

EGR-Engineering

EGR 500. Special Topics in (Study Away). 0-9 Hours.

Independent studies in various subject and/or service areas outside the state of Alabama or the continental United States.

EGR 510. ESL in Education. 1-6 Hour.

Course provides students an opportunity to help students in K-12 to analyze and solve problems using engineering concepts and design process to engage and excite them about engineering, science, and technology.

EGR 520. Engineers in Service and Learning in EiSAL. 0-6 Hours.

This course will allow engineering students the opportunity to communicate and live in other cultural environments allowing them to share interdisciplinary engineering design and analysis in a real-world setting. It will also allow them the opportunity to work in multi-cultural groups to solve a common problem.

EGR 540. Social Responsibility. 1 Hour.

This course provides students with an understanding of key social and economic concepts of global health that, together with an understanding of interprofessional collaboration and community partnerships, will enable them to participate in developing and implementing sustainable global health projects in collaboration with local and international community partners. The course is open to undergraduate and graduate students who are enrolled in two co-requisite courses that are requirements for students participating in the interprofessional global health service learning program at the University of Alabama at Birmingham.

EGR 541. Interprofessional Collaboration (IPC) and Community Partnerships in Global Health. 1 Hour.

This course provides students with an understanding of principles of interprofessional collaboration and community partnerships that, together with key social and economic concepts of global health, enables them to participate in developing and implementing sustainable global health projects in collaboration with local and international community partners.

EGR 542. EGR Service Learning: Interprofessional Global Health Service Learning I: Project Planning. 1 Hour.

This course provides students with an opportunity to apply principles of interprofessional collaboration, community partnerships, and global health in the development of a plan to address a global health problem in collaboration with a community partner. The course is open to undergraduate and graduate students who are enrolled in two co-requisite courses that are requirements for students participating in the global health service learning program at the University of Alabama at Birmingham.

EGR 550. Engineering Service Learning: Teaching Experiences. 1 Hour.

This course provides engineering students the opportunity to assist engineering faculty and students in a tutorial environment by serving as teaching assistants in engineering service courses.

EGR 590. Special Topics in Engineering. 1-3 Hour.

Special Topics in Engineering.

EGR 591. Individual Study in Engineering. 1-6 Hour.

Individual Study in Engineering.

EGR 601. ASEM Seminar. 0 Hours.

Seminar focusing on student research and guest presentations of various topics of interest to safety and risk management engineers and personnel.

EGR 602. Methods for Engineering Practice I. 3 Hours.

First of two course sequence oriented toward introducing the student to modern methods in engineering practice including design methodologies to project management and risk analysis; mathematical and statistical methods; data analysis; reliability; fault detection and analysis; and safety analysis methods.

EGR 603. Methods for Engineering Practice II. 3 Hours.

Second of a practical two course sequence that are oriented toward introducing the student to modern methods in engineering practice including design methodologies to project management and risk analysis; mathematical and statistical methods; data analysis; reliability; fault detection and analysis; and safety analysis methods.

EGR 610. Introduction to System Safety - Prevention through Design. 3 Hours.

Best practice in any business sector requires the pursuit of a triple bottom line – protecting people, planet, and profit. This course provides an overview of system safety in general and Prevention through Design in particular and explores their efficacy in helping companies achieve a bottom line that is socially, environmentally, and financially rewarding. Topics of inquiry include the processes of hazard analysis and risk assessment, the concept of "acceptable" risk, the safety decision hierarchy of controls, safety standards (the mandatory minimum vs. the voluntary best practice), safety as a cost control strategy, and the critical elements of a comprehensive, advanced safety program. Course content is presented within the framework of real-world case studies from a variety of industry sectors, including, but not limited to, manufacturing, utilities, and health care and includes several guest lectures by leaders in the profession. Students apply course content to their own business environment. Live participation in a weekly 1.5 hour online forum is required. The EGR 610 forum is typically held on Sunday from 1:30-3:00 CDT. EGR 610 must be taken during the first semester.

EGR 611. Hazard Analysis & Waste Elimination. 3 Hours.

Hazards have the potential to cause harm to people, planet, and profits. Hazard analysis is a process that begins with the identification of a hazard and proceeds into an estimate of the severity of harm or damage that could result if the potential is realized and a hazard-related incident occurs (ASSE TR-Z790.001 – 2009). This course examines engineering techniques utilized to systematically and logically identify and analyze hazards in the workplace. These techniques include preliminary hazard list (PHL), preliminary hazard analysis (PHA), system hazard analysis (SHA), subsystem hazard analysis (SSHA) and others. Students work in teams to use these techniques to retrospectively analyze a real-world disaster. Live participation in a weekly 1.5 hour online forum is required. The EGR 611 forum is typically held on Sunday from 1:30-3:00 CDT.

Prerequisites: EGR 610 [Min Grade: C]

EGR 612. Engineering Risk. 3 Hours.

