INDUSTRIAL ENGINEERING (INDSTENG)

INDSTENG 2130 Fundamentals of Industrial and Systems Engineering 3 Credits
Introduction to the field of industrial and systems engineering and associated specialties. Fundamental topics on manufacturing processes and systems, operations research, methods engineering, human factors, facilities design, quality and management. Introduction to real-world problem formulation and solution using economics, linear algebra and statistical concepts. Professional ethics will be discussed using case studies.
Components: Class
Prereqs/Coreqs: P. Sophomore Standing and C- or higher in (MATH 2450 or MATH 2530 or GENENG 1500) or mathematics proficiency level of 40

INDSTENG 3130 Industrial Engineering Computer Applications 3 Credits
Spreadsheets, databases, Statistical Analysis Software, and computer programming. Emphasis on using the computer and computer software as a tool to solve Industrial Engineering problems and to facilitate Industrial Engineering activities.
Components: Class
Prereqs/Coreqs: P. C- or higher in both INDSTENG 2130 and MATH 2640

INDSTENG 3530 Operations Research I 3 Credits
Basic methodology and techniques of operations research. Emphasis on application and problem solving models; linear programming, sensitivity analysis, nonlinear/classical optimization, queuing theory; Markov processes; dynamic programming.
Components: Class
Prereqs/Coreqs: P. C- or higher in MATH 4030

INDSTENG 3630 Work Measurement and System Design 3 Credits
Principles and techniques of work design, operation analysis and job design. Work methods and analysis; predetermined time systems; stopwatch time studies; work sampling; standards development. Safety and ergonomic considerations in work design will be emphasized.
Components: Class, Laboratory
Prereqs/Coreqs: P. C- or better in MATH 4030

INDSTENG 3730 Engineering Management 3 Credits
Fundamental concepts of management including management skills, functions, roles and theories; project management techniques; transition from engineer to manager; ethics in engineering; intellectual and property rights; and product liability.
Components: Class
Prereqs/Coreqs: P. Junior standing

INDSTENG 3780 System Safety Engineering 3 Credits
Principles of safety engineering and safety management with an emphasis on OSHA standards. Common hazard situations are presented for anticipation, identification, and evaluation. Safety management, plans, and programs are discussed with an emphasis on development and implementation. Risk assessment concepts and tools are introduced.
Components: Class
Prereqs/Coreqs: P. Junior standing or consent of instructor

INDSTENG 3830 Engineering Design of Systems 3 Credits
Fundamental concepts in classifying systems; application of the systems life cycle and design processes in modeling and analyzing engineering systems. Analysis and modeling must include systems requirement analysis, functional analysis, technical performance measures, and system design models. Application areas like decision making, risk analysis, etc. may be covered.
Components: Class
Prereqs/Coreqs: P. C- or better in INDSTENG 2130

INDSTENG 3950 Industrial Engineering Cooperative Education 2 Credits
Work experience in industry under the direction of the College of Engineering, Mathematics and Science Cooperative Education and Internship Program. During co-op the student is expected to be away from his/her studies at UW-Platteville and work for an industry for a semester and summer. Credits do not fulfill graduation requirements.
Components: Field Studies

INDSTENG 3970 Industrial Engineering Internship 1 Credit
Work experience in industry under the direction of the College of Engineering, Mathematics and Science Cooperative Education and Internship Program. NOTE: This program is separate and distinct from the cooperative education program and is principally designed to cover the summer work experience. Internship is designed to provide experiential learning experience to the student during the summer period. Credits do not fulfill graduation requirements.
Components: Field Studies
Prereqs/Coreqs: P. Junior standing

INDSTENG 4030 Production and Operations Analysis 3 Credits
Analysis and design of production control procedures including inventory and scheduling. Operations management techniques including forecasting and aggregate planning. Project planning using CPM/PERT.
Components: Class
Prereqs/Coreqs: P. C- or higher in both INDSTENG 3130 and INDSTENG 3530

INDSTENG 4130 System Simulation and Analysis 3 Credits
Applications of computer simulation of discrete systems with emphasis on model formulation; instruction in at least one simulation language. Emphasis on input data analysis, model development, model validation, statistical analysis of output, and experimental design.
Components: Class, Laboratory
Prereqs/Coreqs: P. C- or higher in MATH 4030

INDSTENG 4230 Facilities Design 3 Credits
Design principles and analytical procedures for facility location, development of an overall functional relationship plan, materials receipt accounting, processing and storage areas. Discussion of manufacturing and service-oriented facilities. Application of IE principles to optimization of site selection and facility design. Facilities covered include automated manufacturing systems, flexible manufacturing systems, modular design and office space design. Application of computerized layout techniques is emphasized.
Components: Class
Prereqs/Coreqs: C: INDSTENG 3630

