) The design, selection and layout of buildings and equipment for proper utilization in manufacturing. Prerequisite: BE 3373 or IE 3373 with a grade of C or better.
Department: Industrial Engineering
3 Credit Hours
5 Total Contact Hours
3 Lab Hours
2 Lecture Hours
0 Other Hours

IE 4385. Statistical Quality Control/Reliability.
Statistical Quality Control and Reliability (3-0) The statistical design of systems for prescribed quality levels and prevention of defects. Prerequisite: BE 3373 or IE 3373 with a grade of C or better.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours
Prerequisite(s): (BE 3373 w/C or better) OR (IE 3373 w/C or better)

Operations Research II: Stochastic Models: An introduction to probabilistic optimization including queuing theory, Monte Carlo techniques of simulation, project scheduling, and basic Markov processes. Current topics in probabilistic modeling are included. A project is an integral part of this course.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours
Prerequisite(s): (IE 3373 w/C or better) OR (BE 3373 w/C or better)

IE 4391. Production Planning and Inventory Control Systems.
Production Planning and Inventory Control Systems: A study of the principles and theory used in the design and maintenance of production operations and inventory systems. These include forecasting techniques, inventory models, production control models and assembly line balancing.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours
Prerequisite(s): (BE 3373 w/C or better) OR (IE 3373 w/C or better)

Probabilistic Operations Research (3-0) An introduction to probabilistic optimization including queuing theory, Monte Carlo techniques of simulation, project scheduling and basic Markov processes. Current topics in probabilistic modeling are included. A project is an integral part of the course. Prerequisite: IE 3330 or 2330 with a grade of "C" or better or equivalent.
Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours
IE 4393. Engineers and Managing.

Engineers and Managing (3-0) Study of industrial organizations, supervision and compensation of personnel, labor unions and group interaction, from the engineering management viewpoint. Prerequisite: Senior standing.

Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Classification Restrictions:
Restricted to class of SR

IE 4395. Special Topics Industrial Engr.

Special Topics in Industrial Engineering (3-0) Selected topics of current interest in industrial engineering. Prerequisite: Junior or senior standing in engineering.

Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

IE 4396. Intl Manufacturing Intern I.

International Manufacturing Internship I (0-0-3) An applied internship in a local manufacturing plant where a student applies the international manufacturing and engineering fundamentals from IE 4360 and 4361. The student intern will rotate between two departments in a US offshore manufacturing facility from testing and inspection, design, quality, production and inventory control, maintenance, purchasing, planning and scheduling, safety and ergonomics tooling, accounting, etc. The mid-term and final examinations will consist of a written report and presentation based on the research/design/analysis performed in a department to the faculty mentor and industrial partner. Must be admitted to the International Manufacturing Certificate Internship Program.

Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
0 Lecture Hours
3 Other Hours

IE 4397. Intl Manufacturing Intern II.

International Manufacturing Internship II (0-0-3) An applied internship in a local manufacturing plant where a student applies the international manufacturing and engineering fundamentals from IE 4360 and 4361. The student intern will rotate between two departments in a US offshore manufacturing facility from testing and inspection, design, quality, production and inventory control, maintenance, purchasing, planning and scheduling, safety and ergonomics tooling, accounting, etc. The mid-term and final examinations will consist of a written report and presentation based on the research/design/analysis performed in a department to the faculty mentor and industrial partner. Must be admitted to the International Manufacturing Certificate Internship Program.

Department: Industrial Engineering
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
0 Lecture Hours
3 Other Hours

IE 4466. Senior Design.

Senior Design (2-6) Conceptual, preliminary, and final design solutions to engineering problems by students in teams. Prerequisite: Students must be in their last full semester (semester of graduation) and must have a 2.0 GPA or better overall and in their major.

Department: Industrial Engineering
4 Credit Hours
8 Total Contact Hours
6 Lab Hours
2 Lecture Hours
0 Other Hours
IE 4490. Operations Research II.
An introduction to probabilistic optimization including queuing theory, Monte Carlo techniques of simulation, project scheduling, and basic Markov processes. Current topics in probabilistic modeling are included. A project is an integral part of this course. Prerequisite: BE 3373 or IE 3373 with a grade of C or better.
Department: Industrial Engineering
4 Credit Hours
4 Total Contact Hours
0 Lab Hours
4 Lecture Hours
0 Other Hours

Operations Research (4-0) An introduction to deterministic optimization models. These include the concepts of operations research modeling, classical optimization, linear and dynamic programming, and network analysis. An introduction to probabilistic optimization including queuing theory, Monte Carlo techniques of simulation, project scheduling, and basic Markov processes. Current topics in deterministic and probabilistic modeling are included. A project is an integral part of the course. Prerequisites: BE 3373 with a grade of "C" or better.
Department: Industrial Engineering
4 Credit Hours
4 Total Contact Hours
0 Lab Hours
4 Lecture Hours
0 Other Hours