

- 3) College of Undergraduate Studies
 Person communicated with: Dean Brent Iverson
 Date of communication: 2/10/16
 Response: Approved inclusion of courses from College of Undergraduate Studies

4. **Official Certificate Name:** Undergraduate Certificate: Humanitarian Engineering

5. **Proposed Implementation Date:**⁴ Fall 2016

6. **CIP Code** (administrative unit awarding the certificate):⁵ **14.19**

7. **Statement of Objective:**⁶

The Cockrell School of Engineering has seen a significant increase in recent years in the number of students wanting to participate in development projects and/or projects that help traditionally underserved populations. The success of Projects for Underserved Communities in which students enroll in a sequence of courses followed by an implementation on site is one example of the Cockrell School's efforts to meet this demand. The Humanitarian Engineering Certificate expands on this by providing a structured program with both technical and non-technical courses to prepare the students for designing and implementing projects or products for underserved communities. Although the certificate is primarily designed for engineering students, any student meeting the requirements would be eligible.

8. **Number of Students Expected to Receive the Certificate Each Semester:** 10/semester

9. **Number of Hours Required for Completion:**⁷ 18 hours

10. **List Faculty on the Certificate Program Faculty Committee.**⁸

Name of Faculty Member	College/Department	Title at UT Austin	Highest Degree and Awarding Institution
Janet Ellzey (chair)	Mechanical Engineering	Professor	PhD, UC-Berkeley
Richard Crawford	Mechanical Engineering	Professor	PhD
Carolyn Seepersad	Mechanical Engineering	Associate Professor	PhD, Ga Tech

11. **Academic Course Requirements:**⁹ Use this table to identify the courses that qualify for this certificate program.

Course Abbreviation and Number	Course Title	SCH ¹⁰
	(students choose from the following list)	3
UGS 302	Development of Moral Action	
UGS 302	Global Indigenous Cultures	
UGS 302	How to Change the World	
UGS 302	Humanitarian Aid Worker Story	
UGS 302	Language and Culture in Amazonia	
UGS 302	Marketing for Social Profit	
UGS 302	New World/Old World encounters	
UGS 302	Social Entrepreneurship	
UGS 302	Social Inequality/Educ Lat Amer	

UGS 302 UGS 302 UGS 303 UGS 303 UGS 303 UGS 303 UGS 303 UGS 303 UGS 303 SOC 307N SOC 307K SOC 308K SOC 308N SOC 319 GRG 305 GRG 319 E E 302	Usability and user-centered design Globalization and Social Media Diff Dialog: Visualizing Cuba Diff Dialog: Cultural Identities/differences Emerging markets Global Inequalities & Health Latin Amer Envir Hist/Sustainbl Middle East Today Our Global Backyard Sociology of Development Fertility and Reproduction Social Change and the Future Compar Relig/Politics/Culture Intro to Social Demography This Human World: Intro to Geography Geography of Latin America Introduction to Electrical Engineering (with approved project)	
	Engineering Physics and Lab: PHY 303L and PHY103N	4
ME 279M ME279M ME266K ME 266P or E E 464	humanitarian engineering project (students choose one of the following (a) (b) (c)) (a) Projects with Underserved Communities sequence) Project Development with Underserved Communities Project Design with Underserved Communities (b) Approved project in design sequence: Mechanical Engineering Design Project Mechanical Engineering Design Project Lab Senior Design Project (c) Approved independent study research project Approval for options (b) and (c) must be obtained in advance from the Committee for the Humanitarian Engineering Certificate.	4
AFR 372D/HIS 350L AFR 374E/HIS 346L ANS 361.29/ANT 324L/RS 373M ANS 372.26 ANT 324L.24/AFR 372G.3 ANT 324L.37/AFR 374E.2 ANT 324L.57/GRG 356 GOV 328L GOV 337M.8 GRG 344K GRG 356T/HIS 363K GRG 356T	(students choose from the following list) Medicine in African History Modern Latin America Biomedicine, Ethics, & Culture Topic 26: Global Markets and Local Cultures Archaeol of African Thought Pol of Race/Violence Brazil Archaeol of Climate Change Into to Latin American Gov & Pol International Politics Latin America Global Food, Farming, and Hunger GC Mapping Latin America Land use/Land cover Change Practicum	3

