General Engineering (GNEG)

Courses

GNEG 1010 Engineering Professionalism and Career Development: 0 semester hours.
This course prepares students for the professional engineering world. Provides career planning tools; discusses expected behaviors and soft (power) skills essential for engineering career success. The connection between personal, professional, and financial goals and how such goals contribute to short- and long-term personal, professional, academic, and financial goals. Professional, ethical, and moral behavior and proper communication for the workplace. This course enables engineers to take full advantage of internships, co-ops, engineering jobs, and the classroom.
Co-requisite: ELEG 1101.

GNEG 1101 Introduction to Engineering, Computer Science, and Technology: 1 semester hour.
Intro to basic engineering and computer science concepts. Students will become aware of various disciplines of engineering and computer science, ethical and professional responsibilities in these fields, creativity and design. It also prepares students for professional engineering world. Provides career planning tools; discusses expected behaviors and soft skills essential for engineering career success. The connection between personal, professional, and financial goals and how such goals contribute to short- and long-term personal, professional, academic, and financial goals. Professional, ethical, and moral behavior and proper communication for the workplace. This course enables engineers to take full advantage of internships, co-ops, engineering jobs, and the classroom.
Co-requisites: ELEG 1102, MATH 1314, MATH 1316, MATH 2413.

GNEG 1112 Engineering Lab II for Mathematics: 1 semester hour.
Practical applications of the 1st level Calculus for problems in engineering, computer science, and technology. The 1st level Calculus concepts will be reinforced through hands-on, physical application in the laboratory.
Co-requisite: MATH 2413.

GNEG 1120 Biomedical Engineering Seminar: 1 semester hour.
Interactive introduction to biomedical engineering and the medical device industry through technical presentations and student engagement activities led by subject matter experts.

GNEG 1319 Special Topics: 0-3 semester hour.
This special topics course enables students at all levels of matriculation to be exposed to interdisciplinary subject matter along the breadth of the field of engineering that is not taught in other courses in the general engineering or departmental curriculum.

GNEG 2102 Engr Lab III for Math: 1 semester hour.
Practical applications of the 2nd level Calculus for problems in engineering, computer science, and technology. The 2nd level Calculus concepts will be reinforced through hands-on, physical application in the laboratory.

GNEG 2115 Engineering Research I: 0-1 semester hour.
Research methodology course, the content of which includes an introduction to scientific method, formulation of research question, development and implementation of research plan, analysis and evaluation of results, and reporting of findings.

GNEG 2117 Advanced Engineering Professionalism and Career Development: 1 semester hour.
Further prepares students for the professional engineering world by providing advanced techniques and tools of success. Students learn to build higher level career skills like negotiating and reviewing offers (including benefits), how to work with others using emotional intelligence and conflict management, and hone their public speaking and presentation skills. Students also learn about various other career paths including graduate school and entrepreneurship. This course better enables them to take their careers to the next level, whatever path they choose to pursue.
Prerequisites: CHEG 1101 or CHEG 1011 or COMP 1101 or COMP 1011 or CVEG 1101 or CVEG 1011 or ELEG 1101 or ELEG 1011 or MCEG 1101 or MCEG 1011 or GNEG 1100 or GNEG 1010.

GNEG 2319 Special Topics: 0-3 semester hour.
This special topics course enables students at all levels of matriculation to be exposed to interdisciplinary subject matter along the breadth of the field of engineering that is not taught in other courses in the general engineering or departmental curriculum.

GNEG 2615 Engineering Cooperative Education I: 0-6 semester hour.
A cooperative program of engineering with an approved engineering-based industry, engineering consulting firm, or governmental regulatory agency engaged in planning and administration of engineering functions. The student receives related engineering assignments in a real work situation. The assignment is commensurate with the theoretical engineering experience of the student.

GNEG 3106 Introduction to Engineering Project Management: 1 semester hour.
Principles and techniques of managing engineering and software projects. Topics include project initiation, estimating, resource allocation, developing work plans, scheduling, progress tracking, design coordination, production coordination, quality management, managing teams and close out, and case study of real world projects.
Prerequisites: CHEG 2308 or CHEG 2003.

GNEG 3115 Engineering Research II: 0-1 semester hour.
This is a course of research activities consisting of library, laboratory, or other research activities on selected problems. Results of the research are presented in formal, oral, and written presentations.
Prerequisites: GNEG 2151 or GNEG 2115.

GNEG 3319 Special Topics: 0-3 semester hour.
This special topics course enables students at all levels of matriculation to be exposed to interdisciplinary subject matter along the breadth of the field of engineering that is not taught in other courses in the general engineering or departmental curriculum.

GNEG 3615 Engineering Cooperative Education II: 6 semester hours.
A cooperative program of engineering with an approved engineering-based industry, engineering consulting firm, or governmental regulatory agency engaged in planning and administration of engineering functions. The student receives related engineering assignments in a real work situation. The assignment is commensurate with the theoretical engineering experience of the student.