INDSTENG 4330 Material Handling and Warehousing 3 Credits
Procedures and techniques for analysis of material handling and warehousing problems. Principles of materials handling; systematic handling analysis; productivity analysis; unit load design; automatic identification techniques; selection/use of common and state-of-the-art equipment and techniques; design of materials handling systems; safety procedures in materials handling.
Components: Class
Prereqs/Coreqs: P. C- or higher in both INDSTENG 3530 and GENENG 2820

INDSTENG 4430 Quality Engineering 3 Credits
Emphasis on modern Total Quality Management philosophies, Statistical Process Control methods and tools for problem solving and ongoing process improvement. Acceptance sampling procedures and standards, experimental design including Taguchi techniques, quality audits. Economic aspects of quality decisions, basic concepts in reliability analysis. Basics of ISO 9000.
Components: Class
Prereqs/Coreqs: P. C- or higher in MATH 4030

INDSTENG 4440 Human Factors Engineering 3 Credits
Introduction to the basic theories on physical and cognitive ergonomics and engineering anthropometry. Considerations of human capabilities, environmental effects and safety standards in work design for industrial systems. Applications of fundamental human-performance modeling techniques in industrial and service sectors.
Components: Laboratory, Class
Prereqs/Coreqs: P. C- or higher in MATH 2740

INDSTENG 4530 Operations Research II 3 Credits
Advanced operations research topics including integer programming, nonlinear optimization, decision making under uncertainty using different decision criteria and application of optimization techniques in machine learning methods like regression, logistic regression, and decision trees.
Components: Class
Prereqs/Coreqs: P. C- or better in INDSTENG 3530

INDSTENG 4540 Human Performance and System Design 3 Credits
Design of the interface between human and elements of a complex system. Concentration on perception and cognitive aspects of work including sensory perception, learning, and judgment. Characteristics of complex systems and necessary support for human operators. Error minimization. Application of human-system performance considerations in product design.
Components: Class
Prereqs/Coreqs: P. C- or higher in INDSTENG 3630

INDSTENG 4610 Machining and Metrology 3 Credits
Introduction to the concepts and basics of traditional and advanced machining processes and the principles and methods of conducting accurate measurements using different measuring tools and apparatuses to engineering students. This course is intended to give students the opportunity to gain hands-on experience in traditional and advanced cutting machines, GM coding, CNC machining, and using different measuring tools and equipment.
Components: Laboratory, Class
Prereqs/Coreqs: P. C- or better in MECHENG 3040 or consent of instructor

INDSTENG 4630 Manufacturing Systems Design 3 Credits
Principles and procedures related to the design, implementation, documentation and control of manufacturing systems. Consideration of transfer line, numerical control systems, flexible automation, robotics, and manufacturing support activities such as cost, quality, and materials control. Introduction to CAD/CAM and CIM.
Components: Laboratory, Class
Prereqs/Coreqs: C: INDSTENG 3130 and MECHENG 3040

INDSTENG 4750 Principles and Applications of Project Management 3 Credits
Systems perspective of scope definition, and management of scope, time human resources, communications, and risk, as it applies to industrial engineering projects. (Spring)
Components: Class
Prereqs/Coreqs: P. C- or higher in INDSTENG 3730 or INDSTENG 4730

INDSTENG 4830 Engineering Continuous Improvement 3 Credits
Introduction to value engineering and lean techniques. Applications of engineering valuation. Basic principles of function analysis. Discussion of lean tools including value stream mapping.
Components: Class
Prereqs/Coreqs: P. Junior standing

INDSTENG 4930 Industrial Systems Design 3 Credits
This is the capstone design course, the culmination of the IE program; requires knowledge and application of all the IE principles to comprehensive industrial project design and development. The project will involve the application of more than one of the following methodologies to case studies or industrial projects: facilities location and design; production planning and control; materials handling; evaluation of alternatives; economic analysis; quantitative models; cost, inventory and budgeting controls, system specifications, safety considerations. Students must take this course only in their last semester.
Components: Laboratory, Class
Prereqs/Coreqs: C: INDSTENG 4130 and INDSTENG 4030

INDSTENG 4980 Current Topics in Engineering 1-3 Credits
In-depth study of a current topic of interest to the engineering profession. The topic will be identified in the course title.
Components: Laboratory, Class
Prereqs/Coreqs: P. consent of instructor

INDSTENG 4990 Independent Study 1-3 Credits
Advanced study in the area of specialization.
Components: Independent Study
Prereqs/Coreqs: P. senior standing