GRG 356T GRG356/LAS330 GRG 357 SOC 321G PHL 325C PHL 325M HIS 363K/LAS366 HIS 363K.2/LAS366.28 HIS 364G.6/AFR374C.6/WGS HIS 366N ADV 378 CMS340K	Intl Development in Africa Water Resources: Latin American/Caribbean Medical Geography Global Health Issues/Systems Environmental Ethics Medicine, Ethics, and Society Politics of Food in Latin America Argentina: Poplsm/Insurrctn Apartheid: South Africa History Global History of Disease Communicating sustainability Communication and Social Change	
ARE 323K ARE 346N ASE 374K BME 344 BME 342 BME 358 BME 339 BME 352 CE 341 CE 342 CE 369R CE 377K CE 374K CE 364 CHE 339 CHE 339T CHE 341 CHE 342 CHE 357 EE 374K EE 374L EE 362R EE 362S EE 339S ME 379M ME 379M ME 337F ME 354M ME 374S ME 379M ME 379M ME 379M ME 379M ME 379M ME 379M ME 379M	(students choose from the following list) Project Management and Economics Building Environmental Systems Space Systems Engr Design Biomechanics Biomechanics of Human Movement Medical Decision Making Biochemical Engineering Advanced Engineering Biomaterials Introduction to Environmental Protection* Water and Waste Water Treatment* Indoor Air Quality Designing Sustainable Nanomaterials* Hydrology* Design of Wastewater and Water Treatment* Introduction to Biochemical Engineering Cell and Tissue Engineering Design for the Environment Chemical Engineering Economics and Business Analysis Technology and the Impact on the Environment Biomedical Electronic Instrument Design Applications of Biomedical Engineering Renewable Energy and Power Systems Development of a Solar-Powered Vehicle Solar Energy Conversion Devices Energy Technology and Policy Introduction to Renewable Energy Engineering and Sustainability Nuclear Environmental Protection Biomechanics of Human Movement Solar Energy Systems Design Clinical Cardiology Design/Control of Robots for Rehabilitation (cancelled) Medical Device Design and Manufacture Nanotechnology for Sustainable Energy Development of a Solar-Powered Vehicle Additional courses may be substituted for those listed upon approval by the adviser for Humanitarian Engineering. *Approval of instructor required for non-CE majors	3
ME179M	Humanitarian Engineering Seminar	1

12. Other Certificate Requirements:

13. Give a Detailed Rationale for Change(s):

The undergraduate certificate in Humanitarian Engineering provides students with the opportunity to develop expertise in designing and/or implementing projects or products for traditionally underserved populations, e.g. the physically or mentally challenged, low-income or rural communities. This certificate is being proposed in response to student demand for opportunities in this area. The participants will develop not only technical knowledge but also awareness of social, political, and/or economic circumstances that may be important to the development of engineering solutions for underserved populations.

The Department of Mechanical Engineering (ME) is the organizer and manager of this certificate. ME is interested in this area because it aligns with research interests of their faculty, fits in with the degree plan which allows students freedom to choose their upper division electives, and because other universities offering programs in this area have experienced a significant increase in the enrollment of women.

14. College/School Approval Process:

Department Approver: Jayathi Murthy, Department of Mechanical Engineering
Title: Professor and Chair
Date: October 15, 2015

College Approver: Jennifer Maynard
Title: Chair, Degrees and Courses Committee
Date: March 29, 2016

Dean Approver: Sharon L. Wood
Title: Dean
Date: April 6, 2016

PROPOSED NEW CATALOG TEXT

To be inserted in section Catalogs > Undergraduate > Cockrell School of Engineering > Degrees and Programs > Minor and Certificate Programs

Humanitarian Engineering Certificate

The certificate consists of eighteen hours. Students must receive a grade of at least a C- in each course applied toward the certificate and have a cumulative grade point average of at least 3.0 in the courses presented to fulfill the certificate. Students must contact the Committee for the Humanitarian Engineering Certificate in the Department of Mechanical Engineering to apply for the certificate in the semester in which they are completing the requirements and graduating.

