

IND E 101 Introduction to Industrial Engineering (1) I&S

Students learn the basic concepts and methods of industrial engineering through team-based hands-on activities, explore the profession of industrial engineering, and discover resources available to Industrial Engineering students at the University of Washington. Offered: A.

IND E 250 Fundamentals of Engineering Economy (4) NW

Basics of industrial cost analysis and accounting. Application of interest computations to engineering decision making. Analysis of engineering alternatives based on use of interest computations, valuations, depreciation, and cost estimates in process and product manufacturing. Offered: ASp.

IND E 315 Probability and Statistics for Engineers (3) NW

Application of probability theory and statistics to engineering problems, distribution theory and discussion of particular distributions of interest in engineering, statistical estimation and data analysis. Illustrative statistical applications may include quality control, linear regression, analysis of variance, and experimental design. Prerequisite: either MATH 136 or MATH 307. Offered: AWSpS.

IND E 316 Design of Experiments and Regression Analysis (4) NW *Kapur*

Introduction to the analysis of data from planned experiments. Analysis of variance and regression analysis with applications in engineering. Prerequisite: IND E 315. Offered: jointly with STAT 316. Offered: W.

IND E 321 Statistical Quality Control (4) *Mastrangelo*

Design of quality control and assurance systems. Statistical Process Control (SPC) design and implementation. Control charts for attributes and variables. Process capability analysis and process improvement techniques. Statistical tolerance design. Quality management and recent developments. Prerequisite: IND E 315. Offered: W.

IND E 337 Introduction to Manufacturing Systems (4) *Storch*

Description of manufacturing systems. Includes discussion of current trends in manufacturing. Introduces process flow analysis, manufacturing organizations including job-shop, assembly lines, and group technology, manufacturing inventory philosophies (just-in-time, MRP, OPT), work environment, and work simplification. Offered: A.

IND E 351 Human Factors in Design (4)

Engineering considerations of the abilities and limitations of the human aspect in the design of operational systems and components. Functional, psychological, physiological, and environmental considerations. Prerequisite: IND E 315. Offered: Sp.

IND E 410 Linear and Network Programming (4) *Zabinsky*

Optimization of linear systems, mathematical model design, simplex methods, primal-dual algorithms, parametric programming, network theory, integer and goal programming and game theory. Design aspects of models with applications involving transportation, allocation, and total industrial engineering systems. Prerequisite: either MATH 136 or MATH 308; CSE 142. Offered: A.

IND E 411 Stochastic Models and Decision Analysis (4) *Ghate, Zabinsky*

Nonlinear optimization and stochastic systems analysis to industrial engineering problems. Topics include: nonlinear programming, dynamic programming, geometric programming, and Markov chains, queueing theory and queueing applications. Prerequisite: IND E 315 & 410. Offered: W.

IND E 412 Integer and Dynamic Programming (4) *Ghate, Zabinsky*

Fundamental concepts of mathematical systems theory and decision theory. Application of general systems approach for specification of requirements, analysis, design, implementation of industrial engineering, and information systems. Generalized techniques and applications common to industrial and mechanical engineers. Class project concerning analysis of large-scale systems problem utilizing operational research. Prerequisite: IND E 411. Offered: Sp.

IND E 424 Simulation (4) *Beamon*

Discrete-event simulation methodology emphasizing model formulation and construction with modern simulation languages and environments, statistical basis for evaluating model results, design and management of simulation projects. Application to manufacturing, retail, and service industries. Prerequisite: IND E 337; IND E 411, which may be taken concurrently. Offered: W.

IND E 426 Reliability Engineering and System Safety (4) *Kapur*

Reliability and system safety measures. Life distributions and their applications in reliability. System reliability models. Design by reliability and probabilistic design. Reliability and safety analysis through FMECA and FTA. Reliability estimation and measurement by testing for binomial, exponential, and Weibull distributions. Prerequisite: IND E 315. Offered: Sp.

IND E 430 Manufacturing Scheduling and Inventory (4) *Beamon*

Manufacturing scheduling and inventory control for different work organizations. Coverage of workforce scheduling, job- and flow-shop scheduling and order release, production line balancing, MRP II, Lean Production, and data management. Particular attention to computer-based aspects of management and scheduling for manufacturing and service industries. Prerequisite: IND E 337 & 411 both of which may be taken concurrently. Offered: A.

IND E 431 Computer Integrated Manufacturing (4)

Design and control of computer-based production systems. Focus on selection and integration of flexible manufacturing technology, computer hardware, application and operating system software, data communication networks, data management systems. Laboratory assignments concentrate on programming and integration of system components. Current literature and recommended texts used as reference sources. Prerequisite: IND 337; CSE 142.

IND E 439 Plant Layout and Material Handling (4) *Beamon*

Design of new or expanding industrial facilities. Consideration of work organization and layout. Study of basic design of plant systems, including plumbing, electrical, HVAC, illumination, acoustics, and waste handling. In depth coverage of material handling system design and equipment choices. Prerequisite: IND E 410, which may be taken concurrently. Offered: A.

IND E 455 User Interface Design (4) *Furness*

Design oriented to cover fundamentals of user interface design; models on human computer interaction, software psychology, input devices, usability, cognitive and perceptual aspects of human-computer interaction, advanced interface, and research methodologies are discussed. Offered: jointly with T C 455. Offered: A.

IND E 470 Introduction to Systems Engineering (4) *Vaughan*

Concepts of system approach, system hierarchies, functional analysis, requirements, trade studies, and other concepts used to define and integrate complex engineering systems. Introduction to risk analysis and reliability, failure modes and effects analysis, writing specifications, and lean manufacturing. Offered: jointly with AA 470. **Also offered through EDGE.**

IND E 494 Design in the Manufacturing Firm (4) *Storch*

Engineering design in manufacturing firms is presented. Topics include design methodology, concurrent engineering, and project management. Focus on the relationship between product design and manufacturing (design for production and assembly). Prerequisite: IND E 337 & T C 333. Offered: W.

IND E 495 Industrial Engineering Design (4) *Storch*

Capstone senior design project involving identification and synthesis of industrial engineering skills. Students apply their knowledge of industrial engineering to actual industrial problems. Prerequisite: IND E 494. Offered: Sp.

IND E 498 Special Topics in Industrial Engineering (1-5, max. 9)

Lecture and/or laboratory.

IND E 499 Special Projects (2-5, max. 9)