

Course Title: Advancing Global Health Through Engineering 11899
Course type: Elective
Language: English
Weekly hours: 2
Academic credits: 2
Lecturer: Dr Seema Biswas, e-mail: SeemaBiswas@msn.com

Prerequisites:

Students choosing this elective are expected to have a good grasp of their chosen specialty of engineering and should have some idea of the role that engineering has in the provision of health care, and in maintaining healthy environments in which to live.

Learning objectives:

This course will provide students with a broad overview of how engineering affects global health in populations across the world. Students will learn the importance of engineering in

- the history of public health
- the delivery of modern health care
- the pressing need to develop engineering solutions to current global health problems
- innovative solutions to community health problems

Learning domains:

This course is open to students of electrical, mechanical, software, biomedical and industrial engineering and is designed to provide all of them with platforms to develop skills in interdisciplinary teamwork, lateral thinking, problem-solving, and communication with each other, health personnel, and with the community.

In addition, students are encouraged to take a broad world view in terms of the benefits to communities of functioning and well-maintained engineering projects (the bigger picture for sustainable projects) while at the same time honing memory skills and the attention to detail necessary in all engineering tasks.

Teaching:

Teaching will be principally in the classroom initially, moving to the laboratory and the community as students advance in their work with the community

- Interactive lectures
- Problem-solving tutorials engineering solutions to health and environmental needs within the local community

Course program:

Pre-course lecture to all students who will then decide whether they want to sign on to the program: Advancing Global Health Through Engineering

Lecture 1: Engineering in the community: health and environmental effects

Problem-solving 1: identify community engineering needs – present three needs in class and choose one need to address for course project. Explain choice in terms of need, feasibility and implementation of solution

Lecture 2: Historical innovations: landmarks in engineering for health

Problem-solving 2: reverse engineering historical innovations

Lecture 3: Engineering solutions to global health problems

Problem-solving 3: planning an engineering solution – present the solution and answer questions from class

Lecture 4: Pitfalls in sustaining global health solutions

Problem-solving 4: community discussion – present the solution to community and answer questions

Lecture 5: Working together to create sustainable engineering solutions

Problem-solving 5: simplifying problems and solutions; working closely with the community; building-in sustainability to an engineering solution

Lecture 6: Community and public health as a function of environmental engineering

Problem-solving 6: community discussion – working with the engineered solution. Feedback and adjustments

Lecture 7: Where there are too few engineers: a global view

Problem-solving 7: working with the community – what does the community need to know about basic engineering solutions, safety, maintenance, repair and effects on the environment

Course assessment:

Attendance and participation in lectures (all interactive) 10%

Presentations in tutorials 20%

Practical project work 40%

Project write up 30%

Course reading (reference only):

Books:

1. Biomedical Engineering: Bridging Medicine and Technology (Cambridge Texts in Biomedical Engineering) 2nd Edition. W. Mark Saltzman

ISBN-13: 978-1107037199

ISBN-10: 1107037190

2. The Medical Device R&D Handbook. 2nd Edition. Theodore R. Kucklick

ISBN-13: 978-1439811894

ISBN-10: 143981189X

3. MSF: Public Health Engineering in Precarious Situations

http://refbooks.msf.org/msf_docs/en/public_health/public_health_en.pdf

Websites:

1. Engineers Without Borders

<https://www.ewb-uk.org/> and <http://www.ewb.org.il/>

2. Environmental Engineering

<http://www.tnu.edu.vn/sites/quynhntt/references/8064517-Environmental-Engineering.pdf>



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