

Engineering for Development:
A Practical Application of Engineering Principles in Developing Communities
May 14, 2013

Overview and General Information

This space is reserved for class times, instructor name, office, contact info and office hours

Required Readings (to be purchased):

Collier, P. (2009). *The bottom billion, why the poorest countries are failing and what can be done about it*. Oxford: New York.

Other reading assignments will be posted on Moodle

Course Description:

This course is formatted as a 3-week, writing intensive interim seminar. The core objective of “Engineering Development” is to have students understand the contexts underlying the application of engineering principles in developing countries. This course will address the importance of engineering for development and illustrate examples of different initiatives across time and space and their varying degrees of success. Development projects are becoming more widely criticized for their failures on a global platform. The engineers of tomorrow need to be well equipped and prepared to handle the challenges presented by executing a project in a developing community.

Assignment Values:

- 45%- 3 Response Essays
- 30%- Class Participation
- 20%- Quizzes
- 5%- Discussion Leading

Learning Outcomes:

1. Define the developing world
2. Describe the importance for engineering for development
3. Identify key issues that engineers face in projects in developing countries
4. Assess case studies that have both failed and succeeded in developing countries
5. Relate non-engineering contexts (historical, geographical, economical, cultural, etc.) to engineering solutions in the developing world

Weekly Course Syllabus

Week 1:

Goals- to define the developing world; to describe the importance for engineering for development

Monday: Discuss Paul Collier's *The bottom billion, why the poorest countries are failing and what can be done about it.*

Tuesday: Field trip to the United Nations in NYC for the Sustainable Development lecture

Wednesday/ Thursday: Discuss *Model of Integrating Humanitarian Development into Engineering Education*

Friday: Discuss *Sustainable Development in Engineering Education: A Pedagogical Approach*

DUE FRIDAY- Response Essay #1- Elaborate upon the ideas presented at the Sustainable Development lecture at the United Nations and evaluate the role of the UN in engineering development today

Week 2:

Goals- to identify key issues that engineers face in projects in developing countries; to assess case studies that have both failed and succeeded in developing countries

Monday/ Tuesday: Interpret TED talk *Engineering a better life for all*

Tuesday: Discuss *Designs on development: engineering, globalization, and social justice*

Wednesday/ Thursday: Discuss *Education for technology readiness: Prospects for developing countries*

Thursday: Evaluate case studies from *Engineers Without Borders: Annual Report*

Friday: Simulation of Engineers Without Borders project
(Design a solution to a proposed engineering problem in a developing community from the perspective of Engineers Without Borders, and present results to the class)

DUE FRIDAY- Response Essay #2- Select 2 case studies from this week's course material and examine what could have been done differently to ensure a higher degree of success in each. Compare and contrast each scenario regarding the perceived problem, the approach, and the eventual solution that was undertaken

Week 3:

Goals- to relate non-engineering contexts (historical, geographical, economical, cultural, etc.) to engineering solutions in the developing world

Monday/ Discuss *Western Engineers In Developing Countries*

Tuesday: Discuss *Learning Outcomes for Environmental and Sustainable Development Component in the Field of Civil Engineering*

Wednesday/ Discuss *Engineering In Context: Engineering In Developing Countries*

Thursday: Evaluate portions of *The World Bank Economic Review (year 2000)*

Friday: Field trip to Princeton to speak with Robert Socolow about Sustainable Development

DUE FRIDAY- Response Essay #3- Why is it important to include others' perspectives when approaching solutions to problems in developing communities? Use examples from the text to strengthen your argument

Reading Assignments

Week 1:

Amadei, B., Sandekian, R. (2010, April). Model of Integrating Humanitarian Development into Engineering Education. *Journal of Professional Issues in Engineering* 136(2), 84-92.

Collier, P. (2009). *The bottom billion, why the poorest countries are failing and what can be done about it*. Oxford: New York.

Ahrens, A., & Zascerinska, J. (2012). Sustainable Development in Engineering Education: A Pedagogical Approach.

Week 2:

Laine, C. (2009, October). [Video file]. Retrieved from

http://www.ted.com/talks/cat_laine_engineering_a_better_life_for_all.html

Engineers Without Borders USA. (2011). *Annual report*. Retrieved from <http://www.ewb-usa.org/about-ewb-usa/annual-reports>

Lee, J. (2001). Education for technology readiness: Prospects for developing countries. *Journal of Human Development*, 2, 115-151.

Nieusma, D., & Riley, D. (2010). Designs on development: engineering, globalization, and social justice. *Engineering Studies*, 2(1), 29-59.

Week 3:

Md Zain, S., Hamidon Wan Badaruzzaman, W., Atiq O. K. Rahmat, R., Jaafar, O., Ezlin Ahmad Basri, N., & Basri, H. (2012). Learning Outcomes for Environmental and Sustainable Development Component in the Field of Civil Engineering. *Asian Social Science*, 8(16), 153-162.

Navaretti, G. B., Soloaga, I., and Takacs, W. *The World Bank Economic Review*, Vol. 14, No. 1 (Jan., 2000), pp. 91-109.

Parsons, LB. (1996, October) Engineering In Context: Engineering In Developing Countries. *Journal of Professional Issues in Engineering Education and Practice*. 122(4), 170-176.

Wesley, L. (1987). Western Engineers In Developing Countries. *Journal of Professional Issues in Engineering*. 113(3), 249-256.

Other Required Readings (not to be purchased):

Pérez-Foguet, A., & Oliete-Josa, S. (2000). Development education and engineering: A framework for incorporating reality of developing countries into engineering studies. *International Journal of Sustainability in Higher Education*, 6, 278-303.

Zolli, A. (2012, November 2). Learning to Bounce Back. *The New York Times*. Retrieved from <http://www.nytimes.com/2012/11/03/opinion/forget-sustainability-its-about-resilience.html?pagewanted=all>