Engineering, Design, and Society

Degrees

- Master of Science in Humanitarian Engineering and Science (Thesis and Non-Thesis options)
- Graduate Certificate in Humanitarian Engineering and Science

Program Description

The mission of the Department of Engineering, Design, and Society (EDS) is to engage in research, education, and outreach that inspires and empowers engineers and applied scientists to become innovative and impactful leaders in socio-technical design, problem definition, and problem solution. Our graduates are prepared to address the challenges of attaining a thriving, sustainable global society. Humanitarian Engineering and Science (HES) is a set of graduate program offerings within EDS.

HES connects students with a passion for contributing to social and environmental problem solving to Mines faculty who lead the field of applying engineering to pressing social, environmental, and community challenges. Integrating engineering with social sciences and design, HES offers courses that teach students how to work with the communities they seek to serve by co-creating solutions that promote justice, responsibility, and sustainability. HES serves students who have diverse career goals spanning NGOs, government agencies and research groups, start-ups, and established companies. Seminar-style courses offered by EDS, along with selected technical courses offered by other academic units across campus, provide students a balance of breadth and depth in applying engineering to social, environmental, and community challenges.

Information on the Humanitarian Engineering degree programs can be found in the Interdisciplinary Programs section of the catalog.

Courses

EDNS515. INTRODUCTION TO ENGINEERING IN SOCIETY. 3.0 Semester Hrs.
This course engages scholarship on the inextricable link between engineering and the various social contexts within which engineers work. We begin by critically reflecting on the question, What is engineering for? We then explore key conceptual domains in the social scientific study of engineering, including knowledge, agency, and expertise. We will learn from a diverse set of social scientific experts who study and collaborate with engineers. Students will leave the course with a better understanding of how social scientific inquiry can aid in understanding, and practicing, engineering. They will also have a clearer articulation of their individual professional commitments and how those fit with more traditional understandings of engineering.

EDNS577. ADVANCED ENGINEERING AND SUSTAINABLE COMMUNITY DEVELOPMENT. 3.0 Semester Hrs.
Analyzes the relationship between engineering and sustainable community development (SCD) from historical, political, ethical, cultural, and practical perspectives. Students will study and analyze different dimensions of sustainability, development, and “helping”, and the role that engineering might play in each. Will include critical explorations of strengths and limitations of dominant methods in engineering problem solving, design and research for working in SCD. Through case-studies, students will analyze and evaluate projects in SCD and develop criteria for their evaluation. 3 hours lecture and discussion; 3 semester hours.

EDNS580. HUMANITARIAN ENGINEERING AND SCIENCE CAPSTONE PRACTICUM. 3.0 Semester Hrs.
(I, II, S) This course allows students to practice the concepts, theories and methods learned in HES courses with the goal of making relevant their academic training to real world problems. This practicum can be achieved through a number of possibilities approved by HES director, including supervision and/or shadowing in HES-related activities, engaging in a social enterprise where they do problem definition, impact gap analysis and layout a business canvas, and designing and carrying out a project or fieldwork of their own, etc. Prerequisite: EDNS570, EDNS475. 3 hours research; 3 semester hours.

EDNS590. RISKS IN HUMANITARIAN ENGINEERING AND SCIENCE. 3.0 Semester Hrs.
(I) This course provides students with opportunities learn about risk and ways of analyzing engineering and scientific projects in relation to risks, and to develop multiple mitigation steps. The students will learn tools to develop their own designs while also evaluating associated risks along multiple dimensions and searching out synergies. 3 hours lecture; 3 semester hours.

EDNS598. SPECIAL TOPICS IN ENGINEERING DESIGN & SOCIETY. 6.0 Semester Hrs.
(I, II) Pilot course or special topics course. Topics chosen from special interests of instructor(s) and student(s). Usually the course is offered only once, but no more than twice for the same course content. Prerequisite: none. Variable credit: 0 to 6 credit hours. Repeatable for credit under different titles.

EDNS599. INDEPENDENT STUDY. 0.5-6 Semester Hr.
Individual research or special problem projects supervised by a faculty member, also, when a student and instructor agree on a subject matter, content, and credit hours. Variable credit: 0.5 to 6 credit hours. Repeatable for credit under different topics/experience and maximums vary by department. Contact the Department for credit limits toward the degree. Independent Study form must be completed and submitted to the Registrar.

Department Leadership

Dean Nieusma, Department Head
Chelsea Salinas, Assistant Department Head

Professors

Juan Lucena, Humanitarian Engineering Director of Undergraduate Programs and Outreach
Kevin Moore, Executive Director of Humanitarian Engineering
Associate Professors
Jessica Smith, Humanitarian Engineering Director of Graduate Programs and Research

Assistant Professor
Elizabeth Reddy

Teaching Professors
Alina Handorean
Carrie McClelland, Director of Grandey First-Year Honors Experience

Teaching Associate Professors
Yosef Allam, Director of Cornerstone Design@Mines
Leslie Light
Mirna Mattijk

Teaching Assistant Professors
Marie Stettler Kleine
Lauren Shumaker, Director of Thorson First-Year Honors Experience

Staff
Monica Kurtz, Stakeholder Relations Manager
Julia Roos, Associate Director of Humanitarian Engineering
Kimberly Walker, Department Manager