

EGR

Engineering

EGR 101 ENGINEERING EXPLORATION I.

(1)

Engineering Exploration I introduces students to the engineering and computer science professions, College of Engineering degree programs, and opportunities for career path exploration. Topics and assignments include study skills, team development, ethics, problem solving and basic engineering tools for modeling, analysis and visualization. Open to students enrolled in the College of Engineering. Students who received credit for EGR 112 are not eligible for EGR 101. Prereq: Enrolled in the College of Engineering or MA ACT of at least 23 or equivalent. Students who received credit for EGR 112 are not eligible for EGR 101.

EGR 102 FUNDAMENTALS OF ENGINEERING COMPUTING.

(2)

Fundamentals of Engineering Computing introduces students to the practice and principles of computer programming and computational problem solving. Students will engage in hands-on project-based problem solving using modern computer software and hardware, with a particular emphasis on problems and techniques commonly appearing in various domains of engineering. Open to students enrolled in the College of Engineering. Prereq: Enrolled in the College of Engineering or MA ACT of at least 23 or equivalent.

EGR 103 ENGINEERING EXPLORATION II.

(2)

Engineering Exploration II focuses on a semester long engineering design project with students working in teams to apply the skills and tools introduced in EGR 101 or EGR 112 for transfer students and EGR 102. Topics and assignments include more in depth exploration of engineering tools for modeling, analysis, visualization, programming, hardware interfacing, team development, documentation and communication. Students gain experience in project management, identifying constraints, iteration and technical report writing. Prereq: EGR 102 or equivalent; prereq or concur MA 113; prereq or concur PHY 231; prereq or concur; CHE 105.

EGR 111 SUCCESS IN ENGINEERING.

(1)

EGR 111 reserved for Freshman College of Engineering students who have been admitted into the Engineering Living Learning Community. For registration information contact 859-257-0552.

EGR 112 ENGINEERING EXPLORATION FOR TRANSFER STUDENTS.

(1)

Engineering Exploration For Transfer Students introduces transfer students to the engineering and computer science professions using multidisciplinary and societally relevant content. Topics and assignments will focus on skills development for engineering academic success, team development, engineering ethics, problem solving and basic engineering tools for modeling, analysis and visualization. In addition, the students will be introduced to College of Engineering student services and will have opportunities for career path exploration. Open to transfer students enrolled in the College of Engineering. Students who received credit for EGR 101 are not eligible for EGR 112. Prereq: Enrolled in the College of Engineering or MA ACT of at least 23 or equivalent. Students who received credit for EGR 101 are not eligible for EGR 112.

EGR 120 TECHNOLOGY: BLESSING OR CURSE.

(3)

Technology has created the world in which we live. Our wealth, our economy, and the way we live each day have come about due to the emergence of technology over the centuries. The course will examine the relationship between technology and society; how technology influenced the development of society, how society influenced the development of technology, and how people in society view technology. Prereq: Acceptance into SEAM Program.

EGR 190 UNDERSTANDING LEADERSHIP.

(1)

To introduce students to the principles of leadership, common strategies used by leaders, and communication techniques that are vital to becoming a dynamic leader. This course is only available to students admit to the Scholars in Engineering And Management (SEAM) honors program.

EGR 196 ENGINEERING PRACTICE, CULTURE, AND LANGUAGE IN GERMANY.

(3)

This course is part of a study abroad program conducted in Germany. Students will visit Engineering companies and cultural sites in Germany, and better understand engineering practices, training and culture of Germany and its engineering companies. Students will conduct background research on the companies and sites they visit. Students will also take a German language and culture course as part of this course, which will teach basic German language, but also customs, culture and history of Germany and its residents.

