

# Humanitarian Engineering Minor (HUMENG-MN)

## Advising Sheet

### The Ohio State University

#### College of Engineering and Departments of Electrical & Computer Engineering; Civil, Environmental & Geodetic Engineering; Food, Agricultural & Biological Engineering

Revised October 2021

#### College of Engineering

Email: [eng-advisor@osu.edu](mailto:eng-advisor@osu.edu)

<https://engineering.osu.edu/academics/minors>

Humanitarian Engineering is the design and creation of products and processes that promote human welfare, especially for the economically disadvantaged or underserved. Examples of humanitarian technologies for developing communities include affordable:

- Technologies for clean water and sanitation
- Non-polluting lighting, heating, and cooking methods
- Off-grid electricity generation (e.g., solar or bicycle)
- Agricultural technologies and methods (e.g., aquaponics or irrigation)
- Healthcare technologies, shelters

Examples of humanitarianism in the engineering enterprise:

- Engineers' involvement in creating profit-generating technological products and processes for the poor (related to the debate over "aid vs. trade") while respecting social justice (e.g., via local entrepreneurship/business development)
- Engineers' involvement in a company's technology transfer to the developing world, including best practices for safety, health impacts, and effectiveness
- Engineers' involvement in the design and operation of international manufacturing sites (e.g., "sweatshops") in ways that respect social justice (e.g., safety, environment, living wage, worker's rights, and unions)
- Engineers' involvement in development and maintenance of socially responsible technology supply-chains

If you are interested in this minor, you should contact your academic advisor. If you are outside the College of Engineering, please contact [eng-advisor@osu.edu](mailto:eng-advisor@osu.edu) to set up an appointment. The Humanitarian Engineering Minor consists of 15 credit hours of course work as listed below. You are responsible for taking the prerequisites for each course.

#### Key Curriculum Components

- Humanitarian Engineering Core Courses (6 credit hours)
- Understanding of Human Welfare (3-6 credits hours)
- Humanitarian Engineering Project Work (3-6 credit hours)
- Total Credit Hours Required (15 credit hours)

#### Humanitarian Engineering Core Courses (6 credit hours):

- ECE 5050 (Humanitarian Engineering): 3 credit hours
- ECE 5550 (Computational Humanitarianism): 3 credit hours
- FABENG 5200 (Appropriate Technologies for Developing Countries): 3 credit hours
- CIVILEN 5610.01 (Sustainable Infrastructure for Developing Rural Communities): 3 credit hours
- FABENG 2200 (Introduction to Humanitarian Engineering): 1 credit hour
- FABENG 2201 (Introduction to Humanitarian Engineering Laboratory): 2 credit hours

#### Understanding of Human Welfare (3-6 credit hours):

These courses focus on social/cultural, development/poverty, sustainability/environment, economics/international business/public policy, and are meant to help humanitarian engineers understand their customers/clients and the context in which they live. A course list is provided below.

#### Humanitarian Engineering Project Work (3-6 credit hours):

Humanitarian engineering project: international (with trip abroad), local/domestic project, individual or in a group. Project work must be taken for academic credit. If all course content is firmly focused on humanitarian engineering, project course credit can be obtained in the following ways, for any College of Engineering unit:

- Individual Studies (max. 3 credit hours)
- Undergraduate Research
- Honors Thesis Credits
- Capstone Design (max. 3 credit hours Dept. or College)
- ENGR 2797.xx(S) (Service Learning Trip)
- ENGR 4692.xxS (Service Learning in Engineering)
- ENGR 5797.xx(S) (Service Learning Trip)
- BUSMHR 5530 (Topics in Social Entrepreneurship)

Verification of humanitarian engineering content must be given by the faculty for the course; see the HE Minor Student Information Form below.

#### General Guidelines

- Required for graduation: No
- Credit hours required: A minimum of 15 credit hours. At least 6 credit hours must be at the 3000 level or above.
- Filing Minor Form: The student must fill out the HE Minor Student Information Form (see below) with all required information, and get this approved by the HE Minor Advisor.
- Changing the minor: Once the minor has been filed, any changes must be approved by the Minor Advisor.
- Grades required: No grade below a C- will be permitted in courses comprising the minor
- A minimum 2.00 cumulative point-hour ratio is required for the minor
- Course work graded Pass/Non-pass cannot count for the minor
- No more than 3 credit hours of course work graded Satisfactory/Unsatisfactory may count toward the minor
- No more than 3 credit hours of Independent Study (x193) allowed
- No more than 3 credit hours of Capstone design allowed
- Transfer credit hours allowed: No more than 6 hours of transfer credit may be applied to the minor
- Overlap with GE courses: No more than 6 credit hours can overlap
- Overlap with the major and additional minor(s): The minor must be in a different subject from the major (as identified by the registrar's office listing of approved majors). Each minor completed must contain a minimum of 12 credit hours distinct from the major and/or additional minors.