GNEG 4319 Special Topics: 0-3 semester hour.
This special topics course enables students at all levels of matriculation to be exposed to interdisciplinary subject matter along the breadth of the field of engineering that is not taught in other courses in the general engineering or departmental curriculum.

GNEG 4350 Cybersecurity and Public Policy: 3 semester hours.
This course examines existing and evolving cybersecurity and data protection frameworks, while exploring the complex legal, policy, and compliance challenges raised by protection efforts. Topics to be covered will include: Threats to cybersecurity, Domestic and international Internet governance, The Computer Fraud and Abuse Act, and U.S. and Texas state privacy law and personal data protection measures. Other topics may include (cyber) War, international terrorism, and U.S. surveillance law, Private information infrastructure and the law of emergencies. By the end of the course, students should have proficient understand of the rapid development of technology and security at the nexus of law, policy, compliance, and enforcement.

GNEG 4352 Advanced Fundamentals of Cybersecurity: 3 semester hours.
This course is designed to expose students to fundamentals of cybersecurity with knowledge/skills specific to (but not limited): Security assessment role in ensuring organization security, the rules of business ethics as it pertains to hacking, introduction to various tools and techniques for penetration testing, including social and ethical corporate cybersecurity responsibility.

GNEG 5189 Research: 1 semester hour.
Methods and practice in research.

GNEG 5302 Operations Research: 3 semester hours.
An introduction to quantitative modeling and optimization; linear and dynamic programming; queueing theory; inventory modeling; critical path systems; network flow modeling and technological forecasting.

GNEG 5304 Engineering Probability and Statistics: 3 semester hours.
Theory of permutations, combinations; statistical principles of analysis of random data probability as a basis of engineering design.

GNEG 5306 Engineering Analysis I: 3 semester hours.
Introduction to multi-variable calculus. Application of mathematical techniques to various engineering disciplines using linear partial differential equations-boundary value and initial value problems; Linear Optimization techniques.

GNEG 5307 Engineering Analysis II: 3 semester hours.
Complex variable theory using techniques such as conformal mapping, optimization and boundary value analysis, in engineering applications such as control systems and signal processing. Introduction to fractals (fractional dimensions) and their applications in geography and animation will be discussed.
Prerequisites: GNEG 5306 or GNEG 5063.

GNEG 5313 Engineering Numerical Methods: 3 semester hours.
Numerical methods in engineering include fundamental numerical techniques involving recursion relationships, numerical quadratures, etc., applied to engineering problems. Emphasis will be placed on the solution of advanced engineering problems involving ordinary and particle differential equations. Proven and efficient finite methods will be covered with emphasis on engineering conceptualization and formulation. An introduction to finite elements analysis.

GNEG 5315 Data Ethics: 3 semester hours.
This course will introduce, discuss, and analyze ethical issues, algorithmic challenges, and policy decisions in data science. Specifically, the moral, social, and ethical ramifications of the choices will be explored at the different stages of the data analysis pipeline. Through class discussions, case studies and exercises, students will learn the fundamentals of ethical thinking in data science, understand the history of ethical dilemmas in scientific work, and study the distinct challenges associated with ethics in modern data science.

GNEG 5319 Special Topics: 3 semester hours.
Special topics in engineering relating to materials, renewable and non-renewable resources, environmental and energy fields are selected and discussed in detail. Considers all aspects of planning, design fabrication, development and implementation.

GNEG 5320 Graduate Internship: 3 semester hours.
A realistic experience in engineering to enhance the student's professional abilities. Students work on significant projects with industry firms or governmental agencies involving decision-making responsibility. Course requires oral and written report.

GNEG 5329 Special Topics: 1-3 semester hour.
This special topics course enables students at all levels of matriculation to be exposed to interdisciplinary subject matter along the breadth of the field of engineering that is not taught in other courses in the general engineering or departmental curriculum.

GNEG 5330 Graduate Project: 3 semester hours.
A study, design, or investigation, under the direction of a graduate faculty advisor. An oral presentation and a written report are required. Prerequisite: candidacy for the Non- Thesis-Option of the Master of Science in Engineering degree.

GNEG 5389 Research: 3 semester hours.
Methods and practice in research.

GNEG 5399 Independent Study: 1-3 semester hour.
Readings, research and/or field work on selected topics.

GNEG 5608 Thesis: 6 semester hours.
A candidate for the Master Science in Engineering is required to perform a study, design or investigation, under the direction of a faculty advisory committee. A written thesis is required to be presented, defended orally and submitted to the faculty advisory committee for approval.

GNEG 5689 Research: 6 semester hours.
Methods and practice in research.

GNEG 6329 Special Topics: 1-3 semester hour.
This special topics course enables students at all levels of matriculation to be exposed to interdisciplinary subject matter along the breadth of the field of engineering that is not taught in other courses in the general engineering or departmental curriculum.