Engineering risk is defined both quantitatively and qualitatively as an estimate of the probability that a hazard-related incident will occur and of the severity of harm or damage that could result. This course provides students with tools to assess and reduce safety risks in their own company. These tools include risk assessment matrices, probabilistic risk assessment (PRA) measures, including event tree analysis, fault tree analysis, and other prevention through design concepts. The role of a structured, formalized decision analysis process in preventing serious injuries and fatalities is also explored. Students engage in a risk mitigation decision analysis project, which is specific to their company and/or business sector. Guest lecturers from diverse industries discuss their experiences in assessing and managing risk. Live participation in a weekly 1.5 hour online forum is required. The EGR 612 forum is typically held on Sunday from 1:30-3:00 CDT.

Prerequisites: EGR 610 [Min Grade: C] and EGR 611 [Min Grade: C]

EGR 613. Human Performance & Engineering Design. 3 Hours.

Companies can miss important opportunities to eliminate waste if they rely primarily on training to prevent human error. This course explores the historical perspective on human error and serious injury. The course material will provide a solid understanding of the principles of occupational biomechanics and human tolerance to injury with focus on human anthropometry and mechanical work capacity. This course also includes studies of human reliability, static analysis of systems in equilibrium and mechanical systems' design and performance. Due to the quantity of back related injuries and related lost time in the workplace, back pain and injury is studied along with the effect of vibration on the human body. Real-world case studies provide for application of the engineering hierarchy of controls: hazard elimination, hazard substitution, engineering controls, warnings, administrative behavior controls, and personal protective equipment. The course also examines the design aspects of ergonomics, the biomechanical engineering basis of injury prevention, and the long term economic consequences of seemingly minor injuries. In semester projects, students perform incident investigations using biomechanical and other data. After gathering and analyzing data to determine injury causation, they will identify and re-design error-provocative environments in their own workplaces. Live participation in a weekly 1.5 hour online forum is required. The EGR 613 forum is typically held on Sunday from 1:30-3:00 CDT.

Prerequisites: EGR 610 [Min Grade: C]

EGR 614. Engineering Ethics & Acceptable Risk. 3 Hours.

This course explores the economic, social, and political consequences of safety risk and considers provocative real world dilemmas: What is acceptable risk? Are the fundamental canons of engineering ethics contrary to the concept of acceptable risk? What is the worth of human life? Students will conduct critical reviews of corporate safety and ethics policies from market leaders in all major industries as well as their own company. Real-world case studies provide the framework for exercises in resolving conflicts of interest and avoiding the dilemma of "whistle blowing." Live participation in a weekly 1.5 hour online forum is required. The EGR 614 forum is typically held on Sunday from 3:00-4:30 CDT.

Prerequisites: EGR 610 [Min Grade: C](Can be taken Concurrently)

EGR 615. Leading through Climates of Change. 3 Hours.

All progressive companies are moving toward greater sustainability – protecting people, planet, and profits. To guide their companies through these changes and integrate safety into the priorities at the executive level, safety engineers and professionals must have strong leadership skills. This course explores engineering leadership best practices, including the eight steps of transformational leadership – creating a sense of urgency, creating a guiding coalition, developing a vision and strategies, communicating the vision, empowering broad-based action, generating short term wins, consolidating gains and anchoring the culture. Guest lecturers from diverse industries discuss their experiences in managing change in today's global business environment. Live participation in a weekly 1.5 hour online forum is required. The EGR 615 forum is typically held on Sunday from 3:00-4:30 CDT.

Prerequisites: EGR 610 [Min Grade: C]

EGR 616. Policy Issues in Prevention through Design. 3 Hours.

This course provides an overview of best practices in four major policy areas: (1) cost-benefit analysis; (2) corporate culture and the "HR Department"; (3) standards, codes, and regulations; and (4) strategic alliance development. Case studies are used to illuminate both the role of engineers and other safety professionals in shaping public policy on the local, national and international levels and the ethical challenges they encounter. The significance of an organization's corporate culture in developing and implementing advanced safety management plans is also explored. Students conduct "gap analyses" of their company's policies by comparing them to best practices and identifying unintended consequences of poor safety policy in their own business and industry sector. Students will engage in discussion board posts on contemporary policy issues and participate in exercises related to federal rulemaking. Live participation in a weekly 1.5 hour online forum is required. The EGR 616 forum is typically held on Sunday from 3:00-4:30 CDT.

Prerequisites: EGR 610 [Min Grade: C]

EGR 617. Crisis Leadership & Safety-Critical Design. 3 Hours.

Unique technical and leadership skills are required to avert or manage a crisis. This course teaches students those skills in an experiential learning environment. Case studies of real-world industrial and environmental disasters provide the framework for exploring critical human-machine interfaces; crisis communication; coping with people in recovery and developing and implementing a business continuity response. Guest lecturers from diverse backgrounds will discuss their experiences in managing crisis events. Students will engage in discussion board posts and develop a Business Impact Analysis report for their work environment or business unit. Live participation in a weekly 1.5 hour online forum is required. The EGR 617 forum is typically held on Sunday from 3:00-4:30 CDT.

