

1. EM485 Humanitarian Engineering
2. 3 Credit Hours / 3 Contact Hours
3. Course Director: Associate Prof. Samar Malek
4. Text book: *none*
5. Specific course information
 - a. From 1970 to 2000, 68 percent of all U.S. naval operations were categorized as Humanitarian Assistance and Disaster Relief (HA/DR) efforts. In 2007, the Navy officially added HA/DR to their maritime strategy. The course begins with explaining the United Nations Office for Coordination of Humanitarian Affairs' role in coordinating the global response in a disaster between NGOs, and international governments and militaries. The focus of this course will be on the technical aspects of HA/DR response: providing Water & Sanitation, and Shelter; which are two sectors of the 11 "Global Clusters" used by the UN to organize relief efforts. The technical efficacy of those solutions will be assessed using simple analytical, and physical and/or computer modeling. Students will complete a final project designing and prototyping a low-tech solution for water & sanitation or shelter needs.
 - b. This course is an elective for the Mechanical and Nuclear Engineering program.
6. Educational objectives for the course
 - a. Explain the role and coordination of the UN, foreign governments and militaries and non-governmental organizations in humanitarian assistance and disaster relief missions.
 - b. Identify and characterize engineering strategies and technology for development.
 - c. Understand the relationship between ethical engagement and sustainable development in a global setting.
 - d. Explain the influence that a given culture has had on the engineering solutions that are used in that culture (Africa, Middle East etc.).
 - e. Understand the design and analysis of structures constructed with 'unconventional' materials (adobe, timber, bamboo, masonry - those used in constructing structures in developing countries).
 - f. Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
 - g. Conduct a life-cycle assessment.
 - h. Research, develop, write and present an effective case study on humanitarian engineering.
 - i. Design and implement an engineering solution that addresses the needs, from both a practical and cultural perspective, of a disadvantaged community.
 - j. Assess existing engineering solutions using simple analytical, and physical and/or computer modeling.
7. Specific program outcomes address by this course

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Reinforced	x	x	x	x			x
Mastered							

8. Brief list of topics to be covered
- a. Humanitarian Engineering, Poverty and Development
 - b. Humanitarian response organizations and governments
 - c. Shelter design and engineering
 - d. Water, Sanitation & Hygiene design and engineering
 - e. Life-cycle Assessment
 - f. STAAD - structural analysis software