**“Understanding Human Welfare” Approved Course – Humanitarian Engineering Minor**

Offering Unit	Course No.	Course Title	Crds	GE Category(s)	Pre-requisites	Description
AEDECON	2001	Principles of Food and Resource Economics	3			Microeconomic principles applied to allocation issues in the production, distribution, and consumption of food and natural resource use.
AEDECON	2500	Introduction to Environment, Economy, Development and Sustainability	3			Introduces students to principles from various disciplines related to social, economic and environmental sustainability. Students will evaluate key concepts and examine tradeoffs that are a part of sustainability action using case studies representing diverse perspectives.
AEDECON	2580	Feast or Famine: The Global Business of Food	3	soc sci human, nat, and econ resources and diversity global studies		Global and regional trends in food consumption and production are surveyed. Trade, technological change, and other responses to food scarcity are analyzed.
AEDECON	4532	Food Security and Globalization	3		Econ 2001	Examination of the causes and solutions for food insecurity. Global and local factors that affect access to food are also considered.
AEDECON	4535	International Economic Development	3		Econ 2001	Study of the growth and diversification of developing economies and the causes of poverty and inequality. Analyze the impacts of human capital formation, markets, and public policy on development.
ANTHROP	3340	Anthropology of Mental Health	3	Diversity		Provides an introduction to global mental health through the lens of medical anthropology. Students will gain a holistic understanding of present concerns in global mental health and the ways in which anthropology can contribute an understanding to the experience, diagnosis, treatment, and management of mental health issues by diverse populations.
BUS-MHR	2000	Introduction to International Business	1.5		2001.01	Basic coverage of world trade and investment problems, and introduction to multinational corporation strategies and the various types of environments in which they do business.
BUS-MHR	3000	Advanced topics in international business	3		BUS-MHR 2000	Advanced topics in international business including strategy, alliances, and exchange
BUS-MHR	4321	International Labor and Human Resource Management	3		BUSMHR 3100, or 3200, BusMgt 2320, and 2321	Examination of the human resource challenges that emerge in multi-national organizations; emphasis on issues to be considered when preparing oneself and others for international assignments.
BUS-MHR	5530	Value Creation in Social Entrepreneurship	3		BUS_MHR 2500 and ECON 2001.01	Developing a business plan in social entrepreneurship
CRPLAN	3500	The Socially Just City	3	Diversity, Social Science; Organi		Too many cities are split between the haves and the have-nots. Explore how to reduce poverty, increase access to public services, and create a high quality of life for all residents.

				zations & Politics		
EARTHSCI	3411	Water Security in the 21st Century	3	data analysis	Soph standing	Examine the major issues that are contributing to the decline in quantity and quality of global freshwater resources and the resultant environmental and societal impacts
ECON	4130	World Economic Development in Historical Perspective	3	historical study and diversity global studies	ECON 2001.01, 2001.02, 2001.03H and 2002.01, 2002.02, 2002.03 or equiv	A survey of economic development from the middleages through the 20th century, emphasizing Europe, Asia and Africa.
ECON	4560	Cooperation and Conflict in the Global Economy	3		ECON 2001.01(2,3,H)	The economic, social, and political bases for and responses to increasing global economic integration.
ESHESA	2577	Crossing Boundries: A Journey Towards Intercultural Leadership Identity Development	3	Diversity		Builds on intellectual and experiential engagement with issues of difference, diversity, social justice, and alliance building. GE diversity soc div in the US course.
GEOG	2100	Human Geography	3	soc sci individuals and groups		Introduces key concepts in human geography: interconnections between people and places; the role of space and place in political, cultural, economic, and social interactions; understanding uneven development.
GEOG	3701	Making of the Modern World	3	soc sci organizations & politics and diversity: global studies		The geographies of modernity and their formation: the world market, the global polity, diasporas and constructing difference, colonialism, the transformation of nature, Eurocentricity, post-modernity.
GEOG	3800	Geographical Perspectives on Environment and Society	3	soc sci human, nat, and ecoin resources		Geogrphical understadning of interactions between society and environment; how historical and contemporary views of the environment influence people's actions toward the environment and other people.
GEOG	3900	Global Climate Change: Causes and Consequences	3	nat sci physical		Examines the natural and human factors in our climate and environment and explores strategies for a sustainable environment in the future.
GEOG	5700	Geography of Development	3			Policitcal economy if development; development theory; the historical geography of capitalis development; and contemporary development practices and strategies.
INTSTDS	3850	Introduction to Globalization	3	soc indivs and groups and diversity global	sophomore standing	Analysis of globalization in its various aspects, economic, political, environmental and technological, as well as of its extent and desirability.

