ENGINEERING (EGR)

EGR 150. Engineering: Design, Ethics, and Societal Impacts. (3 Credits)
I, II. This course introduces the principles of engineering design and professional responsibility. It explores the relationships between design choices, materials, processes, and their broader societal and environmental impacts, with an emphasis on professional ethics, sustainability, public health, safety, and welfare. 2 Lec/2 Lab.

View Course Learning Outcomes

1. {}

EGR 195. Engineering Graphics and Design. (3 Credits)
A. Introduces principles of engineering design and graphical communication using sketching and 3D solid modeling (CAD). Core topics cover multi-view projection, dimensioning, tolerancing, and relevant engineering standards. Students apply these skills to create, analyze, and effectively communicate solutions to engineering design problems. 2 Lec/2 Lab.

View Course Learning Outcomes

1. {}

EGR 201. Metallic Material Processes. (3 Credits)
I, II. Examines key manufacturing processes for metallic materials, including casting, forming, machining, joining, and finishing, with an emphasis on the relationship between processing parameters, material structure, and resulting properties. 2 Lec/2 Lab.

View Course Learning Outcomes

1. {}

EGR 202. Statistical Quality Control. (3 Credits)
I, II. Prerequisite: MAT 234 and STA 270. Introduces statistical methods for monitoring, controlling, and improving quality in engineering systems and processes. Covers data analysis, control charts, process capability, and continuous improvement techniques.

View Course Learning Outcomes

1. {}

EGR 292. Topics in Engineering Science and Systems. (3-6 Credits)
I,II. Prerequisite: EGR 150. Departmental approval. Study of variable topics in engineering, science, and systems. Course may be retaken to a maximum of 15 credit hours provided the topic is different each time.

View Course Learning Outcomes

1. {}

EGR 301. Non-Metallic Material Processes. (3 Credits)
I, II. Examines manufacturing processes for polymeric, ceramic, and composite materials, with an emphasis on the relationship between processing parameters, material structure, and resulting properties. 2 Lec/2 Lab.

View Course Learning Outcomes

1. {}

EGR 306. Electrical Circuits and Systems for Engineers. (3 Credits)
I, II. Prerequisite: PHY 202. Analysis of linear electric circuits as components of larger engineering systems. Students will apply circuit laws and analysis techniques including nodal analysis, mesh analysis, and Thévenin's theorem to determine both transient and steady-state behavior. The course introduces the ideal operational amplifier and its linear applications, and explores circuit frequency response, including filters and resonance in RLC circuits. These topics provide a foundation for understanding circuits used in measurement, instrumentation, and control systems. 2 Lec/2 Lab.

View Course Learning Outcomes

1. {}

EGR 307. Thermal Systems Engineering. (3 Credits)
I, II. Prerequisite: PHY 202. Analysis of engineering systems governed by thermodynamic principles. Students will apply the laws of thermodynamics and control volume analysis to model and evaluate the performance of integrated thermal systems, including power and refrigeration cycles. The course introduces the primary modes of heat transfer. 2 Lec/2 Lab.

View Course Learning Outcomes

1. {}

EGR 308. Fluid Systems Engineering. (3 Credits)
I, II. Prerequisite: MAT 244 and EGR 307. Analysis of engineering systems involving fluid flow. Students will apply the integral forms of the conservation laws using control-volume analysis to model and evaluate integrated fluid systems. Topics include dimensional analysis, viscid flow in pipe networks, pump performance, and the analysis of forces on immersed bodies. 2 Lec/2 Lab.

View Course Learning Outcomes

1. {}

EGR 310. Engineering Computation. (3 Credits)
I, II. Prerequisite: MAT 244. An examination of engineering principles through the application of computational methods. The course emphasizes the use of computation to model and analyze problems across the engineering spectrum. Topics include algorithmic problem-solving, data visualization, and the implementation of numerical solutions to engineering challenges.

