

## ENGINEERING

## EGR

## College of Engineering

- 100 Introduction to Engineering Design**  
Fall, Spring, Summer. 2(1-2) P: ((MTH 116 or concurrently) or (MTH 132 or concurrently) or (MTH 152H or concurrently) or (LB 117 or concurrently) or (LB 118 or concurrently)) and (WRA 1004 or designated score on English Placement test ) R: Open to students in the College of Engineering or in the Entrepreneurship and Innovation Minor and open to students in the Lyman Briggs College.

Engineering design process as modeled by team-based, interdisciplinary design projects. Roles of engineers and the contributions of engineering in society. Project management, creativity and design of products and processes to specified outcomes under specified constraints. Introduction to computing tools and physical equipment in support of engineering design. Engineering ethics. Oral and written technical communications.

- 102 Introduction to Engineering Modeling**  
Fall, Spring. 2(1-3) P: (MTH 132 or concurrently) or (MTH 152H or concurrently) or (LB 118 or concurrently) R: Open to students in the College of Engineering or in the Lyman Briggs College. Not open to students with credit in CSE 131.

Application of systematic approaches to engineering problems. Problem decomposition and identification of a solution approach. Solution using tools such as advanced spreadsheet features and MATLAB. Data representation, curve fitting and analysis. Mathematical modeling of engineering systems. Application of principles through team-based engineering projects.

- 106 Preparation for Science and Engineering**  
Fall. 1(1-0) Interdepartmental with Lyman Briggs. Administered by Engineering. R: Open to freshmen. Approval of college.

Academic and environmental aspects to college success. Review of math and science fundamentals and development of writing skills. Introduction to Science, Technology, Engineering, and Mathematics (STEM) careers.

- 160 Success in Science, Technology, Engineering, and Mathematics**  
Fall, Spring. 2(2-0) R: Open to freshmen or sophomores.

Professional preparation for Science, Technology, Engineering, and Mathematics (STEM) careers. Transitional challenges. Diversity and STEM. Career options. Communication skills.

- 192 Environmental Issues Seminar**  
Fall. 1 credit. Interdepartmental with Agriculture and Natural Resources and Communication Arts and Sciences and Natural Science and Social Science. Administered by Natural Science. R: Open to students in the College of Communication Arts and Sciences or in the College of Engineering or in the College of Natural Science or in the College of Social Science. Approval of college.

Environmental issues and problems explored from a variety of perspectives, including legal, scientific, historical, political, socio-economic, and technical points of view.

- 193 Introduction to Experiential Education**  
Fall. 1(1-0) RB: Students must have participated in a paid, supervised engineering experience. R: Open to freshmen in the College of Engineering. Approval of department.

A reflection on previous career-related work experiences and exploration of future career opportunities.

- 290 Independent Study**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course. R: Open to students in the College of Engineering. Approval of college.

Independent undergraduate research in engineering.

- 291 Selected Topics**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course.

Experimental course development or special topics offerings.

- 292 Applications in Environmental Studies**  
Spring. 2(1-2) Interdepartmental with Agriculture and Natural Resources and Communication Arts and Sciences and Natural Science and Social Science. Administered by Natural Science. R: Open to students in the Environmental Studies Specialization.

Community engagement project. Projects vary depending on student's major and area of environmental interest.

- 391 Experiential Education I**  
Fall, Spring, Summer. 1(1-0) R: Open to undergraduate students in the College of Engineering.

Supporting students' first internship through assessment and reflection to enhance career understanding.

- 392 Experiential Education II**  
Fall, Spring, Summer. 1(1-0) P: EGR 391 R: Open to undergraduate students in the College of Engineering.

Supporting students' second internship through assessment and reflection to enhance career understanding.

- 393 Engineering Cooperative Education**  
Fall, Spring, Summer. 1(1-0) A student may earn a maximum of 6 credits in all enrollments for this course. R: Open to students in the College of Engineering and not open to freshmen.

Pre-professional educational employment experiences in industry and government related to student's major. Educational employment assignment approved by College of Engineering.

- 400 Special Problems in International Engineering**  
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open to juniors or seniors or graduate students in the College of Engineering.

