ENGN - Engineering

ENGN 100 Spatial Visualization (0 Credit Hours)
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 Credit Hours)
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 Credit Hours)
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. For engineering and engineering technology majors only.
Pre- or corequisite: eligible to enroll in MATH 162M or higher

ENGN 150 Computer Programming for Engineering Problem Solving (4 Credit Hours)
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 or MATH 166

ENGN 301 e-Engineering (3 Credit Hours)
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 Hour)
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 Credit Hours)
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 Credit Hours)
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 Credit Hours)
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 Credit Hours)
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 444 Veterans in Engineering and Engineering Technology Seminar (1 Credit Hour)
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.
Prerequisites: Junior standing or instructor permission

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

ENGN 602T Engineering for Secondary School Teachers (1-3 Credit Hours)
An introduction to foundations of design and civil, environmental, electrical, mechanical, and computer engineering. The course will consist of secondary school appropriate content and concepts that directly correlate with the state and local school systems' science and mathematics curriculum. May lead to a Project Lead the Way certification when applicable.
Prerequisites: Bachelor’s degree or permission of the instructor

ENGN 603T Engineering Seminar for Teachers (1-3 Credit Hours)
An introductory seminar on specific multi-disciplinary or interdisciplinary engineering topics for MS or HS teachers.
Prerequisites: Bachelor’s degree or permission of the instructor

ENGN 611 Financial Engineering (3 Credit Hours)
Financial engineering management, accounting, financial reports and analysis, capital budgeting, investment decisions.

ENGN 612 Analysis of Organizational Systems (3 Credit Hours)
Introduction to fundamental concepts in the analysis of organizations. Examination of social, structural, procedural, and environmental aspects by systems approach. Modules include: History and systems of organizations and management; Basic organizational systems and models; Organizational behavior models; Integration of systems perspectives; and Organizational structures.

ENGN 620 The Entrepreneurial Engineer (2 Credit Hours)
This course is designed to provide engineers and engineering technologists with the knowledge, skills and experience needed to create products and services that will be attractive to consumer markets and to bring those products and services to market in new commercial ventures. Topics covered include: how to evaluate entrepreneurial opportunities in the engineering field; elements of a viable business plan; governance models; management succession planning; use of social media; and creating an ethical engineering enterprise in the global economy.
ENGN 621 The Entrepreneurial Engineer (2 Credit Hours)
This course is designed to provide engineers and engineering technologists with the knowledge, skills and experience needed to create products and services that will be attractive to consumer markets and to bring those products and services to market in new commercial ventures. Topics covered include: How to evaluate entrepreneurial opportunities in the engineering field; elements of a viable business plan; governance models; management succession planning; use of social media; and creating an ethical engineering enterprise in the global economy.

ENGN 623 Leadership and Human Dynamics for the Entrepreneurial Engineer (2 Credit Hours)
This course covers the concepts, skills, and characteristics of effective and successful entrepreneurial leaders in the 21st century. The course covers leadership for entrepreneurial engineers through case studies and literature review in areas such as the fundamentals of leadership, ethical leadership, social capital, emotional intelligence, and three-dimensional leadership.

ENGN 625 Business Planning for Entrepreneurial Engineers (2 Credit Hours)
This course is the capstone of the Entrepreneurship and Innovation graduate certificate for engineers. With data and expertise through prior certificate coursework, students develop and present a comprehensive and viable entrepreneurial business plan in engineering. Topics covered include: Product lifecycle management, marketing and strategic planning, entrepreneurial finance, and effective presentation techniques. The final presentation is delivered to a panel of ODU faculty and engineering practitioners who provide sound feedback to the student.

ENGN 630 Advanced Bioelectronics (3 Credit Hours)
A one-semester course covering advanced topics in bioelectronics. The course will cover advanced application of pulsed power and plasma in the medical, biological and environmental fields. (Cross-listed with ECE 630).
Pre-requisites: bachelor's degree in physics, engineering or biology

ENGN 671 Carbon-Free Clean Energy (3 Credit Hours)
Nuclear power and nuclear energy; solar energy; wind energy; geothermal energy; hydroelectric power; hydrogen as energy resource; hydrogen fuel cells; hybrid technologies; global economics and environmental impacts of carbon-free energy.

ENGN 672 Energy Systems Management (3 Credit Hours)
System management principles; energy systems safety and security; automation and control; environmental effects and comparative risk assessment; energy storage; carbon sequestration; energy systems scale up issues; energy systems integration; hybrid systems; energy systems optimization; effects of public policies on energy systems management.

ENGN 695 Multidisciplinary Topics in Engineering (1-3 Credit Hours)
Special interdisciplinary or multidisciplinary topics of interest with emphasis on emerging areas in engineering.

ENGN 697 Independent Study in Energy Engineering (3 Credit Hours)
Individual analytical, experimental, computational and/or design study selected by the student and supervised by the course instructor.

ENGN 811 Methodologies for Advanced Engineering Projects (3 Credit Hours)
Critical evaluation of published literature; experimental design and analysis; optimization methods; pre-project planning; definition of scope, projects risks, technical, economical, social, and political constraints; execution strategies; effective proposal development.
Pre-requisites: Graduate standing

ENGN 812 Engineering Leadership (3 Credit Hours)
Effective communication techniques, strategic planning, building collaborative relationships, conflict management, building high-performance teams, risk management, managing innovations.
Pre-requisites: Graduate standing

ENGN 813 Engineering Ethics (3 Credit Hours)
Scope of engineering ethics, moral reasoning and ethical theories, the engineer's responsibility for safety, responsibilities to the employer, responsibilities to the public, rights of engineers, global issues, professional codes of ethics, case studies.
Pre-requisites: Graduate standing

ENGN 998 Master's Graduate Credit (1 Credit Hour)
This course is a pass/fail course for master's students in their final semester. It may be taken to fulfill the registration requirement necessary for graduation. All master's students are required to be registered for at least one graduate credit hour in the semester of their graduation.

ENGINEERING Courses

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