EGEN - General Engineering

EGEN 102 Intro to Engineer Comp Apps: 3 Credits (3 Lec)
Effective methods for applying the computer to common numerical problems encountered in chemical engineering. Chemical engineering examples will provide a basis for more comprehensive problems encountered in the other professional level courses.

EGEN 105 Introduction to General Engineering: 2 Credits (1 Lec, 1 Lab)
Provides students an opportunity to explore the fields of engineering, engineering technology, and computer science. Other topics include engineering design, career opportunities, professionalism, and ethics.

EGEN 115 Engineering Graphics: 1 Credits (1 Lec)
Introductory course developing freehand sketching for engineering design graphics. Skills will be developed for sketching and interpreting dimensioned multi-view drawings, pictorials, sections, and assemblies.

EGEN 125CS Tech, Innovation, and Society: 3 Credits (3 Lec)
This course explores the innovative engineering processes that connect the creative elements of science and engineering with solving problems of everyday life. Topics include understanding the role of creativity, public safety and ethics in creating technological solutions. Case studies are investigated, including applying critical thinking to exploring how innovation can help society.

EGEN 200 Designing Our Community: 1 Credits (1 Other)
This course is designed to explore issues in engineering and college academics for American Indian students and other under-represented students in Engineering fields. The course will provide a learning community among students to succeed in achieving their professional goals.

EGEN 201 Engineering Mechanics-Statics: 3 Credits (3 Lec)
PREREQUISITE: PHSX 220 or PHSX 240
COREQUISITE: M 273Q or M 283Q. Equilibrium of particles and rigid bodies; static analysis of structures including trusses, beams, frames and machines; coulomb friction; area and mass centroids, moments and products of inertia.

EGEN 202 Engineering Mechanics -- Dynamics: 3 Credits (3 Lec)
PREREQUISITE: EGEN 201 or EGEN 221 and M 273Q or M 283Q. Kinematics, kinetics, work-energy, and impulse-momentum for particles and rigid bodies. Common Exams.

EGEN 203 Applied Mechanics: 3 Credits (3 Lec)
PREREQUISITE: PHSX 205 or PHSX 220 or PHSX 240
COREQUISITE: M 166Q, M 172Q or M 182Q. Force systems in equilibrium and applications to structural trusses and frames; section properties; distributed force systems; shear and moment distributions in beams; basic particle dynamics.

EGEN 205 Mechanics of Materials: 3 Credits (3 Lec)
PREREQUISITE: EGEN 201 or EGEN 221 and M 273Q or M 283Q. Stress and strain, Hooke's Law, thermal strain, torsion, bending of beams, combined stress, limit analysis, energy methods, virtual work, column theory.

EGEN 208 Applied Strength of Materials: 3 Credits (3 Lec)
PREREQUISITE: EGEN 201 or EGEN 203 or EGEN 221 and M 166Q or M 172Q or M 182Q. Equilibrium and deformation of structural elements; concepts of stress and strain and interrelationship; representation and transformation of combined stress states; axial, torsional and flexural stresses and deformation; column buckling.

EGEN 221 Honors Statics: 3 Credits (2 Lec, 2 Lab)
PREREQUISITE: PHSX 200 or PHSX 240 and good standing in University Honors
COREQUISITE: M 273Q or M 283Q. Honors offering of engineering statics, including topics dealing with equilibrium of particles and rigid bodies; static analysis of structures including trusses, beams, frames and machines; coulomb friction; area and mass centroids, moments and products of inertia.

EGEN 290R Undergraduate Research: 1-6 Credits (1-6 Other)
Directed undergraduate research which may culminate in a written work or other creative project. Course will address responsible conduct of research. May be repeated. Repeatable up to 99 credits.

EGEN 291 Special Topics: 1-4 Credits (1-4 Lec)
PREREQUISITE: None required but some may be determined necessary by each offering department. Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number. Repeatable up to 12 credits.

