

The Ohio State University
College of Engineering

Humanitarian Engineering Minor (HUMENG-MN)

College of Engineering
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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:

- Engineer's 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)
- Engineer's involvement in a company's technology transfer to the developing world, including best practices for safety, health impacts, and effectiveness
- Engineer's involvement in the design and operation of international manufacturing sites (e.g., "sweatshops") in ways that respect social justice (e.g., safety, environmental impact, living wage, worker's rights, and unions)
- Engineer's involvement in development and maintenance of socially responsible technology supply-chains

If you are interested in this minor, you should contact the Humanitarian Engineering Minor Coordinator (Rachel Tuttle; tuttle.146@osu.edu). 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 credits)
- Understanding of Human Welfare (3-6 credits)
- Humanitarian Engineering Project Work (3-6 credits)
- Total Credit Hours Required (15)

Humanitarian Engineering core course (6 credit hours; choose two of the courses below):

- ENGR 5050 (Humanitarian Engineering)
- ECE 5550 (Computational Humanitarianism)
- FABE 5200 (Appropriate Technologies for Developing Countries)
- CIVILEN 5610.01 (Sustainable Infrastructure for Developing Rural Communities)

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. Full course list provided in appendix 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 project 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 credits)
- Undergraduate Research
- Honors Thesis Credits
- Capstone Design (max. 3 credits, 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

Humanitarian Engineering Minor Guidelines

Required for graduation No

Credit hours required A minimum of 15 credit hrs. 1000 level courses shall not be counted toward the 15 credit hr minimum. At least 6 credits must be at the 3000 level or above.

Transfer and EM credit hours allowed A student is permitted to count up to 6 total hours of transfer credit and/or credit by examination

Overlap with the GE A student is permitted to overlap up to 6 credit hours between the GE and the minor..

Overlap with the major and additional minor(s)

- The minor must be in a different subject than the major
- The minor must contain a minimum of 12 hours distinct from the major and/or additional minor(s)

Grades required

- Minimum C- for a course to be listed on the minor
- Minimum 2.00 cumulative point-hour ratio required for the minor
- Course work graded Pass/Non-Pass cannot count on the minor
- No more than 3 credit hours of course graded Satisfactory/Unsatisfactory may count toward the minor

X193 credits No more than 3 credit hours.

Approval required The student must fill out the HE Minor Student Information Form with all required information, and get this approved by the HE Minor Advisor.

Filing the minor program form The minor program form must be filed at least by the time the graduation application is submitted to a college/school counselor.

Changing the minor Once the minor has been filed, any changes must be approved by the Minor Advisor.

College of Arts and Sciences
Curriculum and Assessment Services
154 Denney Hall, 164 Annie & John Glenn Ave.
<http://artsandsciences.osu.edu>

Approved CAA 4/16/14
BV 8/13/14
Rev approved CAA 2/7/18

“Understanding Human Welfare” Approved Course – Humanitarian Engineering Minor

Offering Unit	Course No.	Course Title	Cr ds	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.
ANTH	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; Organizations & Politics		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.
EARTHSCI	3411	Water Security in the 21st Century	3	data analy	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	historic 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 sic 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 organization s & polities 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 econ 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 studies course	sophomore standing	Analysis of globalization in its various aspects, economic, political, environmental and technological, as well as of its extent and desirability.
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 foo are alos considered.

POLITSCI	3220	Politics in Developing World	3	soc sci human, nat, and econresources and divesity global studies course		A general introudcitrn to the theoretical and sustantive literature dealing with the hisotrical development and contemporary characteristiics 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, redistributinal 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 regiems with a focus on interantional 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 resources		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.