Engineering (EGR) Courses

**EGR 5023. Numerical Techniques in Engineering Analysis.** (3-0) 3 Credit Hours.
Prerequisite: Graduate standing in engineering or consent of instructor. Advanced methods of applied mathematics, including numerical linear algebra, initial value problems, stability, convergence, partial differential equations, and optimization.

**EGR 5213. Topics in Systems Modeling.** (3-0) 3 Credit Hours.
Prerequisite: Graduate standing in engineering. Systems analysis approach to formulating and solving engineering problems. Topics include operational research, mathematical modeling, optimization, linear and dynamic programming, decision analysis, and statistical quality control. Topic 1: Applied Operations Research. Application of operations research methods to practical engineering problems. Topic 2: Engineering Systems Modeling. Modeling of modern engineering systems for operational and management control. May be repeated for credit as topics vary. (Same as CE 5013. Credit cannot be earned for both EGR 5213 and CE 5013).

**EGR 5233. Advanced Quality Control.** (3-0) 3 Credit Hours.
Prerequisite: Graduate standing in engineering or consent of instructor. Methods and techniques for process control, process and gage capabilities, inspection plans, American National Standard, and recent advanced techniques. Tour of manufacturing industry. Case studies in process control, outgoing quality, and costs. A project, assigned by a manufacturing company, is required, along with a final presentation of the project.

**EGR 5703. Advanced Scientific Visualization.** (3-0) 3 Credit Hours.
Prerequisite: Graduate standing in engineering or consent of instructor. Topics include 3D image display and generation techniques, visual thinking process, interaction with visualization, efficiency of visualization on sparse grid, haptic rendering and control, and immersive 3D programming.

**EGR 5713. High Performance Computing.** (3-0) 3 Credit Hours.
Prerequisite: Graduate standing in engineering or consent of instructor. Topics include scientific computing in UNIX/LINUX environment, instruction on several import UNIX applications, various parallelization styles of computing, and application programming interfaces (APIs) in scientific applications.

**EGR 6013. Advanced Engineering Mathematics I.** (3-0) 3 Credit Hours.
Prerequisites: EGR 2323 and EGR 3323, or equivalent courses. Advanced methods of applied mathematics, including vector differential calculus, linear algebra, functional space and their applications to engineering problems. (Same as BME 6033. Credit cannot be earned for both EGR 6013 and BME 6033.) (Formerly titled “Analytical Techniques in Engineering Analysis”).

**EGR 6023. Advanced Engineering Mathematics II.** (3-0) 3 Credit Hours.
Prerequisites: EGR 2323 and EGR 3323, or equivalent courses. Advanced methods of applied mathematics. Topics may include solution methods of partial differential equations, complex analysis, optimization theory, other topics in engineering mathematics and their applications to engineering problems. May be repeated for credit as topics vary.

**EGR 6033. Linear and Mixed Integer Optimization.** (3-0) 3 Credit Hours.
Prerequisite: ME 2173 or equivalent. Graduate standing in engineering or consent of instructor. Introduction to the theory of linear programming and duality, algorithms for solving linear programs, network simplex, integer and mixed integer programming (e.g., simplex, branch and bound and branch and cut). This course provides an overview of optimization theory and algorithms as well as emphasizes its applications in different areas of Engineering.