				studies course		
INTSTDS	2500	Intro. to Development Studies	3	soc sci human, nat, and econ resources and diversity global studies course		Examines theories of political economy and development, as well as the historical geography of global capitalism and contemporary issues in international economic development.
INTSTDS	4532	Food Security and Globalization	3		Econ 2001	Examination of the causes and solutions for food insecurity. Global and local factors that affect access to food are also considered.
POLITSCI	3220	Politics in Developing World	3	soc sci human, nat, and econ resources and diversity global studies course		A general introduction to the theoretical and substantive literature dealing with the historical development and contemporary characteristics of the new states of Asia and Africa,
POLITSCI	4282	The Politics of Income Inequality	3			Introduces fundamental politics of income inequality and redistribution, including social policy development, redistributive policy differences between countries, and popularity of differing welfare programs.
POLITSCI	4335	Int'l. Environmental Policy	3			Theories and debates over sustainable development, environment, and security, and effectiveness of international regimes with a focus on international fisheries management and global climate change.
PUBHLTH	2010	Introduction to Global Public Health	3			Public health concepts examining the philosophy, purpose, history, organization, functions, and results of public health practices domestically and internationally. Presents the pressing global public health concerns of the 21st century.
RURLSOC	3580	Social Groups in Developing Societies	3	soc sci indivs and groups and diversity global studies	3 crhrs in RurlSoc, Sociol, or a related social science	Contemporary struggles and experiences of rural social groups in the "Third World" in the context of development and globalization; emphasis on grassroots initiatives and resistance movements.
SOCIOL	3302	Technology and Global Society	3			Social aspects of technology, social change, and technological development; underdevelopment and the global economy
SOCIOL	3306	Sociology of Poverty	3	Soc Div in the US		A study of low-income peoples, especially concerning the effect of poverty on them, and their consequent social participation.

SOCIOL	3463	Social Stratification: Race, Class, and Gender	3	soc sci huan, nat, and econ resour ces		The study of social inequality with a focus on inequalities by class and status, race and ethnicity, and gender.
SOCIOL	3597.01	World Problems in Global Context	3	cross-disciplinary seminar course		Sociological analysis of contemporary world societies - non-industrialized, industrializing, and industrialized - with special attention to major social institutions and patterns of social change.

## Humanitarian Engineering Minor (HUMENG-MN)

### Student Information Form

The Ohio State University

College of Engineering

Revised January 2017

<b>Student Name:</b>	<b>Student Identification Number:</b>
<b>Student Major:</b>	<b>Student Email Address:</b>

### Humanitarian Engineering Core Courses (6 credit hours)

Department	Course #	Title	Credits	Grade

### Understanding of Human Welfare (3-6 credit hours)

Department	Course #	Title	Credits	Grade	On HW list?*

\* If a course is not on the approved Human Welfare list, you must petition to get it included in the minor. To do this, simply attach a syllabus for the course.

### Humanitarian Engineering Project Work (3-6 credit hours)

Department	Course #	Title	Credits	Grade	Faculty approval?*

\* For a course to count for project academic credit, the faculty offering the course must verify that the project focus is on humanitarian engineering. This can be done via a simple one-sentence email, a letter, or the course syllabus developed by the faculty. Whichever approach is used, the justification must be attached.

**Total number of credits counting toward Humanitarian Engineering Minor:** \_\_\_\_\_ (15 credits required)

Student signature: \_\_\_\_\_

Date: \_\_\_\_\_

Minor Advisor signature: \_\_\_\_\_

Date: \_\_\_\_\_

Major Advisor signature: \_\_\_\_\_

Date: \_\_\_\_\_

