

INTERPROFESSIONAL PROGRAMS

Courses

ENCP 101 - Introduction to Engineering (3 Credits)

Engineering problem solving using computers and other engineering tools.

ENCP 102 - Introduction to Computer-Aided Design (3 Credits)

Principles and practice of visualization and graphical representation using modern computer-aided design tools.

ENCP 103 - Exploratory Topics in Engineering and Computing (0-6 Credits)

Introduction to new, contemporary, and emerging issues in engineering and computing that are not regularly included in lower division courses. Course content varies and will be announced in the schedule of classes.

ENCP 105 - Professional Development and Ethics in Engineering and Computing (1 Credit)

Introduction to the field of engineering and computing in a seminar format. Open to first-year students only.

ENCP 200 - Statics (3 Credits)

Introduction to the principles of mechanics. Equilibrium of particles and rigid bodies. Distributed forces, centroids, and centers of gravity. Moments of inertia of areas. Analysis of simple structures and machines. A study of various types of friction.

Prerequisites: D or better in MATH 141.

ENCP 201 - Introduction to Applied Numerical Methods (3 Credits)

Introduction and application of linear algebra and numerical methods to the solution of physical and engineering problems. Techniques include iterative solution techniques, methods of solving systems of equations, and numerical integration and differentiation.

Prerequisite or Corequisite: D or better in MATH 142.

ENCP 210 - Dynamics (3 Credits)

Kinematics of particles and rigid bodies. Kinetics of particles with emphasis on Newton's second law; energy and momentum methods for the solution of problems. Applications of plane motion of rigid bodies.

Prerequisites: D or better in ENCP 200, ECIV 200, or EMCH 200.

ENCP 260 - Introduction to the Mechanics of Solids (3 Credits)

Concepts of stress and strain; stress analysis of basic structural members; consideration of combined stress, including Mohr's circle; introductory analysis of deflection; buckling of columns.

Prerequisites: D or better in ENCP 200, ECIV 200, or EMCH 200; D or better in MATH 241.

ENCP 290 - Thermodynamic Fundamentals (3 Credits)

Definitions, work, heat, and energy. First law analyses of systems and control volumes. Second law analysis.

Prerequisites: D or better in MATH 241.

ENCP 330 - Introduction to Vibrations (3 Credits)

Theoretical and experimental analysis of systems involving one degree of freedom, including measurement methods. Introduction to free vibrations in systems with two degrees of freedom.

Prerequisites: D or better in ENCP 210, ECIV 210, or EMCH 310; D or better in MATH 242.

ENCP 360 - Fluid Mechanics (3 Credits)

Basic principles of fluid statics and dynamics; conservation laws of mass, momentum, and energy developed in the context of the control volume formulation; application of dimensional analysis, dynamic similitude, steady-state laminar viscous flow, and turbulent flow.

Prerequisites: D or better in ENCP 200, ECIV 200, EMCH 200, BMEN 212, BMEN 260, BMEN 263, or ECHE 300; D or better in PHYS 211.

ENCP 399 - Independent Study (1-3 Credits)

ENCP 440 - Sustainable Development in Engineering (3 Credits)

An examination of political, social, technical, and economic issues associated with sustainable development.

ENCP 460 - Special Topics in Engineering and Computing (1-6 Credits)

Emerging topics in engineering and computing. Course content varies and will be announced in the schedule of classes by title. May be repeated up to 8 hours as topic varies.

ENCP 481 - Project Management (1 Credit)

Estimating project time and resources, scheduling, Gantt and PERT charts, budgeting, monitoring and tracking results.

Graduation with Leadership Distinction: GLD: Research

ENCP 491 - Capstone Design Project (3 Credits)

Major team-based design project to be undertaken in a student's final year of study; project planning.

Graduation with Leadership Distinction: GLD: Research

ENCP 492 - Capstone Design Project II (3 Credits)

System implementation, testing, verification and validation of results. Written reports and oral presentations in a technical setting.

Prerequisites: D or better in ENCP 491.

Graduation with Leadership Distinction: GLD: Research

ENCP 530 - Cases in Technology Feasibility Analysis (3 Credits)

Technology innovation, exploitation of intellectual property, and technology feasibility analysis.

ENCP 533 - Legal Aspects of Engineering & Innovation (3 Credits)

Contracts, products liability, intellectual property including patent, trade secrets, copyrights and trademarks, and business torts relating to product design.

ENCP 535 - Developing and Launching New Ventures in Science and Technology (3 Credits)

Processes, strategies and tools to analyze and facilitate the emergence of science and technology oriented ventures.

ENCP 536 - Innovation and New Venture Analysis (3 Credits)

Entrepreneurial perspective and planning, market preparation, business model analysis, business planning and fundraising.

