

# EGR-Engineering Courses

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## Courses

### **EGR 010. Internship Readiness. 0 Hours.**

This course will prepare you for internships and other experiential learning opportunities as well as future career goals. Our focus will be on developing the skills needed to succeed professionally and to execute a successful job search. Students will gain an understanding of networking, career management, strategic job searching, and interview fundamentals. All activities, exercises, and assigned materials are designed to help you succeed as a job seeker. This course complements other undergraduate coursework as well as opportunities offered by Engineering Career Services. Internship readiness course for first-semester sophomore students or transfer students seeking internship, co-op, or research placement.

### **EGR 011. Undergraduate Internship in Engineering. 0 Hours.**

Engineering internship experience in preparation for the student's intended career. Students in a university recognized cooperative education experience should register for COP 011 or COP 012.

### **EGR 102. Engineering LLC Seminar. 0 Hours.**

The Engineering Living Learning Community (LLC) is designed to strengthen students' first year of college while fostering a sense of community. The living-learning community extends learning from the classroom into the residence hall where students participate in structured programs built around academics, common interests, and shared goals. This program will provide scholars with a solid foundation for the successful completion of an engineering degree. Programming within the LLC is a partnership between the Office of Student Housing and Residence Life and the UAB School of Engineering.

### **EGR 103. Computer Aided Graphics and Design. 3 Hours.**

Basic concepts in technical sketching, computer-aided drawing and design, projections, sections, and dimensioning. This course satisfies Blazer Core Communicating in the Modern World.

**Prerequisites:** MA 105 [Min Grade: C](Can be taken Concurrently) or MA 106 [Min Grade: C](Can be taken Concurrently) or MA 107 [Min Grade: C](Can be taken Concurrently) or MA 125 [Min Grade: C](Can be taken Concurrently)

### **EGR 117. Engineering Design & Innovation I: Design Thinking. 3 Hours.**

The ability to innovate is an essential skill that drives existing economies, creates new markets, and generates new jobs. In this class, student teams engineer a device, app, product or system using Design Thinking to iterate a solution to a client's real-world problem. Throughout the course, students develop problem solving, critical thinking, team building, client management, communication, and presentation skills that improve their confidence and career-readiness. By the end of the course, each team will be able to succinctly articulate and defend the team's design concept and prototype invention in the form of an 'investment pitch.' This course is approved for the Blazer Core Curriculum Communicating in the Modern World.

**Prerequisites:** MA 106 [Min Grade: C](Can be taken Concurrently) and (EGR 110 [Min Grade: C] or EGR 200 [Min Grade: C](Can be taken Concurrently))

### **EGR 150. Computer Methods in Engineering. 3 Hours.**

An introduction to engineering computation using MATLAB language and Excel. Basic programming skills using built-in functions are emphasized. Generation and manipulation of matrices, operations on matrices, plotting, and iterations calculations. If/else and other logical constructs, and data input/output are covered. Engineering applications are used throughout the course.

**Prerequisites:** (MA 125 [Min Grade: C] or MA 225 [Min Grade: C])

### **EGR 194. Engineering Explorations. 1 Hour.**

The objective of this course is to explore engineering specialties, engineering ethics, career preparation, and the industries in which engineers work. May include lab tours, guest speakers, and lab activities.

**Prerequisites:** MA 102 [Min Grade: C] or MA 105 [Min Grade: C] (Can be taken Concurrently) or MA 106 [Min Grade: C](Can be taken Concurrently) or MA 107 [Min Grade: C](Can be taken Concurrently) or MA 125 [Min Grade: C](Can be taken Concurrently) or MA 225 [Min Grade: C](Can be taken Concurrently)

### **EGR 200. Introduction to Engineering. 3 Hours.**

Introduction to the profession of engineering, ethics and safety, engineering specialties, career opportunities, educational requirements, and student success strategies; introduction to teamwork, technical communication, and present and future societal demands on the profession. This course satisfies Blazer Core Local Beginnings requirement with flags in Collaborative Assignments & Projects and First Year Experience.

**Prerequisites:** (MA 102 [Min Grade: C] or MA 105 [Min Grade: C] (Can be taken Concurrently) or MA 106 [Min Grade: C](Can be taken Concurrently) or MA 107 [Min Grade: C](Can be taken Concurrently) or MA 125 [Min Grade: C](Can be taken Concurrently) or MA 225 [Min Grade: C](Can be taken Concurrently))

### **EGR 217. Engineering Design & Innovation II: Prototyping. 3 Hours.**

Students will learn how and when to use paper and other low-fidelity prototyping techniques as well as more advanced techniques such as 3D Printing, laser cutting, metal fabrication/welding, microcontroller programming, machining, and computer-aided design. These prototyping tools will be used to iteratively design, build and prototype a product or process that meets the client's design criteria and constraints using the principles of Design Thinking.