Supervised study of selected topics in engineering using laboratories, equipment, and engineering design techniques. Given at various international universities and institutes.

- 440 Engineering Entrepreneurship**  
Fall. 3(3-0) R: Open to juniors or seniors in the College of Engineering.

Technical skills to enable and engage in engineering related entrepreneurship at all levels. Discovery, evaluation, and engagement of entrepreneurial opportunities starting with technology development to solve a problem, bring about desired change that is scalable, and the application of engineering principles in business related endeavors.

- 475 Special Topics in International Engineering**  
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open to juniors or seniors or graduate students in the College of Engineering.

Topics selected to supplement regular courses. Given at various international universities and institutes.

- 480 Information and Communication Technologies and Development**  
Fall. 3(3-0) Interdepartmental with Media and Information. Administered by Media and Information. P: Completion of Tier I Writing Requirement SA: TC 480

Role of information and communications technologies (ICT) in low income countries and in disadvantaged areas in middle and high income countries. Theories and case studies that link ICT and social, political, economic and environmental change.

- 488 Information and Communication Technology Development Project (W)**  
Spring, Summer. 3 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. Interdepartmental with Media and Information. Administered by Media and Information. P: Completion of Tier I Writing Requirement RB: MI 480 SA: TC 488

Challenges and opportunities of implementing an information and communication technology in a developing country or underprivileged region of the United States. Hands-on experience conducting field work on location.

- 490 Independent Study (W)**  
Fall, Spring, Summer. 1 to 4 credits. P: Completion of Tier I Writing Requirement R: Open to juniors or seniors in the College of Engineering. Approval of college.

Individualized reading, research, and/or project.

- 493 Advanced Experiential Education I**  
Fall, Spring, Summer. 1(1-0) P: EGR 392 R: Open to undergraduate students in the College of Engineering.

Supporting students' third internship through assessment and reflection to enhance career understanding.

- 494 Advanced Experiential Education II**  
Fall, Spring, Summer. 1(1-0) A student may earn a maximum of 2 credits in all enrollments for this course. P: EGR 493 R: Open to undergraduate students in the College of Engineering.

Supporting students' fourth internship through assessment and reflection to enhance career understanding.

## EGR—Engineering

- 811 Foundations of Engineering Education**  
Fall. 3(3-0) RB: Teaching experience (e.g. TA) and interest in becoming a higher education faculty member as a career. R: Open to graduate students in the College of Engineering.

Introduces the theoretical foundations of engineering education, student learning theories, educational research, and instructional design. How to effectively teach, manage, and assess student performance.

- 840 Engineering Entrepreneurship**  
Fall. 3(3-0) R: Open to graduate students in the College of Engineering.

Technical skills to enable and engage in engineering related entrepreneurship at all levels. Discovery, evaluation, and engagement of entrepreneurial opportunities starting with technology development to solve a problem, bring about desired change that is scalable, and the application of engineering principles in business related endeavors.

- 891 Selected Topics**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 9 credits in all enrollments for this course. R: Open to graduate students in the College of Engineering.

Selected topics in engineering.

- 893 Graduate Experiential Education**  
Fall, Spring, Summer. 1(1-0) A student may earn a maximum of 3 credits in all enrollments for this course. R: Open to graduate students in the College of Engineering. Approval of department.

Faculty-mentored graduate research or educational employment experience in industry or government.

- 993 Engineering Research Writing**  
Fall, Spring, Summer. 1(1-0) A student may earn a maximum of 3 credits in all enrollments for this course. R: Open to graduate students in the College of Engineering. Approval of department.

Support for students engaged in substantial writing projects such as thesis or dissertation.

- 994 Effective Interdisciplinary Research Collaborations**  
On Demand. 3(3-0) Interdepartmental with Communication Arts and Sciences and Nursing. Administered by Communication Arts and Sciences. RB: Students should have background or expertise in technology, nursing, health, and/or communication. Students should have applied research interests. R: Open to graduate students in the College of Communication Arts and Sciences and open to graduate students in the College of Engineering and open to graduate students in the College of Nursing.

Interdisciplinary research methods, techniques, approaches, and funding. Applied research on issues that crosscut communication, nursing, and engineering.