General Engineering Courses

Engineering Ethics Values Courses

ENEV 1952. Ethics and Values Colloquium 1. 1 cr. hr.
The colloquium consists of a series of lectures, films, and discussions involving social problems with significant technical components, societal values and engineering ethics. S/U grade assessment.

ENEV 2952. Ethics and Values Colloquium 2. 1 cr. hr.
Consists of a series of lectures, films and discussions involving social problems with significant technical components, societal values and engineering ethics. S/U grade assessment. Prereq: ENEV 1952.

ENEV 3952. Ethics and Values Colloquium 3. 1 cr. hr.
Consists of a series of lectures, films and discussions involving social problems with significant technical components, societal values and engineering ethics. S/U grade assessment. Prereq: ENEV 2952.

ENEV 4952. Ethics and Values Colloquium 4. 1 cr. hr.
Consists of a series of lectures, films and discussions involving social problems with significant technical components, societal values and engineering ethics. S/U grade assessment. Prereq: ENEV 3952.

ENEV 4995. Independent Study. 1-4 cr. hrs.
Undergraduate independent study project of either a theoritical or experimental nature. Prereq: Jr. stndg, 3.000 GPA, cons. of instr., and cons. of dept. ch.

General Engineering Courses

GEEN 1120. Introduction to Engineering Graphics. 1 cr. hr.
Practicing and understanding the engineering graphics fundamentals and application of computer-aided design (CAD), utilizing solid modeling software to develop typical industrial product 3-D models and drawings. Prereq: Enrolled in Engineering.

GEEN 1130. Introduction to Engineering Computing. 1 cr. hr.
Introduces students to an engineering programming environment and the corresponding algorithm and logic development. Students apply engineering computing techniques to solve selected engineering (model) equations and problems. Prereq: Enrolled in the College of Engineering.

GEEN 1200. Engineering Discovery 1. 3 cr. hrs.
Introduces students to engineering and engineers, engineering system investigation and modeling, and engineering graphics fundamentals and computer-aided design (CAD). The lecture and laboratory topics, contents and activities include engineering essentials and Fermi’s questions/problems, scientific and engineering dimensions and units, introduction to spreadsheet computing, engineering graphics fundamentals and computer-aided design (CAD), utilizing solid modeling software, and engineering system investigation through various department modules. Professionalism, teamwork and technical communication are stressed. Students participate in a team-based computer graphics design project at the end of the term. Prereq: Enrolled in the College of Engineering.

GEEN 1210. Engineering Discovery 2. 3 cr. hrs.
Introduces students to engineering problem solving, the engineering design process and engineering computing. The lecture and laboratory topics/ contents and activities include engineering problem solving steps/procedures, introduction to the engineering design process, introduction to programming basics and their applications to scientific and engineering problems, and multidisciplinary engineering problem solving through various department modules. Professionalism, teamwork, and technical communication are stressed. Students participate in a team-based engineering design projects during the semester. Prereq: BIEN 1100, CEEN 1200, EECE 1200, or GEEN 1200; enrollment in the Opus College of Engineering.

GEEN 2110. Statics. 3 cr. hrs.
Fundamentals of forces and force systems. Internal and external forces. Support reactions. Definition of a free-body diagram (FBD). Emphasis on development of FBD-drawing skills. Moment of a force. Force system resultants. Vector methods in two and three dimensions. Equilibrium analysis of particles and rigid bodies. Truss analysis by methods of joints and sections. Analysis of simple frames and machines. Analysis of friction. Centroids of composite areas and volumes. Resultants of distributed loads. Prereq: MATH 1451 or MATH 1455; enrolled in the OPUS College of Engineering.

GEEN 2120. Dynamics. 3 cr. hrs.
Fundamentals of motion of particles and rigid bodies. Application of Newton's laws. Principles of position, velocity, and acceleration. Use of work-energy and impulse-momentum methods. Introduction to vibrations. Prereq: GEEN 2110.

GEEN 2130. Mechanics of Materials. 3 cr. hrs.
Concepts of stress, strain and deflection. Factor of safety. Mechanical properties of materials. Stress and deformation calculations for cases of axially loaded rods, torsion of circular shafts, beam bending and combined loading. Horizontal shear connectors in built-up beams. Area moment of inertia. Parallel-axis theorem. Introduction to beam design. Stress concentration. Stress transformation and principal stress calculation by Mohr's circle. Statically indeterminate analysis. Elastic buckling of columns. Prereq: GEEN 2110.