The course requirements for the certificate are:

1. Three credit hours lower division UGS or Social Science Course

UGS302	Development of Moral Action
UGS302	Global Indigenous Cultures
UGS302	How to Change the World
U1GS302	Humanitarian Aid Worker Story
UGS302	Language and Culture in Amazonia
UGS302	Marketing for Social Profit
UGS302	New World/Old World encounters
UGS302	Social Entrepreneurship
UGS302	Social Inequality/Educ Lat Amer
UGS302	Usability and user-centered design
UGS302	Diff Dialog: Visualizing Cuba
UGS302	Diff Dialog: Cultural Identities/differences
UGS302	Emerging markets
UGS302	Global Inequalities & Health
UGS302	Lat Amer Envir Hist/Sustainbl
UGS302	Middle East Today
UGS302	Our Global Backyard
SOC307N	Sociology of Development
ANT302	Cultural Anthropology
CTI302	Classics of Social and Political Thought
GRG305	This Human World: Intro to Geography

2. Four credit hours Engineering Physics and Lab: PHY 303L and PHY103N

3. Four credit hours humanitarian engineering project (choose one of the following)
(a) Projects with Underserved Communities sequence:

- ME279M Project Development with Underserved Communities
- ME279M Project Design with Underserved Communities

- (b) Approved project in design course such as ME466K
- (c) Approved independent study research project

Approval for options (b) and (c) must be obtained in advance from the Committee for the Humanitarian Engineering Certificate.

4. One credit hour seminar course: ME179M Humanitarian Engineering Seminar

5. Three credit hours from the following list

- GRG 344K Global Food, Farming, and Hunger
- GRG356 Water Resources: Lat American/Caribbean
- SOC369K Populations and Society
- GRG 336 Contemp Cultural Geography
- GRG 350K Geographies of Globalization
- GRG 357 Medical Geography
- SOC 321G Global Health Issues/Systems
- CTI 323 Might and Right Among Nations
- PHL 325C Environmental Ethics
- PHL 325M Medicine, Ethics, and Society
- ANS 372 Topic 26: Global Markets and Local Cultures
- HIS 366N Global History of Disease
- ADV 378 Communicating sustainability
- CMS340K Communication and Social Change

6. Three credit hours from the following list

- ARE 323K, Project Management and Economics
- ARE 346N Building Environmental Systems
- BME 344 Biomechanics
- BME 342 Biomechanics of Human Movement
- BME 358 Medical Decision Making
- BME 339 Biochemical Engineering
- BME 352 Advanced Engineering Biomaterials
- CE 341 Introduction to Environmental Protection
- CE 342 Water and Waste Water Treatment
- CE 369R Indoor Air Quality
- CE 377K Designing Sustainable Nanomaterials
- CE 374K Hydrology
- CE 341 Introduction to Environmental
- CE 342 Water and Waste Water Treatment

CE 364	Design of Wastewater and Water Treatment
CHE 339	Introduction to Biochemical Engineering
CHE 339T	Cell and Tissue Engineering
CHE 341	Design for the Environment
CHE 342	Chemical Engineering Economics and Business Analysis
CHE 357	Technology and the Impact on the Environment
EE 374K	Biomedical Electronic Instrument Design
EE 374L	Applications of Biomedical Engineering
EE 362R	Renewable Energy and Power Systems
EE 362S	Development of a Solar-Powered Vehicle
EE 339S	Solar Energy Conversion Devices
ME 379M	Energy Technology and Policy
ME 379M	Introduction to Renewable Energy Engineering and Sustainability
ME 337F	Nuclear Environmental Protection
ME 354M	Biomechanics of Human Movement
ME 374S	Solar Energy Systems Design
ME 379M	Clinical Cardiology
ME 379M	Design/Control of Robots for Rehabilitation (cancelled)
ME 379M	Medical Device Design and Manufacture
ME 379M	Nanotechnology for Sustainable Energy
ME 379M	Development of a Solar-Powered Vehicle
PGE 305	Energy and the Environment

Additional courses may be substituted for those listed upon approval by the adviser for Humanitarian Engineering.