Prerequisites: EGR 610 [Min Grade: C]

EGR 618. Intrapreneurship & Calculated Risk Taking. 3 Hours.

Intrapreneurs are innovative change agents inside an existing corporation -- insider entrepreneurs. This course prepares students to become and/or identify effective intrapreneurs within their own business environment. Topics include the history of intrapreneurial success inside technology-based corporations and the fundamentals of recognizing opportunity and launching a new, promising enterprise within an existing business. Students also learn to recognize and effectively manage intrapreneurial risk, including the safety readiness of technology for the market place and the corporate "immune response" to new ideas and inside innovators. Case studies of real-world intrapreneurial success and failure provide a framework for group discussion and student exercises. Live participation in a weekly 1.5 hour online forum is required. The EGR 618 forum is typically held on Sunday from 3:00-4:30 CDT.

Prerequisites: EGR 610 [Min Grade: C]

EGR 619. Capstone Project - Part I. 3 Hours.

Bringing to bear the competencies acquired through the program, students develop a proposal, outline, schedule and rough draft of a comprehensive, advanced safety engineering and management plan for their business unit/specialty area that is consistent with the ANSI/AIHA Z10-2005, Occupational Health and Safety Management Systems standard. Judicious selection of the Capstone topic and of projects throughout the ASEM curriculum allows students to build on and use earlier course products to support their Capstone report. Live participation in a quarterly 1.25 hour online forum is required. Must be taken during the penultimate or final semester.

Prerequisites: EGR 610 [Min Grade: C] and EGR 611 [Min Grade: C] and EGR 612 [Min Grade: C] and EGR 613 [Min Grade: C] and EGR 614 [Min Grade: C] and EGR 615 [Min Grade: C] and EGR 616 [Min Grade: C] and EGR 617 [Min Grade: C]

EGR 620. Capstone Project-Part 2. 3 Hours.

Students complete the development of their comprehensive, advanced safety engineering and management (ASEM) plan that was begun in EGR 619, including background information of the project, an ASEM plan (management and employee participation, planning, implementation and operation, evaluation and corrective action and management review), and rollout strategy. Students must submit completed report with detailed attachments, and orally present project highlights to the class in a live online classroom setting. Live participation in a quarterly 1.25 hour online forum is required. EGR 620 must be taken during the final semester.

Prerequisites: EGR 610 [Min Grade: C] and EGR 611 [Min Grade: C] and EGR 612 [Min Grade: C] and EGR 613 [Min Grade: C] and EGR 614 [Min Grade: C] and EGR 615 [Min Grade: C] and EGR 616 [Min Grade: C] and EGR 617 [Min Grade: C]

EGR 642. Technical Entrepreneurship. 3 Hours.**EGR 690. Special Topics. 1-4 Hour.****EGR 692. Engineering Graduate Project. 3 Hours.**

Students will conduct research and complete project for Plan II MS degree.

EGR 695. Innovation-Commercialization Project. 3 Hours.

Through hands on activities, as well as mentorship by professional engineers and local industrial designers, the students will develop products ready for mass production.

EGR 696. Internship in Design and Commercialization. 3 Hours.

An internship is designed to provide real world experiences in a profession of interest. It enables correlation of classroom learning with application in industry; broadens understanding of the types of employment available in the field; helps students discover their individual interests; builds resume credentials for the students; and develops relationships between UAB and industry.

EGR 697. Engineering Grad Internship. 0-6 Hours.

Student works in a professional environment reflective of research interests pursuant to graduate degree.

EGR 698. Non-Thesis Research. 1-12 Hour.

Research allows the student to explore a topic of interest under the close supervision of a faculty member. The course may include directed readings, applied work, in addition to carrying out individual research in selected area.

EGR 699. Thesis Research. 1-12 Hour.

Research allows the student to explore a topic of interest under the close supervision of a faculty member. The course may include directed readings, applied work, in addition to carrying out individual research in selected area.

EGR 710. Intro to Interdisciplinary EGR. 3 Hours.

Introduces current trends and cutting-edge research in areas related to engineering that require interdisciplinary approaches.

EGR 711. Methodology for IEGR Research. 3 Hours.

Presents a detailed perspective on methods of approach for interdisciplinary problems, including experimental design, laboratory experimentation, physical modeling, simulation, and analysis.

EGR 790. Special Topics. 1-4 Hour.**EGR 791. Independent Study. 1-6 Hour.**

Independent Study in Engineering.

EGR 792. Interdisciplinary EGR Seminar. 1 Hour.

Discussions and presentations of research involving engineering in a number of disciplines. Required for graduate students in the interdisciplinary engineering Ph.D. program.

EGR 796. Journal Club in Interdisciplinary Engineering. 1 Hour.

Journal club to discuss current research and investigations in areas of interdisciplinary engineering.

EGR 797. Interdisciplinary Engineering Internship. 1-6 Hour.

Student works in a professional environment reflective of research interests pursuant to doctoral degree.

EGR 798. Non-Dissertation Research. 0-12 Hours.**EGR 799. Dissertation Research. 1-12 Hour.**

Prerequisites: GAC Z