

Engr 245, Sustainable Technology and the Developing World
Spring 2015
Syllabus and Schedule

INSTRUCTOR: Dr. Laurie Williams, Department of Physics and Engineering

Office: 632 BH; Office Hours: 11:15 – 12:10 MWF, 2:30 – 3:25 MF, 1:25 – 2:20 T

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TIME AND ROOM: 5:35-6:30 W Berndt Hall 234

DESCRIPTION: This course investigates the technical, social, economic, and environmental forces that impact the ability to effectively provide sustainable, appropriate technologies in the developing world. It is a required part of the Engineers Without Borders program.

LEARNING GOALS: Students will understand the principles of sustainable development and some of the practical engineering applications within the context of village scale projects in the developing world. Students should:

1. Be able to clearly define sustainability and identify the core principles (ABET outcome h, i, j).
2. Be able to apply the ideas of sustainability to generate or explain examples (ABET outcome h, i, j).
3. Understand the developing world based on factors like geography, demographics, historical development issues, economics, standard of living (needs), and culture (ABET outcome h, i, j).
4. Have a basic understanding of engineering (design) process (ABET outcome c).
5. Understand role of technology in engineering projects (ABET outcome h, j).
6. Have a basic understanding of the engineering technologies commonly used on VAP-EWB projects (ABET outcome h, j).
7. Describe the notion of capacity building and explain its' role in sustainability of village scale projects (ABET outcome h, i, j).

ABET OUTCOMES:

- (c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- (h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- (i) A recognition of the need for, and an ability to engage in life-long learning.
- (j) A knowledge of contemporary issues.

GRADING: Based on assignments, classroom participation, attendance, completion of readings and participation in group work.

SPECIAL NEEDS ACCOMMODATION: In accordance with the policy of Fort Lewis College any student in need of special accommodations based on a documented disability will be given appropriate consideration. Please speak with the instructor and the Disability Services Coordinator, Phone: (970) 247-7459.

DEPARTMENT POLICY: see website at:

http://www.fortlewis.edu/engineering/downloads/Syllabus_Addendum_Policies.pdf

This syllabus and other course materials are posted on the Engr 245 CANVAS course management site.

Schedule

| Per | Date | Topic | Assignments |
|------------------------|------|---|---------------------------|
| 1 | 1/14 | The Developing World Geography, demographics, human needs, the environment The UN Human Development Index | Demographic data |
| 2 | 1/21 | Historical factors that led to a division of the world Guns, Germs, and Steel, episode 1 (Assignment – watch 2, 3 and make Canvas forum entry) | GGs questions |
| 3 | 1/28 | International Development History of international development and theories; http://www.bookrags.com/wiki/International_development , also see Wikipedia Human Development Report – UNDP, http://hdr.undp.org/en/humandev/ Universal declaration of human rights and the Millennium Development Goals | |
| 4 | 2/4 | Sustainability Two concepts, three factors, five principles Case studies, the good and bad | |
| 5 | 2/11 | Working with People - Culture Understanding cultures and cultural assumptions http://www2.pacific.edu/sis/culture/pub/Module_I_-_What_to_know_befo.htm Hofstede's Dimensions of Culture | Complete culture exercise |
| 6 | 2/18 | Introduction to water systems | Group project |
| 7 | 2/25 | Water system design exercise | |
| 8 | 3/4 | Water system design exercise continued | |
| 9 | 3/11 | Sanitation 1 | |
| 10 | 3/18 | Sanitation 2 | |
| Spring Break 3/23-3/27 | | | |
| 11 | 4/1 | Data collection and management | Mapping exercise |
| 12 | 4/8 | Surveying and mapping lab (distance measure exercise to estimate, pace and tape a course around BH, hand level, intro to GPS, how to create a schematic map) | |
| 13 | 4/15 | Engineering design, appropriate technology and sustainability | |
| 14 | 4/22 | Concrete | |
| | | Final exam, Wed, 4/29/15, 5:35-6:30 pm | Summary exercise |

Dr May has prepared a relatively extensive list of references that you can use during this course. It can be found at, O:\Williams_1\ENGR 245\Readings.