

Industrial, Manufacturing, and Systems Engineering Courses

Courses

ISE 1333. Computational Methods.

Computational Methods: Computational methods and algorithms for industrial, manufacturing and systems engineering applications.

3 Credit Hours

3 Total Contact Hours

0 Lab Hours

3 Lecture Hours

0 Other Hours

ISE 2303. Materials & Manufacturing 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.

3 Credit Hours

3 Total Contact Hours

0 Lab Hours

3 Lecture Hours

0 Other Hours

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

ISE 2333. Decision Support Systems.

Decision Support Systems: Decision support systems for industrial, manufacturing and systems engineering applications.

3 Credit Hours

3 Total Contact Hours

0 Lab Hours

3 Lecture Hours

0 Other Hours

ISE 2377. Electro-Mechanical Systems.

Principles of electrical circuits, generators, and motors. Introduction to electronics and introduction to micro-processors 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)

ISE 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)

ISE 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.

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)

ISE 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)

ISE 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)

ISE 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.

3 Credit Hours

3 Total Contact Hours

0 Lab Hours

3 Lecture Hours

0 Other Hours

Prerequisite(s): (MATH 3323 w/C or better)

ISE 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.

1 Credit Hour

1 Total Contact Hour

0 Lab Hours

0 Lecture Hours

1 Other Hour

ISE 4266. Senior Design.

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

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)

ISE 4334. Work Design- Prod. & Safety.

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.

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)

ISE 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 and 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)

ISE 4354. Data Analytics Applications.

This course introduces the concepts, algorithms, techniques, and systems of data mining, including (1) an introduction to data analytics, (2) data preprocessing, (3) mining frequent patterns and correlation, (4) classification, (5) cluster analysis, and (6) learning about the software used in data mining and (7) demonstration of how to apply data analytics techniques using python. The course will give students a basic understanding of common data analytics techniques and their applications. Keywords: Data Analytics, Industrial Analytics, Industrial Data.

3 Credit Hours

3 Total Contact Hours

0 Lab Hours

3 Lecture Hours

0 Other Hours

Major Restrictions:

Restricted to majors of IASE

Classification Restrictions:

Restricted to class of JR,SR

Prerequisite(s): (ISE 3373 w/C or better)

ISE 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)

ISE 4371. Engineering Problems.

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

ISE 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)

ISE 4390. Oper Research II: Stoch Models.

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.

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)

ISE 4391. Prod Plan & Inv Cont Sys.

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.

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)

ISE 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

ISE 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

ISE 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