EGEN 292 Independent Study: 1-3 Credits (1 Other)
PREREQUISITE: Consent of instructor and approval of department head. Directed research and study on an individual basis. Repeatable up to 6 credits.

EGEN 310R Multidisciplinary Engineering Design: 3 Credits (3 Lec)
PREREQUISITE: Junior standing in an Engineering curriculum or consent of instructor. Introduces engineering students to topics such as design process, creative design, project management, teamwork, and technical leadership while highlighting the skills needed to work in a multi-disciplinary environment.

EGEN 324 Applied Thermodynamics: 3 Credits (3 Lec)
PREREQUISITE: PHSX 205 or PHSX 220
COREQUISITE: M 166Q or M 172Q. General treatment of the basic laws of thermodynamics and engineering applications with introduction to heat transfer for curricula not requiring EMEC 320/EMEC 321 series. Evening exams required.

EGEN 325 Engineering Economic Analysis: 3 Credits (3 Lec)
PREREQUISITE: Junior standing, M 171Q or M 165Q, or instructor approval. Methods for comparing and evaluating capital investment alternatives. Concepts include the time value of money, rates of return, cash flows, incremental analysis, depreciation, influences of taxes, inflation and deflation, depreciation, replacement analysis. Emphasis is placed upon evaluating various engineering alternatives. Some open-ended design problems are included.

EGEN 330 Business Fundamentals for Technical Professionals: 3 Credits (3 Lec)
PREREQUISITES: Junior Standing; and M 171Q or M 165Q. Basic business topics for engineers and other technical professionals. Introduces key topics related to financial statements, accounting practices, ethics, and evaluation of capital investment alternatives including present worth, rate of return, and after-tax analysis methods.

EGEN 331 Applied Mechanics of Fluids: 3 Credits (3 Lec)
PREREQUISITE: EGEN 208 or EGEN 205. Basic principles of fluid mechanics: pressure measurement, forces on submerged areas, fluid flow through conduits, open channel flow, forces caused by fluids in motion, pumps.

EGEN 335 Fluid Mechanics: 3 Credits (3 Lec)
PREREQUISITE: EGEN 202, EGEN 205. Introduction to modern fluid mechanics.
EGEN 350  Applied Engineering Data Analysis: 2 Credits (2 Lec)
PREREQUISITE: M 166Q or M 172Q. An overview of data variability and
applied statistical analysis techniques for a broad range of engineering
disciplines. Topics include fundamentals of probability, essential probability
distributions, hypothesis testing, experimental design strategies, and
regression in the context of engineering applications. Evening exams
required. Common final

EGEN 365  Introduction to Mechatronics: 3 Credits (2 Lec, 1 Lab)
PREREQUISITE: CSCI 111 or CSCI 112 or CSCI 127 or EMIE 303 (or
consent of instructor); EGEN 202 or ETME 340; ELE 203 or ELE 250.
Course introduces students to the design of mechatronic systems through
integration of electrical engineering, mechanical engineering, and computer
science disciplines. Topics include measurement and sensing, mechanical
and electrical actuators, hardware/software interfacing, basic control of
mechatronic systems, and graphical simulation software. A significant lab
component culminates in an open-ended team design project

EGEN 415  Advanced Mechanics of Solids: 3 Credits (3 Lec)
PREREQUISITE: EGEN 205. Advanced topics in deformational
mechanics of materials; application to contemporary engineering problems.
Computer applications

EGEN 420  Ice and Snow Mechanics: 3 Credits (3 Lec)
PREREQUISITE: EGEN 335 or ECIV 337
From an engineering perspective, ice and snow are very complex materials.
This course will assist students in understanding and predicting the
physical and thermo-mechanical processes of ice and snow, their roles in
the environment, and their implications for engineering. A solid grasp of
calculus, physics and engineering mechanics will be required to be able to
study these processes.