GEEN 2952. Professional Development for Engineers. 1 cr. hr.
Objective is to assist engineering students with their career discernment and to promote professional development. Focuses on the skills needed to secure a job and provides resources and tools to conduct a job search. Topics include: professional development; engineering options; cooperative education and internship opportunities; ethics as well as job search, resume writing, interviewing, professional communication and networking techniques. All sophomore-level and transfer students required to attend. Prereq: Enrolled in the College of Engineering.

GEEN 2960. Engineering Social Systems and Values. 0 cr. hrs.
Reflection providing an awareness of an engineer's professional responsibilities to the community and world at large. Students are required to participate in an approved experiential learning experience, such as service, research, internship or co-operative education activity and demonstrate that they have engaged with and added value to others across differences in social and/or values systems. Students should reflect upon their own values and social contexts, and develop their capacity to engage with social and value systems different from their own in their place of work or service. Students critically reflect upon how the experience broadened their viewpoints and developed intercultural competencies. SNC/UNC grade assessment. Prereq: GEEN 2952, enrolled in the Opus College of Engineering, and cons. of dept.

GEEN 2961. E-Lead 1: Foundations of Leadership and Individual Development. 2 cr. hrs.
Identifying and developing individual leadership traits, skills, talents, values, beliefs and behaviors through weekly course work and a week-long leadership conference that contribute to effective leadership practice in a multi-disciplinary environment. Investigation of leadership theories and styles that contribute to effective leadership practice in various environments with people from different backgrounds and perspectives. Personality and behavioral assessments, case studies, readings, presentations, role-playing and simulations are emphasized along with a workshop related to adversity and resilience. Prereq: Second year, full-time student, admitted to the E-Lead Program in the Opus College of Engineering.

GEEN 3959. E-Lead Experience: Explorations in Innovation Leadership Practice. 2 cr. hrs.
Develop skills and practices important for life-long learning related to personal leadership growth and development as an innovator. Studies include selecting and reading E-Lead approved leadership and innovation texts and producing video book reports about the texts; discussing other leadership and innovation texts and reports with peers in the class; identifying, arranging and participating in a shadow experience with innovative leaders in industry. Prereq: GEEN 2961, Jr. stndg., admitted to the E-Lead Program in the Opus College of Engineering and cons. of dept.

GEEN 3961. E-Lead 2: Leading With Others. 2 cr. hrs.
Identifying and developing skills, talents, behaviors and attributes which contribute to effective leadership of teams and projects, especially multi-disciplinary teams working on innovative projects. Investigation into emotional intelligence, team dynamics, collaboration, inclusion and diversity, communication, confrontation, feedback, change management, global leadership and servant leadership. Simulations, role-playing, case studies, readings, presentations and team problem-solving are emphasized along with a workshop related to having honest and authentic conversations. Prereq: GEEN 2961, admitted to the E-Lead Program in the Opus College of Engineering.

GEEN 3990. E-Lead Experience: Professional Leadership Experience. 1 cr. hr.
Students in the E-Lead Program are required to participate in a professional experience such as an internship, co-op, clinical rotation, undergraduate research project, etc. During these experiences, E-Leaders make observations and reflect on their experience through the three leadership themes of the E-Lead Program - leading oneself, leading with others and leading innovation. Upon completion of the experience, students submit a reflective and integrative paper about the experience in their role, responding to predetermined questions and citing specific examples from the professional leadership experience to describe their observations and assertions. Prereq: GEEN 2961, admitted to the E-Lead Program in the Opus College of Engineering.

GEEN 3991. Co-Op Work Period 1. 0 cr. hrs.
Registration for approved cooperative education program work assignments is required of all co-op students. Grading and credits are accomplished in the accompanying following term when registered for courses numbered 3991, 3992, etc. Fee. SNC/UNC grade assessment. Prereq: Enrolled in Opus College of Engineering and Co-op student.

GEEN 3992. Co-Op Grading Period 1. 1 cr. hr.
Grading for preceding co-op work assignments is accomplished by review of employer evaluation forms, work exit reports, and other materials as required during each term in school following a work period. No tuition is charged for grading periods. S/U grade assessment. Prereq: Enrolled in Opus College of Engineering, Co-op student and GEEN 3991.

GEEN 3993. Co-Op Work Period 2. 0 cr. hrs.
Registration for approved cooperative education program work assignments is required of all co-op students. Grading and credits are accomplished in the accompanying following term when registered for courses numbered 3991, 3992, etc. Fee. SNC/UNC grade assessment. Prereq: Enrolled in Opus College of Engineering, Co-op student and GEEN 3992.

