JOHNS HOPKINS
WHITING SCHOOL
of ENGINEERING

Syllabus
Engineering and Health Care Needs Assessments in Uganda
Intersession 2020
EN.580.306
(3 credits, EQ)

Description

This three-week intersession course exposes JHU students to an extended clinical immersion experience in a low resource healthcare setting. JHU students will work in teams with Ugandan engineering students to develop a list of health care needs in Uganda. Students will have the opportunity to observe medical procedures, diagnostic testing, patient management and treatment planning. These unique immersion experiences will include the opportunity to visit Radiology, Neonatal, Pathology, Oncology, Plastic Surgery, and Virology clinics and departments. Students will visit CAMTech (Consortium for Affordable Medical Technology) to meet with students and fellows who are working on relevant, pressing health care issues to develop affordable solutions. They will visit a rehabilitation center and a rural clinic, interacting with the professionals who help patients every day. Interested students may continue to work on a follow-up design project which solves a significant problem during the spring semester.

Prerequisites

Engineering student

Instructors

Eileen Haase, PhD, ehaase1@jhu.edu
Office: Clark 104

Samson Jarso, PhD, sjarso@andromedainnovation.org

Course Meetings

January 3, 2020 through January 25, 2020

Textbook

There is no textbook

Online Resources

Please log in to Blackboard for all materials related to this course including pre-departure readings and quizzes, safety training

Course Objectives

At the end of the semester, students will be able to:

(1) Identify and describe engineering needs in Uganda
(2) Identify and describe health care needs in Uganda
(3) Work within a team to create a collaborative and inclusive environment
(4) Provide the team leadership required to organize and manage project deadlines and goals
(5) Analyze and specify solution requirements to top ranked needs
(6) Storyboard potential solutions to top ranked needs

(7) Analyze and compare design alternatives from multiple teams
(8) Incorporate a global perspective to achieve a solution that will be accepted locally and globally
(9) Communicate effectively to a range of audiences
(10) Optional second semester: build, test, and evaluate a prototype

Course Topics

- Background information on Uganda: population, government, transportation, water, air quality
- Engineering design process (needs assessment, interviewing, storyboarding, solution analysis, comparing alternatives)
- Clinical topics: Viruses, AIDS, Cancer, Pathology, Radiology, Plastic Surgery, Neonatal
- Site Visits: Clinics at Makerere and Mbarara Hospitals, rural clinic, orphanage, rehabilitation center, CAMTech

Course Expectations & Grading

This course work is divided into three components: Pre-departure preparation, needs assessments and team presentations while in Uganda, Post-departure problem analysis and potential solutions.

- Pre-departure preparation (20%)
    - Online readings and quizzes with background material on each of the topics
        - Quizzes may be taken multiple times.
        - Quiz scores: 0 if not attempted, 1 if attempted but failed, 2 pts if attempted and grade>80%
    - Required pre-departure anonymous survey
    - Optional: free Coursera course by JHU. The material on Travel Health and Prevention (Week 2) and Staying Safe (Week 3) have particularly useful information:
        - https://www.coursera.org/learn/international-travel
- Needs Assessments (60%)
    - Students will submit six observation papers, two per week, worth 20 points each
        - Each paper should list five observations (0 points if missing, 1 pt if poor/inadequate description, 2 pts if adequate) = 10 points total
        - Each paper should have five follow-up questions (0 if missing, 1 if unclear/trivial, 2 pts if adequate) = 10 pts total
    - Individual observation papers will be discussed in teams, combined as appropriate, and prioritized in group discussions.
    - Students are also expected to participate in group discussions and serve as the team leader during the trip.
- Final summary (20%)
    - After the course is completed, and preferably on the plane going home, students are required to summarize all of the observed problems from three weeks and rank their top four (as a team).
    - The team should answer the following questions for their top four problems:
        - Is the problem worth solving?
        - Who is the target costumer?
        - What is the proposed solution?
    - There is a required End-of-Class Anonymous Survey

Key Dates

All pre-departure quizzes must be completed prior to the departure date of January 3, 2020.
The observation papers will be due twice per week. Specific dates will be announced during the trip based on opportunities for free time and discussion.
The final team paper summarizing the top four problems and potential solutions is due within two weeks of the return (February 10, 2020)

Assignments & Readings
These are posted on the Blackboard site for this course.

Ethics
The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition.

Students are encouraged to form study groups, but all submitted work must be entirely your own. Students may not use homework assignments from other students, including from previous years. Please see the "*Course Information*" file for more details. Report any violations you witness to the instructor.

You can find more information about university misconduct policies on the web at these sites:

- For undergraduates: http://e-catalog.jhu.edu/undergrad-students/student-life-policies/
- For graduate students: http://e-catalog.jhu.edu/grad-students/graduate-specific-policies/

Students with Disabilities
Any student with a disability who may need accommodations in this class must obtain an accommodation letter from Student Disability Services, 385 Garland, (410) 516-4720, studentdisabilityservices@jhu.edu .

ABET Outcomes

- Ability to apply mathematics, science and engineering principles (a).
- Ability to function on multidisciplinary teams (d).
- Ability to identify, formulate, and solve engineering problems (e).
- Understanding of professional and ethical responsibility (f).
- The broad education necessary to understand the impact of engineering solutions in a global and societal context (h).
- Recognition of the need for and an ability to engage in life-long learning (i).
- Knowledge of contemporary issues (j).
- Ability to use the techniques, skills and modern engineering tools necessary for engineering practice (k).