ENCP 540 - Environmentally Conscious Manufacturing (3 Credits)

Design for the environment; life cycle analysis; environmental economics and global competitiveness; legal and regulatory affairs; and management of technological change. Interdisciplinary collaboration of engineering, science, math, and business majors. Graduate student standing or consent of instructor.

ENCP 602 - Introduction to Engineering Design for Teachers (3 Credits)

An introduction to computer-aided design with solid modeling for pre-service and in-service teachers. Design process, professional communication and collaboration methods, design ethics, and technical documentation. Non-engineering and computing majors only. Prerequisite: college algebra with trigonometry.

ENCP 603 - Gateway to Technology for Teachers (3 Credits)

Addresses the development of knowledge, skills, and understanding of modern technology. For preservice and in-service teachers. College of Engineering and Computing majors are excluded.

Prerequisites: MATH 112 or MATH 115.

ENCP 605 - Principles of Engineering for Teachers (3 Credits)

Introduces technological processes employed in engineering and engineering technology for K-12 teachers. For pre-service and in-service teachers. College of Engineering and Computing majors are excluded.

Prerequisites: MATH 112 or MATH 115.

INDE 190 - Introduction to Industrial Engineering (3 Credits)

Introduction to the profession and core topics of industrial engineering. Introduction to problem solving, ethics and industrial engineering design and analysis techniques.

INDE 291 - Materials & Manufacturing (3 Credits)

Engineering materials, deformative manufacturing, subtractive manufacturing, additive manufacturing, assembly processes, quality control and productivity; computer aided manufacturing.

Prerequisites: D or better in INDE 190 or ENCP 101.

INDE 292 - Work Design & Ergonomics (3 Credits)

Manual components and cognitive aspects of work. Ergonomics and work design methods for increased productivity and improved worker health and safety. Integration of motion and time study with human factors and ergonomics and safety engineering.

INDE 391 - Production Engineering & Management (3 Credits)

Planning and control of operations in both manufacturing and service industries. Effective management and utilization of resources and the production of cost-effective products and services. Principles, models, and techniques used for production planning and inventory control.

Prerequisites: D or better in MATH 141 or MATH 122; D or better in STAT 201 or higher.

INDE 392 - Operations Research in Engineering (3 Credits)

Application of operations research to industrial engineering. Algorithmic and practical implementation of mathematical models to describe and/or improve systems and to gain real-time efficiency.

Prerequisites: D or better in MATH 344 and STAT 509.

INDE 397 - Industrial Engineering Laboratory (3 Credits)

Industrial engineering experiments, instrumentation, and analysis and interpretation of data.

Prerequisites: D or better in MATH 142 and D or better in one of the following: CSCE 102, CSCE 106, CSCE 145, CSCE 146, ENCP 201, ECIV 201, EMCH 201, ITEC 104, CSCE 104, or ITEC 352.

INDE 460 - Independent Study (1-6 Credits)

Individual investigation or studies of special topics. Requires contract approval.

INDE 490 - Quality Engineering (3 Credits)

Quality tools and techniques employed to help prevent defects in engineered products, and to avoid problems when delivering solutions or services to customers.

Prerequisites: D or better in STAT 509 or higher; D or better in INDE 391.

INDE 496 - Facilities Planning & Material Handling (3 Credits)

Methods to analyze and optimize facilities layout and the arrangement and movement of physical resources to support the production and distribution of goods and services.

Prerequisites: D or better in INDE 391.

INDE 497 - Industrial Engineering Capstone Project (3 Credits)

Open-ended team design experiences that develop the ability to develop, implement, and improve integrated systems that include people, materials, information, equipment, and energy. Real-world experiences and business perspectives.

Prerequisites: D or better in INDE 291, INDE 391, and INDE 392.

INDE 561 - Special Topics in Industrial Engineering (1-6 Credits)

Content varies and will be announced in the schedule of classes by section title. May be repeated for different topics.

INDE 591 - Smart Manufacturing (3 Credits)

Advanced concepts of smart manufacturing: hardware infrastructure, cyber infrastructure, data infrastructure, industrial Internet of things, machine to machine network, machine vision, manufacturing event understanding.

Prerequisites: D or better in INDE 291 or EMCH 377.

INDE 593 - Supply Chain Engineering (3 Credits)

Engineering analysis of the movement, production, and storage of raw materials, work-in-process inventory, finished goods, and services from point of origin to point of consumption or use.

Prerequisites: D or better in INDE 392.

INDE 595 - Systems Simulation (3 Credits)

Discrete event simulation methodology emphasizing the statistical basis for simulation modeling and analysis. Overview of computer languages and simulation design applied to various industrial situations.

Prerequisites: D or better in INDE 392.