Please include a draft of the catalog copy immediately following the above form. If this is an update of an existing copy, the draft should be based on the text of the current catalog available at: http://www.utexas.edu/faculty/council/2014-2015/uc_change/UG_catalog_02.16.15.docx. **Strike through and replace (with underlines) only the specific language to be changed. Do NOT use “track changes!”** Submit form electronically to the Office of the General Faculty and Faculty Council at fc@austin.utexas.edu. For questions, please also email or call 471-5934.

¹ **Minimum Criteria for Certificate Recognition on the Transcript**

- a) The transcript-recognized undergraduate academic certificate program must be completed in conjunction with or within one year of completion of an undergraduate degree at The University of Texas at Austin; students pursuing an integrated undergraduate/graduate program must complete the requirements for the certificate within one year after completing the undergraduate requirements of their program. A maximum of nine credit hours in the certificate program may be taken after completion of the undergraduate degree.
- b) Transcript-recognized undergraduate academic certificate programs must require a minimum of eighteen hours of certificate course work, but not more than twenty-four hours.
- c) At least half of the required coursework in the certificate program must be completed in residence at The University of Texas at Austin.
- d) A student may **not** earn a certificate in the same field of study as his or her major, and at least one course required in the certificate program must be outside the requirements of the major. However, courses in the certificate program outside the major may fulfill other degree requirements such as general education requirements or required elective hours.
- e) Students apply for transcript recognized undergraduate academic certificates at the time they complete their undergraduate degree or the certificate program, whichever comes later. Transcript recognition is awarded at that time.

² See: Certification Form for New Certificate Programs at Universities and Health-Related Institutions (“New Certificate Request Form”) at <http://www.thecb.state.tx.us/index.cfm?objectid=5D0C5FF2-AAB7-2586-5F742FC569C700E0&flushcache=1&showdraft=1>.

³ Exclusive: of *exclusive* application and of primary interest only to a single college or school (“no protest” period is *seven calendar days*); general: of *general* interest to more than one college or school (but not for submission to the General Faculty) (“no protest” period is *fourteen calendar days*); *major* legislation must be submitted to the General Faculty for adoption (“no protest” period is *fourteen calendar days*).

⁴ Certificates will not appear on the University transcripts until next catalog.

⁵ Use the federal CIP code selector site to pick a code, <http://nces.ed.gov/ipeds/cipcode>. After all other areas of this form are completed, forward a copy to the Office of Institutional Reporting, Research, and Information Systems (IRRIS) IRRIS_data_request@utlists.utexas.edu with a request to verify the CIP code (“CIP CODE” in the subject line). Include your contact information, so an IRRIS member may contact you with any questions.

⁶ Include heading in *Undergraduate Catalog* where changes will be made.

⁷ See footnote 1b above: eighteen to twenty-four hours are required.

⁸ For inclusion on transcripts, the faculty committee must have a minimum of five members and at least 2/3 of the committee must be tenured or tenure-track.

Note with an asterisk those faculty members who are tenured or tenure-track. Please also note the program chair who will be responsible for authorizing the students’ certificates. Specify changes to the committee membership by noting those no longer on the committee and those added to the committee. (*Add and delete rows as needed.*)

⁹ Note with an asterisk (*) courses that would be added if the certificate program is approved. Specify changes to the qualifying courses by noting those no longer qualifying and those now qualifying. (*Add and delete rows as needed.*) If the course numbers and titles change on a regular basis, please indicate the types of courses and number of hours for required for each. Note with a hashtag (#) courses that require a prerequisite and provide the prerequisite course numbers.

¹⁰ Semester Credit Hours.