Industrial, Manufacturing, and Systems Engineering Courses

Courses

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.

3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Prerequisite(s): (CHEM 1305 w/C or better)

Principles of electrical circuits, generators, and motors. Introduction to electronics and introduction to microprocessors for data acquisition.

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 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.

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.

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) AND (CE 2315 w/C or better) OR (IE 2315 w/C or better) OR (MECH 1321 w/C or better) OR (BE 2434 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.

3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Prerequisite(s): (IE 3373 w/C or better)
**IE 3373. Engr Probability & Stat Models.**
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.

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 3390. Operations Research I.**
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.

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.

4 Credit Hours
6 Total Contact Hours
3 Lab Hours
3 Lecture Hours
0 Other Hours

Prerequisite(s): (BE 3373 w/C or better ) OR (IE 3373 w/C or better ) AND (CE 2315 w/C or better ) OR (IE 2315 w/C or better ) OR (MECH 1321 w/C or better ) OR (BE 2434 w/C or better)

**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.
1 Credit Hour
1 Total Contact Hour
0 Lab Hour
0 Lecture Hour
1 Other Hour

**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.

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 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.
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.
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.
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.
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.
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 4385. Statist Quality Cntrl/Reliabil.
Statistical Quality Control and Reliability (3-0) The statistical design of systems for prescribed quality levels and prevention of defects.
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 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.
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 & Inventory Control.
Production and Inventory Control (3-0) 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.
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 4395. Special Topics Industrial Engr.
Special Topics in Industrial Engineering (3-0) Selected topics of current interest in industrial engineering.
3 Credit Hours
3 Total Contact Hours
0 Lab Hours
3 Lecture Hours
0 Other Hours

Classification Restrictions:
Restricted to class of JR,SR

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.
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 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.

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.

4 Credit Hours
8 Total Contact Hours
6 Lab Hours
2 Lecture Hours
0 Other Hours