GEEN 3994. Co-Op Grading Period 2. 1 cr. hr.
Grading for preceding co-op work assignments is accomplished by review of employer evaluation forms, work exit reports, and other materials as required during each term in school following a work period. No tuition is charged for grading periods. S/U grade assessment. Prereq: Enrolled in Opus College of Engineering, Co-op student and GEEN 3993.

GEEN 4810. Industrial Ecology and Sustainable Design. 3 cr. hrs.
Introduces students to the emerging sustainability challenges and impacts on industry and engineering design. Analyzes corporate frameworks to identify and prioritize sustainability initiatives that add business value. Learn tools to characterize sustainability aspects of design and apply the tools in multi-disciplinary case studies to generate recommendations. Integrates essential communication skills to present case study results to various stakeholders. Prereq: Jr. stndg. and cons. of instr.; or Sr. stndg.

GEEN 4820. Systems Engineering Principles and Practice. 3 cr. hrs.
Introduces fundamental systems engineering principles and practices for the development of complex systems throughout the system life cycle: from concept development to engineering development, production, operation and support. Specific topics include needs analysis, concept exploration, concept definition, engineering design, integration and evaluation, production and operation and support. In addition, essential systems engineering methods and tools such as trade-off analysis, risk management, and modeling and simulation are covered. Prereq: Jr. stndg. and cons. of instr.; or Sr. stndg.

GEEN 4830. Engineering Risk Analysis. 3 cr. hrs.
Introduces key techniques and tools used to establish system design decisions – amid uncertainty – from a risk analysis perspective. Evaluates a holistic view of sources, consequences and mitigation of risks. Important emergent properties that result from effective system risk analysis, such as safety and resilience, are discussed.

GEEN 4840. Model-Based Systems Engineering. 3 cr. hrs.
Develops experience in the application of model-based systems engineering (MBSE) tools and methodologies to define, analyze and design a complex system. Students will incrementally build and analyze a system model that consists of the following perspectives/levels: operational need, system need, logical architecture and physical architecture. Prereq: GEEN 4830.

GEEN 4961. E-Lead 3: Leading Innovation. 2 cr. hrs.
Identifying and developing skills, talents, behaviors and attributes which contribute to effectively leading innovation in various contexts. Investigation into understanding innovation as a business strategy, sources and types of innovation, the mindset and skill set required to lead innovation, barriers to innovation, building a culture that supports innovation, ethical conduct and practical implementation of innovation. Simulations, case studies, readings, projects, presentations and problem-solving are emphasized along with a day-long boot camp related to innovation practices. Prereq: GEEN 3961, admitted to the E-Lead Program in the Opus College of Engineering.

GEEN 4991. Co-Op Work Period 3. 0 cr. hrs.
Registration for approved cooperative education program work assignments is required of all co-op students. Grading and credits are accomplished in the accompanying following term when registered for courses numbered 3991, 3992, etc. Fee. SNC/UNC grade assessment. Prereq: Enrolled in Opus College of Engineering, Co-op student and GEEN 3994.

GEEN 4992. Co-Op Grading Period 3. 1 cr. hr.
Grading for preceding co-op work assignments is accomplished by review of employer evaluation forms, work exit reports, and other materials as required during each term in school following a work period. No tuition is charged for grading periods. S/U grade assessment. Prereq: Enrolled in Opus College of Engineering, Co-op student and GEEN 4991.

GEEN 4993. Co-Op Work Period 4. 0 cr. hrs.
Registration for approved cooperative education program work assignments is required of all co-op students. Grading and credits are accomplished in the accompanying following term when registered for courses numbered 3991, 3992, etc. Fee. SNC/UNC grade assessment. Prereq: Enrolled in Opus College of Engineering, Co-op student and GEEN 4992.

GEEN 4994. Co-Op Grading Period 4. 1 cr. hr.
Grading for preceding co-op work assignments is accomplished by review of employer evaluation forms, work exit reports, and other materials as required during each term in school following a work period. No tuition is charged for grading periods. S/U grade assessment. Prereq: Enrolled in Opus College of Engineering, Co-op student and GEEN 4993.

GEEN 4995. Independent Study in General Engineering. 1-3 cr. hrs.
Undergraduate independent study project of either theoretical or experimental nature. Prereq: Jr. stndg., 3.000 GPA, cons. of instr., and cons. of dept. ch.

GEEN 4998. E-Lead Experience: Capstone Project. 3 cr. hrs.
The culminating innovation leadership experience for students completing the E-Lead Program. Student uses all knowledge and skills gained in the prerequisite E-Lead courses to intentionally develop both personal leadership capacity and impact the people and processes of a final capstone project. Prereq: GEEN 4961, admitted to the E-Lead Program in the Opus College of Engineering.