HUMANITARIAN ENGINEERING MINOR

Contacts

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Program Description

The Humanitarian Engineering minor program offers students an enriching educational journey dedicated to enhancing the human condition and supporting underserved communities both locally and globally. Through a blend of engineering fundamentals and social consciousness, students are equipped with the tools and mindset to tackle complex global and community challenges. From designing sustainable infrastructure to implementing innovative solutions for healthcare access, students engage in hands-on projects with community and institutional partners to develop innovative systems that directly impact the lives of underserved populations. By emphasizing collaboration, cultural sensitivity, reflection, and ethical considerations, graduates emerge ready to address pressing humanitarian needs while promoting sustainable development and social equity. With a focus on holistic problem-solving and community engagement, this program prepares students to make a tangible and lasting difference in the world.

1. Graduates will demonstrate the ability to apply engineering principles and humanitarian design processes to develop solutions that address the needs of underserved populations both locally and globally.
2. Graduates will exhibit the capacity to work effectively in interdisciplinary teams, integrating knowledge from engineering, social sciences, and local cultural contexts to design and implement projects.
3. Graduates will possess an understanding of and sensitivity to cultural differences.
4. Graduates will be able to create sustainable and appropriate engineering solutions, considering environmental impact, resource limitations, and long-term viability.
5. Graduates will demonstrate an understanding principles of community engagement through the design and execution of projects that meet community-identified needs and support capacity building.
6. Graduates will be able to identify, formulate, and solve humanitarian engineering problems following high ethical standards and an understanding of professional responsibility.

Program Requirements

The minor program in Humanitarian Engineering requires 18 credits, as laid out below.

- Core Courses (6 credits)
- Technical Electives (6 credits)
- SS/H Electives (3 credits)
- Project (3 credits)

Detailed course lists are provided below.

Note:

- A maximum of 6 credit hours at the 100- or 200-level across all categories will count toward the minor.
- Of the total 18 credits required, at least 6 credits must be completed within ECS.

To ensure successful completion of all minor requirements before graduation, students are encouraged to:

- Complete the introductory core course (ECS 311) by the end of their sophomore year, and
- Submit their project proposal to the program coordinator for approval by the end of their junior year.

Core Courses: 6 credits

- ECS 311 Introduction to Humanitarian Engineering

AND

One of the following ethics-related courses:

- ECS 392 Ethical Aspects of Engineering and Computer Science
- PHI 363 Ethics and International Relations
- PSC 363 Ethics and International Relations
- PHI 393 Contemporary Ethics
- PHI 394 Environmental Ethics
- PHI 398 Medical Ethics
- PHI 415 Roots of Western Civilization

Technical Electives

Students may select from the following courses to fulfill the technical elective requirement for the Humanitarian Engineering minor.

- BEN 200 Selected Topics
- CEE 274 Sustainability in Civil and Environmental Systems
- CEE 275 Infrastructure and Society
- CEE 327 Prin of Fluid Mechanics
- CEE 352 Water Resources Engineering
- CEE 361 Evolution of an Infrastructure Project
- CEE 413 Physical Hydrology
- CEE 442 Treatment Processes in Environmental Engineering
- CEE 463 Introduction to Sustainable Engineering
- CEE 471 Environmental Chemistry and Analysis
- CEE 573 Water, Sanitation, and Sustainability in Low-Resource Settings
- CEE 577 Urban Stormwater Management
- CIS 400 Selected Topics Ethics of Machine Learning
- CIS 454 Software Implementation
- DES 400 Selected Topics Inclusive Design Intelligence ++
- IST 343 Data in Society
- MND 413 Emerging Media Platforms
- PHP 303 Environmental Health

For non-STEM major students:

- CHE 103 Chemistry in the Modern World
- PHY 101 Major Concepts of Physics I
- PHY 102 Major Concepts of Physics II
- PHY 215 General Physics I for Scientists
- PHY 216 General Physics II for Scientists
- CIS 151 Fundamentals of Computing and Programming
- ECS 102 Introduction to Computing

SS/H Electives

The SS/H elective aims to provide students with a broad understanding of humanitarianism, social sciences, and cultural awareness. Specific courses may be approved by the program coordinator.

- COM 337 Real News, Fake News: Literacy for the Information Age
- HFS 325 Children and Families in Health Care Settings
- HFS 326 Medical Terminology: Professional, Cultural and Developmental Perspectives
- MAX 123 Critical Issues for the United States
- MAX 132 Global Community
- MAX 300 Selected Topics AI and Humanity
- PHP 309 Health Disparities and Underserved Populations
- PSC 310 Refugees in International Politics
- PSC 318 Technology, Politics, and Environment
- PSC 354 Human Rights and Global Affairs
- PSC 356 Political Conflict
- PSC 360 Sustainability Science and Policy
- PSC 387 Ethnic Conflict
- PSC 435 Humanitarian Action in World Politics
- PST 101 An Introduction to the Analysis of Public Policy
- SOC 102 Social Problems
- WRT 307 Advanced Writing Studio: Professional Writing
- WRT 427 Emerging Technologies in Professional & Technical Writing

Humanitarian Engineering Project

Project course credit can be earned through (but not limited to):

- Individual Studies
- Undergraduate Research
- Honors Thesis Credits
- Capstone Design
- Service-Learning Trip
- Engineers Without Borders
- ISI Technical Assistance Program

To qualify, the project must have a clear focus on humanitarian engineering. Specific project must be approved by the program coordinator.