

ENGINEERING (EGR)

Engineering (EGR) Courses

EGR 6113. Curriculum, Instruction, and Assessment. (3-0) 3 Credit Hours.

Prerequisite: CI 6003. Examination of different pedagogical approaches to the teaching and learning process in schools, with emphasis on the development of curriculum for classroom instruction, evaluation, organization, and management. This course has Differential Tuition.

EGR 6183. Engineering Education Methods. (3-0) 3 Credit Hours.

This course is designed to provide graduate students with an opportunity to acquire foundational knowledge on theories of teaching and learning in engineering education. The course contains principles of inclusive, learner-centered, and evidence-based pedagogy and assessment in engineering learning environments. This course serves as an opportunity to gain knowledge about the role of engineers as educators, mentors, and advisors through critical examinations of theory, disciplinary literacies, dominant ideologies, and empirical research in engineering education. This course has Differential Tuition.

EGR 6283. Mentored Teaching in Engineering. (3-0) 3 Credit Hours.

This course allows students the opportunity for a deeper understanding of teaching and learning through practice, feedback, and reflection as performed regularly in assigned teaching duties. Educational goals and objectives are identified, and engaging and meaningful activities are designed to address the learning goals using asset-based, student-centered curricular strategies. Students have the opportunity to develop assessments of the classroom activities and methods they use to support student learning. Reflection is used as a central method for learning and formatively evaluating the educator's practice. Topics include equity in education, inclusive teaching, grading and assessment, engagement activities, and cultural relevance. This course has Differential Tuition.

EGR 6293. Professional Development in Engineering Education. (3-0) 3 Credit Hours.

This course provides students with an opportunity to acquire an awareness of the Standards for Professional Development for Teachers of Engineering. Students will have an opportunity to practice strategies for designing and delivering professional development experiences for teachers and instructors of engineering. Students will be made aware of future careers and professional advancement opportunities at institutions of higher education, K-12 settings, corporate training, and formal and informal educational environments. This course has Differential Tuition.

EGR 6313. Teaching Engineering through Spatial Visualization. (3-0) 3 Credit Hours.

This course provides students the opportunity to explore research and pedagogical approaches to integrating spatial visualization as a skill to support students and professionals within the science, technology, engineering, and math (STEM) curricula. Instruction and exercises will be provided to allow students the opportunity to practice some spatial visualization skills. The course will also allow for the exploration of some technologies that can support various forms of visual representation of data. Examples include medical imaging, communication technology, transportation technology, and energy and power technology. This course has Differential Tuition.

EGR 6453. Engineering for Social Justice. (3-0) 3 Credit Hours.

This course examines the role of engineers in society, the complexity of sociotechnical challenges, the importance of diversity and inclusion in spaces where engineering is practiced, and the ways in which engineering can be used as a vehicle to rectify injustices created by engineered designs and artifacts. The course also provides an opportunity to acquire the tools to critically analyze engineering systems, challenge dominant engineering discourses, and reshape the practice of engineering. This course has Differential Tuition.

EGR 6463. Engineering Social Responsibility and Ethics. (3-0) 3 Credit Hours.

This course provides students with an opportunity to acquire foundational perspectives on engineering ethics and social responsibility in relationship to individuals, industry, and the public welfare in both education and practice. The course places emphasis on the unified nature of ethics, philosophy, morality, legal responsibility, and social issues. This course has Differential Tuition.

EGR 6513. Human Centered Design and the Impact of Modern Technologies. (3-0) 3 Credit Hours.

This course explores the issues faced by society as technology becomes an integral part of human life. The course provides students with opportunities to think critically, practically, creatively, and responsively about technological and social challenges; and encourages them to examine potential solutions to challenges of their own. The course also explores and discusses the socio-technological and user interplay in engineering design. This course has Differential Tuition.

EGR 6653. Foundations of Engineering Education Research Methodologies. (3-0) 3 Credit Hours.

This course provides students with an introduction to the field of engineering education research. The course offers students the opportunity to critically explore, analyze, and apply theoretical and conceptual frameworks to guide and conduct engineering education research. The course also allows students opportunities to examine the processes to engage in ethical research practices in engineering spaces. This course has Differential Tuition.