**Prerequisites:** EGR 117 [Min Grade: D] and (EGR 103 [Min Grade: D] or ME 102 [Min Grade: D])

### **EGR 265. Math Tools for Engineering Problem Solving. 4 Hours.**

Designed to allow engineering majors to utilize the terminology and problem-solving approaches inherent to engineering, while completing their mathematical preparation.

**Prerequisites:** MA 126 [Min Grade: C] or MA 226 [Min Grade: C]

### **EGR 281. Project Lab I. 1-2 Hour.**

Students work on a team to design and prototype a device, product, or app that solves a client's real-world problem.

### **EGR 301. Honors Research I. 1 Hour.**

Introduces students to research methodology, ethics, data analysis, and technical communication. Students must be invited into program in order to enroll.

**Prerequisites:** (MA 227 [Min Grade: C] or EGR 265 [Min Grade: C])

**EGR 317. Engineering Design & Innovation III: Project Implementation. 3 Hours.**

In this course, students will use Design Thinking methodology to ideate and iterate a solution to a client's real-world problem considering safety, regulatory and other constraints as well as social, environmental, and economic factors. Students will learn to identify and address key issues related to project management and scheduling, engineering ethics, intellectual property management, business model development, and risk assessment and risk management.

**Prerequisites:** EGR 217 [Min Grade: D] and (EGR 265 [Min Grade: D] or MA 227 [Min Grade: D])(Can be taken Concurrently) and (CE 210 [Min Grade: D] or EE 312 [Min Grade: D] or EE 314 [Min Grade: D] or MSE 280 [Min Grade: D])

**EGR 375. Engineering Outreach. 0-3 Hours.**

Outreach to community, K-12 students, and teachers to increase exposure to the engineering profession through hands-on projects. An emphasis will be placed on opportunities in STEM as well as its importance in everyday life.

**EGR 381. Project Lab II. 1-2 Hour.**

Students work on a team to design and prototype a device, product, or app that solves a client's real-world problem.

**EGR 481. Interdisciplinary Project Lab. 1-3 Hour.**

Multidisciplinary student teams (engineering, business, arts) engineer devices based on client needs. The project team will collaborate with the client to establish an appropriate engineering design to meet user needs. Students are trained in product development, product design, and engineering validation and will develop training and documentation market analysis, a business plan and a go-to-market strategy as appropriate for the project.

**EGR 490. Special Topics in Engineering. 0-3 Hours.**

Special Topics in Engineering.

**EGR 491. Individual Study in Engineering. 1-6 Hour.**

Individual Study in Engineering.

**EGR 494. Undergraduate Honors Research in Engineering I. 1-3 Hour.**

Research opportunities for undergraduate students in the Engineering Design Honors Program.

**Prerequisites:** EGR 301 [Min Grade: C] or STH 201 [Min Grade: C]

**EGR 495. Undergraduate Honors Research in Engineering II. 1-3 Hour.**

Research opportunities for undergraduate students in the Engineering Design Honors Program.

**Prerequisites:** EGR 494 [Min Grade: C]

**EGR 498. Capstone Design I. 3 Hours.**

Through experiential learning, students go through the early phases of engineering design innovation. Engineering students will work in multi-disciplinary teams to develop design concepts for both a client-based prototype and a commercializable version. Designs take into account client and user needs as well as legal, regulatory, and marketing requirements. Business ethics are also covered. Emphasis is placed on communication to targeted audiences in both oral and written formats.

**Prerequisites:** EGR 317 [Min Grade: D]

**EGR 499. Capstone Design II. 3 Hours.**

Capstone design project; a continuation of EGR 498. Through experiential learning, student teams complete the engineering design process for their client-based prototype incorporating engineering standards and realistic constraints. Student teams develop a business plan to present to potential business partners and product development teams from established companies. Additional skills learned in this part of the design process include: development of business proposals, project planning and scheduling, project execution and resource scheduling, communication of design, and interim and final design reviews. Emphasis is placed on communication of design and design justification in both an oral and written format to targeted audiences.

**Prerequisites:** EGR 498 [Min Grade: D]