EGR 198 PLTW CREDIT. (1-6)

This course grants college credit to Project Lead the Way Pathway to Engineering graduates from PLTW Certified high schools. University of Kentucky Engineering students may earn one college credit for each of the PLTW Pathway to Engineering courses [IED, POE, DE, CIM, CSE, CEA, ES, AE] completed while enrolled in secondary school(s), up to a maximum of six UK College of Engineering credits. Three of these credits may be used in approved engineering majors as support electives. Additional credits past three can be used for fulfill free electives in approved engineering majors. Criteria to obtain the credit include: • Graduation from a PLTW Certified secondary school. • Completing each PLTW course with an average of B. • Scoring in the 6th Stanine or above on the End-of-Course (EOC) PLTW exam. • Enrolling in the UK College of Engineering. • Paying any designated University of Kentucky tuition and fees. Prereq: Process to obtain the credit: • be a graduate of a PLTW Certified secondary school; • received a B (or better) in the PLTW course in high school; • scored in the 6th Stanine or above on the End-of-Course (EOC) PLTW exam for that course; • be enrolled in the UK College of Engineering; and • pay any designated University of Kentucky tuition and fees.

EGR 199 TOPICS IN ENGINEERING: TITLE TO BE ASSIGNED. (1-6)

An experimental, topical or interdisciplinary course devoted to special topics of interest in engineering. Course offerings must be approved by the Deans and Chairpersons of all cosponsoring academic units. A particular title may only be offered twice under the EGR 199 number. Students may not repeat this course under the same title. May be repeated to a maximum of twelve hours. Prereq: Enrollment in the College of Engineering, or permission of the instructor.

EGR 201 LITERATURE, TECHNOLOGY, AND CULTURE. (3)

EGR 201 focuses on human endeavors in science as refracted through literature. The course brings together two distinct traditions: the study of literature and the practice of technical communication. The course operates from several assumptions: (1) that imaginative treatments of technological subjects offer powerful, useful, and even needed critical perspectives, (2) that authors and engineers both work from written conventions – genres and other tropes – that frame knowledge, (3) that writers benefit from scrutiny of generic conventions, and (4) that creative play with conventional literary genres can inspire engineers to “think outside the box,” to think creatively about their own designs and projects and about innovative ways of presenting their work. Prereq: Students must have successfully completed the first course in the General Education Communication sequence (or its transfer equivalent) and must have completed at least 30 hours of course work.

#EGR 215 INTRODUCTION TO THE PRACTICE OF ENGINEERING FOR TRANSFER STUDENTS. (3)

Introduction to the Practice of Engineering for Transfer Students welcomes transfer students to the College of Engineering and introduces them to the creativity inherent in how engineers and computer scientists approach innovation, design and problem solving from blue sky brainstorming to implementing a solution. Students will be introduced to general engineering content, practice with tools of the trade (written and oral communications, data analysis, visualization, and professional development), provide peer reviews and discuss ethical implications of creative engineering endeavors. Students will work in teams to apply the skills and tools introduced. Topics and assignments include in depth engagement with engineering tools for modeling, analysis, visualization, team development, documentation and communication. Students gain experience in project management, identifying constraints, accepting and providing critical analysis, iterating to refine their work, and keeping a technical design notebook. Prereq: Enrolled in the College of Engineering or MA ACT of at least 23 or equivalent. Prereq or concur: MA 113.

EGR 240 GLOBAL ENERGY ISSUES. (3)

This is a cross-disciplinary course open to all majors. This course critically examines issues associated with the technical, economic, societal, environmental, and geopolitical aspects of energy. The course is taught through lectures, discussions, and invited speakers.

***EGR 390 EXPERIENTIAL LEARNING IN ENGINEERING OR COMPUTER SCIENCE. (1-3)**

Project or activity led by an engineering faculty member, designed to provide students the opportunity to apply engineering principles in the context of real-world and multi-disciplinary community-based problems. May be repeated to a maximum of nine credits. Prereq: Engineering standing.

EGR 394 BS/MBA SEMINAR. (0-1)

Participation in team development exercises, seminars, company visits, and activities associated with the BS/MBA program. Prereq: Admission to the BS/MBA program.

