ENGN - Engineering

ENGINEERING Courses

ENGN 100. Spatial Visualization. 0 Credits.
The course introduces students to spatial visualization/thinking. The objective of the course is to enhance students' ability of thinking in three dimensions. The course covers student experience with spatial visualization/thinking, design and representation, and strategic use. Educational interventions and testing to improve three-dimensional visualization skills are used. The course does not count towards College of Engineering & Technology graduation credit. Prerequisites: Permission of instructor required; enrollment limited to first-year engineering students participating in the Summer Preview/Orientation.

ENGN 108. Introduction to Engineering. 3 Credits.
A one-semester course covering topics in civil, environmental, mechanical, electrical and computer engineering. For non-engineering majors. Prerequisites: MATH 102M.

ENGN 110. Explore Engineering and Technology. 2 Credits.
This course involves a series of projects to introduce a variety of engineering and technology disciplines; hands-on experiences with selected engineering problems and issues; a team approach to managing engineering projects; discovering the unknown, formulating solutions, designing, manufacturing, and testing; and emphasis on learning modules, communication and presentation skills, creativity and innovation. Pre- or corequisite: eligible to enroll in MATH 162M or higher.

ENGN 150. Computer Programming for Engineering Problem Solving. 4 Credits.
Introduction to computer programming using engineering problem-solving. Software design topics include program design, algorithm development, and testing. Programming language concepts include data types (primitive, composite, abstract, pointers) and program structure (assignment and control flow statements, functions). Laboratory exercises involve utilizing C++ and Matlab to solve engineering problems (control, information processing, simulation, data analysis). Pre- or corequisite: MATH 163.

ENGN 301. e-Engineering. 3 Credits.
A study of the theory and best practices involved in conducting physically-dispersed engineering team collaboration. Student teams will apply e-Engineering concepts using a distributed product engineering scenario. Course module topics include project management, virtual teaming, distributed collaborative tools, and scenario-specific engineering skills. Prerequisites: junior standing.

ENGN 401. Fundamentals of Engineering Review. 1 Credit.
This course prepares the engineering and engineering technology students for the Fundamentals of Engineering Examination. Prerequisites: Senior standing.

ENGN 402. Introduction to Engineering Design for Teachers. 3 Credits.
This course is for K-12 teachers seeking endorsement. No credit will be given to students pursuing majors in the College of Engineering and Technology. The major focus of this course is to expose students to the design process, research and analysis, teamwork, communication methods, global and human impacts, engineering standards, and technical documentation. Topics include engineering design process, modeling, sketching, measurement, statistics and applied geometry, engineering drawing standards, CAD solid modeling, reverse engineering, consumer product design innovation, graphic design and virtual design teams. Prerequisites: MATH 211 and PHYS 111N.

ENGN 403. Statics for Teachers. 3 Credits.
This course is for K-12 teachers seeking endorsement. No credit will be given to students pursuing majors in the College of Engineering and Technology. Scalar methods and free body diagrams are employed in the analysis of discrete and distributed force systems and their application to bodies in external equilibrium. Friction, moment of inertia, and center of gravity are also included. Prerequisites: MATH 211.

ENGN 404. Introduction to Fluids for Teachers. 3 Credits.
This course is for K-12 teachers seeking endorsement. No credit will be given to students pursuing majors in the College of Engineering and Technology. The study of fluid statics and dynamics, including momentum, energy, Bernoulli's Equation, laminar and turbulent fluid flow and friction in pipes, fluid machinery, and open-channel flow. Prerequisites: CET 200.

ENGN 405. Introduction to Thermodynamics for Teachers. 3 Credits.
This course is for K-12 teachers seeking endorsement. No credit will be given to students pursuing majors in the College of Engineering and Technology. The basic laws of thermodynamics, properties of fluids, heat and work and their applications in processes and cycles, and an introduction to conduction heat transfer will be covered. Prerequisites: CHEM 121N, MATH 211, and PHYS 111N.

ENGN 411. Energy Management and Policy. 3 Credits.
An introduction to energy management and contemporary policy issues. Topics include energy history, energy management principals, energy auditing, rates for commercial and industrial consumers, energy security and reliability, utility deregulation and energy system outsourcing, financing energy management projects, codes and standards, energy and climate change, and use of alternative energy. Prerequisites: Junior standing, PHYS 111N and MATH 162M.

ENGN 412. Fundamentals of Energy Conversion and Transmission. 3 Credits.
A general overview of energy conversion and transmission systems. The topics will include energy resources and units, fossil fuels, natural gas, nuclear fuel, energy from renewables, energy efficiency, energy management control systems, energy systems integration, energy systems and cyber security. Prerequisites: Junior standing, PHYS 111N and MATH 162M.

ENGN 444. Veterans in Engineering and Engineering Technology Seminar. 1 Credit.
This course aims to augment the transition from service to student to engineer through helping the veteran achieve a sense of belonging to the engineering profession through class discussions, seminars, and workshops designed to develop their identities as engineers and increase their feeling of belonging in engineering fields through self-efficacy and help with their persistence to degree completion. Class activities are designed to build a sense of community and increase students' relevance by helping students develop a career identity in engineering. Prerequisite: Junior standing or instructor permission.

ENGN 454/554. Introduction to Bioelectricity. 3 Credits.
Covers the electrical properties of cells and tissues as well as the use of electrical and magnetic signals and stimuli in the diagnosis and treatment of disease. Typical topics to be covered include basic cell physiology, endogenous electric fields in the body, electrocardiography, cardiac pacing, defibrillation, electrotherapy, electroporation, electrotherapy in wound healing. In addition, ultrashort electrical pulses for intracellular manipulation and the application of plasmas to biological systems will be covered. (Cross-listed with ECE 454/ECE 554) Prerequisites: PHYS 111N or higher; MATH 200 or higher.

ENGN 495. Multidisciplinary Topics in Engineering and Technology. 1-3 Credits.
Special interdisciplinary or multidisciplinary topics of interest with emphasis on emerging areas in engineering. Prerequisites: instructor permission.

ENGN 554. Introduction to Biotechnologies. 3 Credits.
A one-semester course covering the electrical properties of cells and tissues as well as the use of electricity and magnetism in the diagnosis and treatment of disease. Typical topics to be covered include electrocardiography, cardiac pacing, defibrillation, electrotherapy, electroporation, electrotherapy in wound healing. In addition ultrashort electrical pulses for intracellular manipulation and the application of plasmas to biological systems will be covered. (Cross listed with ECE 554). Prerequisites: PHYS 111N or higher; MATH 200 or higher.
Prerequisites: bachelor's degree in physics, engineering or biology. This course will cover advanced application of pulsed power and plasma in the medical, biological and environmental fields. (Cross-listed with ECE 630).