View Course Learning Outcomes

1. {}

EGR 311. Solid Mechanics. (3 Credits)
I, II. Prerequisite: EGR 195 and MAT 234. Introduction to the mechanical behavior of stationary solid systems. Topics include the analysis of rigid body equilibrium, force vector resolution, properties of structural areas, and the evaluation of internal loads in mechanical components. Includes computational analysis of structural assemblies. Provides the requisite foundation for the analysis of deformable bodies and mechanical design.

View Course Learning Outcomes

1. {}

EGR 322. Mechanical Systems Analysis. (3 Credits)
I, II. Prerequisite: EGR 311. Kinematic and kinetic analysis of moving mechanical assemblies. Focuses on the determination of position, velocity, and acceleration in planar mechanisms. Topics include inertial force analysis, balancing of rotating components, work-energy applications in machinery, and the simulation of mechanical constraints. Emphasizes the use of computer-aided motion analysis.

View Course Learning Outcomes

1. {}

EGR 330. Materials Testing and Measurement. (3 Credits)
A. Prerequisites: EGR 195, EGR 201, and MAT 234. Fundamentals of materials testing and metrology. Covers mechanical testing (tensile, impact, hardness, fatigue), principles of precision measurement, and Geometric Dimensioning & Tolerancing (GD&T). 2 Lec/2 Lab.

View Course Learning Outcomes

1. {}

EGR 349. Engineering Internship/Co-op. (1-8 Credits)
I, II. Prerequisite: Departmental approval, successful completion of 30 semester hours of coursework including 6 hours of Engineering courses and minimum of 2.25 GPA. Supervised work experience in an engineering role, applying classroom knowledge to real-world problems. A minimum of 80 hours of employment is required for each semester hour of academic credit. Credit may only be awarded in the semester in which the work is completed.

View Course Learning Outcomes

1. {}

EGR 392. Advanced Topics in Engineering Science and Systems. (3-6 Credits)
I, II. Prerequisite: EGR 202 or Departmental approval. Study of variable advanced topics in engineering, science, and systems. Course may be retaken to a maximum of 15 credit hours provided the topic is different each time.

View Course Learning Outcomes

1. {}

EGR 407. Engineering Project Management. (3 Credits)
I, II. Prerequisite: EGR 202. Covers the principles and practices of managing engineering projects throughout their lifecycle, including selecting and adapting appropriate project management methodologies. Topics include project initiation, scope definition, WBS, CPM, Gantt charts, resource allocation, risk management, execution, monitoring, control, and closing.

View Course Learning Outcomes

1. {}

EGR 493. Directed Studies in Engineering Science and Systems. (3-6 Credits)
I, II. Prerequisite: Junior or Senior standing, Departmental approval. Independent investigation of a specific topic in engineering, science, or systems under the guidance of a faculty mentor. Students must have the independent study proposal form approved by faculty supervisor and department chair prior to enrollment. Course may be retaken to a maximum of 6 credit hours.

View Course Learning Outcomes

1. {}

EGR 498. Senior Capstone Design Project I. (3 Credits)
I. Co-requisite: EGR 407. Prerequisite: MAT 353 and Senior Standing. First part of a two-semester capstone design experience. Teams apply engineering principles to solve a complex, real-world engineering problem, considering sustainability, ethics, and economic factors. Focus on project definition, planning, and initial design. 1 Lec/3 lab.

View Course Learning Outcomes

1. {}

EGR 499. Senior Capstone Design Project II. (3 Credits)
II. Prerequisite: EGR 498. Second part of a two-semester capstone design experience. Teams refine their design, conduct detailed analysis, and develop a prototype/simulation. Culminates in a final report and presentation. 1 Lec/3 Lab.

View Course Learning Outcomes

1. {}

EGR 501. Engineering Economic Analysis. (3 Credits)
A. Prerequisite: MAT 211 or MAT 234 or higher. An introduction to the principles of engineering economic analysis and their application to engineering design and decision-making. This course emphasizes the time value of money and the formulation and evaluation of engineering alternatives. Students will learn to model and analyze engineering projects using methods of equivalence, including present worth, annual worth, and rate of return. Further topics include benefit-cost analysis, depreciation models, after-tax economic analysis, replacement analysis, and sensitivity analysis to account for uncertainty.

View Course Learning Outcomes

1. {}