EGR 399 COOPERATIVE ENGINEERING EDUCATION. (1)

A course designed for undergraduate students who, through the engineering cooperative education office, secure full-time, salaried, career-related positions under the supervision of a sponsoring employer. Enrollment in the course constitutes full-time status. Course may be taken on a pass-fail basis only and may be repeated on a rotational basis to a maximum of six credit hours. Prereq: Approval of Coordinator of Cooperative Engineering Education.

EGR 401 CAREER PLANNING/EMPLOYMENT SEMINAR. (1)

This course will introduce students to the various elements involved in obtaining a position in their chosen field of engineering. Prereq: Engineering standing.

#EGR 490 ENGINEERING LEADERSHIP. (1)

To introduce students to advanced principles of leadership, common strategies used by distinguished community leaders and UK alumni, and communication techniques that are vital to becoming a dynamic leader in engineering industry. Prereq: Junior or senior with Engineering standing.

EGR 505 PROJECT LEAD THE WAY (Subtitle required). (1-6)

ProjectLead The Way is the nation's leading provider of science, technology, engineering, and math (STEM) programs. Through world-class K-12 curriculum, high-quality teacher professional development, and outstanding partnerships, PLTW is helping students develop the skills needed to succeed in the global economy. To be an educator in this program teacher must successfully complete a core training session. Core Training is an intensive program intended to give Instructors an overview of the PLTW course they will be teaching. Class meets from 8am to 5pm each day, with an hour for lunch. Attendance is required at all sessions. During the training, participants complete a portfolio in order to be certified to teach the course and receive credit. Prereq: Completion of a bachelors or be registered as a junior or higher at a Kentucky university.

EGR 523 CONCEPTS, ASSESSMENT TOOLS AND METHODS IN SUSTAINABLE POWER AND ENERGY. (3)

A multidisciplinary course presenting an overview of key topics in sustainability and environmental impact assessment for engineers. Topics will include assessment of current and future energy systems, renewable and conventional energy technologies, supply chain management, sustainability metrics, energy assessment tools, environmental impact assessment and life cycle assessment. Topics will be presented and their attributes described within a framework that aids in evaluation and analysis of energy technology systems and designs in the context of political, social, economic, and environmental goals. Prereq: Engineering Standing and Senior Classification or Consent of Instructor. (Same as CME/MFS 523.)

EGR 537 NUMERICAL ANALYSIS. (3)

Floating point arithmetic. Direct methods for the solution of systems of linear algebraic equations. Polynomial and piecewise polynomial approximation, orthogonal polynomials. Numerical integration: Newton Cotes formulas and Gaussian quadrature. Basic methods for initial value problems for ordinary differential equations. The emphasis throughout is on the understanding and use of software packages for the solution of commonly occurring problems in science and engineering. Prereq: CS/MA 321 or equivalent, or graduate standing or consent of instructor. Knowledge of a procedural computer language is required. (Same as CS/MA 537.)

EGR 540 POWER ECONOMICS AND PUBLIC POLICY. (3)

This course provides an introduction to the theories and industry practices related to power economics and power public policy. Topics studied include: U.S. power markets, electric utility business regulation, electric utility environmental regulation, public policy theory, political science theory, development of new electric generation facilities, utility business operation, engineering influence on public policy, and engineering economic analysis. Prereq: Engineering standing, graduate standing, or consent of instructor.

EGR 542 ELECTRIC POWER GENERATION TECHNOLOGIES. (3)

Overview of technologies used for generating electricity from location, recovery, transportation and storage of fuel to the types of technologies used to convert the fuel to electricity. Included is a discussion of the advantages and disadvantages of each technology and how they must adapt to be viable in the future. Technologies covered include coal, natural gas, nuclear, biomass, wind, solar and advanced technologies. Prereq: Engineering standing or consent of instructor. (Same as CME 542.)

EGR 543 SOLAR CELL DEVICES AND SYSTEMS FOR ELECTRICAL ENERGY GENERATION. (3)

Physics of photovoltaic (PV) devices, emerging technologies, design of PV cells and systems, electronic components for signal conditioning, integration, installation, performance evaluation and economic issues related to PV systems. Prereq: EE 211 or EE 305 and Engineering Standing, or consent of instructor. (Same as BAE 543/EE 543.)

