

INDE - INDUSTRIAL ENGINEERING (INDE)

INDE U102 Foundations of Industrial and Systems Engineering 3 Credit Hours

Principles, concepts, and methodologies underlying the field of industrial and systems engineering. Topics will explore the fundamental principles of efficiency, productivity, and effectiveness within complex systems, with a focus on understanding the interplay between various components and processes and expose students to careers in the discipline.

INDE U210 Manufacturing Processes 4 Credit Hours

Fundamental techniques used in manufacturing including machining, casting, forming, welding, and additive manufacturing. Emphasis is placed on the practical aspects of manufacturing, including machine operation, tooling, fixture design, process optimization, and quality control.

Prerequisite(s): ENCP U101.

Corequisite(s): INDE U210L.

INDE U210L Manufacturing Processes Laboratory 0 Credit Hours

Practical application, observation, and documentation of techniques used in manufacturing including machining, casting, forming, welding, and additive manufacturing.

Prerequisite(s): ENCP U101.

Corequisite(s): INDE U210.

INDE U310 Systems Modeling and Simulation 3 Credit Hours

Modeling, analysis, and simulation techniques for complex systems in engineering fields. Introduces students to various modeling paradigms, simulation methodologies, and tools used to analyze and optimize system behavior, performance, and design. Fundamental concepts in systems theory, including system representation, dynamics, feedback, and control are covered.

Prerequisite(s): Calculus II, ENGR U230, CSCI U150.

INDE U320 Engineering Economy 4 Credit Hours

Principles, techniques, and applications of economic analysis in engineering decision-making. Skills necessary to evaluate engineering projects, investments, and alternatives from a financial perspective, considering factors such as costs, benefits, risks, and time value of money are developed.

Corequisite(s): INDE U320L.

INDE U320L Engineering Economy Laboratory 0 Credit Hours

Analysis techniques, use of modeling tools, and applications of techniques toward real-world engineering problems.

Corequisite(s): INDE U320.

INDE U330 Lean Engineering 4 Credit Hours

Principles, methodologies, and tools of lean thinking including value stream mapping, 5S workplace organization, standardized work, pull production systems, and just-in-time (JIT) manufacturing within the context of engineering practice. Concepts of continuous improvement, waste reduction, and customer value creation will be used to optimize processes, eliminate inefficiencies, and enhance productivity in engineering operations.

Corequisite(s): INDE U330L.

INDE U330L Lean Engineering Lab 0 Credit Hours

Application of the principles of lean, including waste reduction and continuous improvement, value stream mapping, just-in-time production, kaizen, and six sigma to engineering problems.

Corequisite(s): INDE U330.

INDE U340 Operations Research 3 Credit Hours

Quantitative modeling and analytical tools necessary for optimizing complex decision-making processes in engineering. Focus is on applying mathematical and computational techniques to solve problems related to resource allocation, scheduling, inventory management, and logistics.

Prerequisite(s): MATH U142, ENGR U230, CSCI U150.

INDE U360 Production Planning and Inventory Control 3 Credit Hours

Strategies for aggregate planning, master production scheduling, and materials requirements. Demand forecasting, capacity planning, and scheduling to create production plans that balance production capacity with customer demand while minimizing costs and maximizing resource utilization are utilized.

Prerequisite(s): ENGR U230.

INDE U410 Facilities Planning and Logistics 4 Credit Hours

Facility layout design, space allocation, flow analysis, and process optimization using quantitative methods and simulation techniques.

Topics in transportation planning, inventory management, warehousing, and distribution are also covered.

Prerequisite(s): INDE U310.

Corequisite(s): INDE U410L.

INDE U410L Facilities Planning and Logistics Laboratory 0 Credit Hours

Practical application, observation, and documentation of facility layout design, space allocation, flow analysis, and process optimization using quantitative methods and simulation techniques.

Prerequisite(s): INDE U310.

Corequisite(s): INDE U410.

INDE U415 Quality Control and Management 3 Credit Hours

Principles, methodologies, and practices involved in ensuring and improving product and service quality across various industries to achieve organizational excellence, customer satisfaction, and competitive advantage. Emphasis is placed on understanding how tools and techniques used in quality control and improvement, including statistical process control (SPC), quality function deployment (QFD), failure mode and effects analysis (FMEA), and Six Sigma methodology can be applied to monitor processes, identify defects, and drive continuous improvement.

Prerequisite(s): ENGR U230.

INDE U430 Ergonomics and Human Factors Engineering 4 Credit Hours

Design and optimization of systems, products, and environments to enhance human performance, safety, and well-being. Focus is placed on the interaction between humans and their technological and social environments and how human capabilities and limitations influence the design of products, workspaces, and user interface.

Prerequisite(s): INDE U330.

Corequisite(s): INDE U430L.

INDE U430L Ergonomics and Human Factors Engineering Laboratory 0 Credit Hours

Application of concepts related to design and optimization of systems, products, and environments to enhance human performance, safety, and well-being related to engineering problems.

Prerequisite(s): INDE U330; Corequisite: INDE U430.

INDE U480 Industrial Engineering Capstone Project I 3 Credit Hours

Major engineering design experience emphasizing project-based learning, teamwork, professional development, and preparing students for successful careers in engineering practice.

Prerequisite(s): 33 credit hours in INDE or ENGR courses with a C or better.

INDE U490 Industrial Engineering Capstone Project II and Senior Seminar 3 Credit Hours

Continuation of the major engineering design experience. Integration and application of the knowledge, skills, and techniques acquired to solve real-world engineering problems at an advanced level. Critical evaluation of an engineering-related ethical issue as well as written and oral presentations are included.

Prerequisite(s): INDE U480 with a C or better.