EGEN 435  Fluid Dynamics: 3 Credits (3 Lec)
PREREQUISITE: EGEN 335 ECIV 337. Equations governing steady and
unsteady fluid flow; applications to contemporary engineering problems.
Computer applications

EGEN 488  Fundamentals of Engineering Exam: ()
PREREQUISITE: Must be in final semester of program. Student
participation in engineering program assessment. Requirement to complete
the Fundamentals of Engineering (FE) examination or the Major Field
Test in Computer Science (CS majors only). Students register for the FE
exam through the NCEES website (https://ncees.org/) and then schedule
a time to take the exam online. Documentation must be submitted to the
Engineering Dean’s Office prior to Finals Week

EGEN 490R  Undergraduate Research: 1-4 Credits (1 Other)
PREREQUISITE: Consent of instructor. Directed undergraduate research/
creative activity which may culminate in a research paper, journal article, or
undergraduate thesis. May be repeated
Repeatable up to 12 credits.

EGEN 491  Special Topics: 1-4 Credits (1-4 Lec)
PREREQUISITE: Course prerequisites as determined for each offering.
Courses not required in any curriculum for which there is a particular one-
time need, or given on a trial basis to determine acceptability and demand
before requesting a regular course number
Repeatable up to 12 credits.

EGEN 492  Independent Study: 1-3 Credits (1 Other)
PREREQUISITE: Junior standing, consent of instructor, and approval of
Department Head. Directed research and study on an individual basis
Repeatable up to 4 credits.

EGEN 494  Engineering Peer Academic Leader Foundations: 1 Credits
(1 Lec)
PREREQUISITE: Acceptance into the College of Engineering Peer
Academic Leaders program. Students will learn skills to enhance their
ability to interact with individuals from underrepresented or disadvantaged
groups within the student population. Leadership potential will be
developed through identification of implicit bias, gender schemas, and
microaggressions and emphasize the student’s role in becoming an effective
agent of change
Repeatable up to 6 credits.

EGEN 498  Internship: 1-3 Credits (1-3 Other)
PREREQUISITE: Junior standing, consent of instructor and approval of
Department Head. An individualized assignment arranged with an agency,
business, or other organization to provide guided experience in the field.
Students may not take this course the semester they graduate
Repeatable up to 12 credits.

EGEN 498Z  Internship: 1-3 Credits (1-3 Other)
PREREQUISITE: Junior standing, consent of instructor and approval of
Department Head. An individualized assignment arranged with an agency,
business, or other organization to provide guided experience in the field.
Students may not take this course the semester they graduate
Repeatable up to 12 credits.

EGEN 505  Advanced Engineering Analysis: 3 Credits (3 Lec)
PREREQUISITE: One of the following: EMIE 425, EMIE 326,
EGEN 335. Mathematical modeling of engineering systems, physical
interpretation of ordinary and partial differential equations and methods of
solution

EGEN 506  Numerical Sol to Engr Problems: 3 Credits (3 Lec)
Numerical methods used to solve common engineering research problems.
Solutions to nonlinear equations. Optimization methods.

EGEN 511  Engineering Methods for Teachers: 3 Credits (2 Lec, 1
Other)
This course is designed to introduce the concepts of engineering technology
design to equip teachers of science to meet and exceed emerging standards
of teaching engineering process K-12. A balanced approach of engineering
processes and educational pedagogy will be the cornerstones of the course.
Offered Spring.

EGEN 541  Thry Magnetic Resonance Imag I: 3 Credits (3 Lec)
PREREQUISITE: Graduate standing, or consent of instructor. Advanced
topics in NMR phenomena including relaxation, diffusion, chemical shift,
and magnetic susceptibility, as well as experimental aspects including phase
cycling, magnetic field gradients, rf coil, tuning and matching and pulse
sequence development will be covered

EGEN 542  Thry Magnetic Resonance Imag II: 3 Credits (3 Lec)
PREREQUISITE: Graduate standing. Consent of Instructor. Advanced
topics in nuclear magnetic resonance phenomena focusing on molecular
dynamics and pulse sequence development for measuring complex
dynamics will be covered