EGR 546 ELECTRIC POWER SYSTEM FUNDAMENTALS. (3)

Introduction to power transmission basics, power system components, power flow, fault analysis and protection, control, stability, and economic operation of the power grid. This course will also introduce modern trends such as distributed generation, communications, and cybersecurity. Prereq: Graduate or engineering standing and EE 221, EE 305, or equivalent. (Same as EE 546.)

EGR 549 POWER AND ENERGY EXPERIENCES. (3)

This course will provide unique experiences through visits to a variety of energy-related sites and presentations from topical experts. The course begins with preparations through readings, videos, and assignments. The course then has a week-long tour of selected energy related sites, which may include: pumped storage site, coal mine, coal- and gas-fired and nuclear power plants, power operations center, wind farm, hydroelectric generation, landfill gas site, smart grid demonstration center, solar farm, high efficiency building, etc. in the region. More than simply tours, these visits include presentations by industry technical personnel. Students prepare for these visits in advance through preliminary assignments, and students then do a written summary and reflection journal on these visits afterwards. This Course may not be used to satisfy degree requirements if credit is earned in EGR 649. Prereq: EGR 240 or EGR 542 or EGR 546, or consent of the instructor. Due to the nature of this class, enrollment is limited. Students pursuing either the Undergraduate Certificate or Graduate Certificate in Power and Energy may be given preference in enrollment.

EGR 553 ENVIRONMENTAL CONSEQUENCES OF ENERGY PRODUCTION. (3)

This course will introduce the relationship of energy, pollution control technology, and the environment. The scientific and engineering aspects of energy production are examined and the associated environmental problems and control technologies are discussed. Prereq: CHE 105, MA 214, and engineering standing or consent of instructor. (Same as CE 553.)

EGR 599 TOPICS IN ENGINEERING (Subtitle required). (1-3)

An experimental, interdisciplinary course devoted to a topic of interest to students in several departments of the college. Only three credits may be earned under the same title; students may register for more than one section each semester. A particular topic may be offered at most three times under the EGR 599 number. Prereq: Variable, given when topic is identified.

EGR 601 INTRODUCTION TO RESEARCH IN ENGINEERING. (3)

Introduction to scientific research, applied to engineering. Characterization of scientific research, the definition of a research project, and methodology in research. Discussion includes management, organization and execution of a research project, scientific writing, information related to research ethics and data management, national policies, and intellectual properties. Case studies. Introduction to share research tools such as high performance computing or scanning electron microscopy. Prereq: Graduate standing or consent of instructor.

EGR 611 BOUNDARY ELEMENT METHODS IN ENGINEERING. (3)

Introduction of boundary element methods for use in solving common engineering equations, such as the Laplace equation, the Poisson equation, the wave equation, and the diffusion equation. Both the theoretical and numerical aspects of the boundary element technique are presented. Application areas include heat conduction, potential flow problems, acoustic wave propagation, general diffusion, and stress analysis. Prereq: EGR 537 or consent of instructor. (Same as ME 611.)

EGR 649 POWER AND ENERGY EXPERIENCES. (3)

This course will provide unique experiences through visits to a variety of energy-related sites and presentations from topical experts. The course begins with preparations through readings, videos, and assignments. The course then has a week-long tour of selected energy related sites, which may include: pumped storage site, coal mine, coal- and gas-fired and nuclear power plants, power operations center, wind farm, hydroelectric generation, landfill gas site, smart grid demonstration center, solar farm, high efficiency building, etc. in the region. More than simply tours, these visits include presentations by industry technical personnel. Students prepare for these visits in advance through preliminary assignments, and students then do a written summary and reflection journal on these visits afterwards. This course may not be used to satisfy degree requirements if credit is earned in EGR 549. Prereq: EGR 542 or EGR 546, or consent of the instructor. Due to the nature of this class, enrollment is limited. Students pursuing the Graduate Certificate in Power and Energy may be given preference in enrollment.