EGR 6853. Advanced Engineering Education Research Methodologies. (3-0) 3 Credit Hours.

Prerequisite: EGR 6653 or instructor approval. This course offers an in-depth examination of research study designs and methodologies in engineering education research. An exploration of current and emerging research methods in engineering education research are analyzed, critiqued, and evaluated throughout the course. The course also provides students with theoretical literature on quantitative, qualitative, and mixed-methods research approaches from different fields such as psychology, sociology, anthropology, and STEM education to explore their relation to engineering education. Course may be repeated for credit when topics vary. This course has Differential Tuition.

EGR 6913. Advanced Topics in Interdisciplinary STEM Education. (3-0) 3 Credit Hours.

Topics and critical issues in interdisciplinary STEM education. Topics include a focus on (1) research and development of innovative STEM learning and emerging STEM learning environments both in and out of school settings and (2) research that advances the field of formal and informal STEM Education. Course may be repeated for credit when topics vary. This course has Differential Tuition.

EGR 6932. Engineering Education Practicum. (2-0) 2 Credit Hours.

The purpose of this course is to expose students to challenge-based instructional pedagogies under the supervision of the faculty advisor. This course is a practical introduction to engineering education that considers technical and social justice challenges in the community. The course allows for the development of transforming leadership competencies, connects students to their surrounding community through an engineering lens, and provides an experiential and collaborative learning experience that integrates knowledge. This course has Differential Tuition.

EGR 6943. Graduate Project. (0-0) 3 Credit Hours.

Students will have the opportunity to demonstrate acquired skills in engineering education by carrying out a major culminating engineering education project using the engineering design process. This semester-long project must have the prior approval of a supervising faculty member. Credit will be awarded upon successful submission of a written report. May be repeated once for elective credit, but not more than 6 hours will apply to the master's degree. Enrollment is required each term in which the project is in progress. This course has Differential Tuition. Course fee: DL01 \$75.

EGR 6973. Special Problems: Becoming an Engineering Educator. (3-0) 3 Credit Hours.

An organized course offering the opportunity for specialized study in engineering education for instructors in either a college/university setting or a K#12 educational classroom. This course covers the theoretical foundations of engineering curriculum design, a culturally responsive teaching framework for teaching engineering content, and using engineering design as the impetus for student learning of STEM content. Students will be provided the opportunity to enhance other valuable skills for engineering educators, such as writing grant proposals, managing active learning classrooms, and developing teaching methods to enable diverse student learning. This course may be repeated for credit when topics vary. This course has Differential Tuition.

EGR 6981. Master's Thesis Research. (0-0) 1 Credit Hour.

Prerequisite: Master's student standing and consent of the instructor and the Graduate Advisor of Record. Students pursuing the thesis option will receive guidance through this course and the opportunity to propose, execute, summarize, and defend a research project. This course has Differential Tuition.

EGR 6982. Master's Thesis Research. (0-0) 2 Credit Hours.

Prerequisite: Master's student standing and consent of the instructor and the Graduate Advisor of Record. Students pursuing the thesis option will receive guidance through this course and the opportunity to propose, execute, summarize, and defend a research project. This course has Differential Tuition.

EGR 6983. Master's Thesis Research. (0-0) 3 Credit Hours.

Prerequisite: Master's student standing and consent of the instructor and the Graduate Advisor of Record. Students pursuing the thesis option will receive guidance through this course and the opportunity to propose, execute, summarize, and defend a research project. This course has Differential Tuition.

EGR 6991. Research Seminar. (1-0) 1 Credit Hour.

Organized research lectures and seminar presentations related to innovative topics in Engineering Education will be offered. The grade report for this course is either "CR" (satisfactory participation in the seminar) or "NC" (unsatisfactory participation in the seminar). This course may include a written component. Course may be repeated for credit, but not more than 1 hour will apply to the master's degree, regardless of the discipline in which the project is in progress. This course has Differential Tuition.