

Spring 4-1-2008

# Engineering and Sustainable Community Development

Juan C. Lucena  
*Colorado School of Mines*

David Frossard  
*Colorado School of Mines*

Tina Gianquitto  
*Colorado School of Mines*

Jon Leydens  
*Colorado School of Mines*

Carl Mitcham  
*Colorado School of Mines*

*See next page for additional authors*

Follow this and additional works at: <https://scholarworks.umass.edu/esence>

 Part of the [Engineering Commons](#)

---

## Recommended Citation

Lucena, Juan C.; Frossard, David; Gianquitto, Tina; Leydens, Jon; Mitcham, Carl; Schneider, Jen; and Straker, Jay, "Engineering and Sustainable Community Development" (2008). *Ethics in Science and Engineering National Clearinghouse*. 355.  
Retrieved from <https://scholarworks.umass.edu/esence/355>

This Syllabus is brought to you for free and open access by the Science, Technology and Society Initiative at ScholarWorks@UMass Amherst. It has been accepted for inclusion in Ethics in Science and Engineering National Clearinghouse by an authorized administrator of ScholarWorks@UMass Amherst. For more information, please contact [scholarworks@library.umass.edu](mailto:scholarworks@library.umass.edu).

---

**Authors**

Juan C. Lucena, David Frossard, Tina Gianquitto, Jon Leydens, Carl Mitcham, Jen Schneider, and Jay Straker

2-07-08

## Course Syllabus, Spring 2008

Course No: LAIS 498/598    Title: Engineering and Sustainable Community Development

Class Meetings: Tues and Thur, 9:30 to 10:45 am

Course Website: <http://blackboard.mines.edu/>

Instructors:

**Juan C. Lucena** ([jlucena@mines.edu](mailto:jlucena@mines.edu), 303-273-3564) (Course coordinator)

David Frossard ([dfrossar@mines.edu](mailto:dfrossar@mines.edu))

Tina Gianquitto ([tinagian@mines.edu](mailto:tinagian@mines.edu))

Jon Leydens ([jleydens@mines.edu](mailto:jleydens@mines.edu))

Carl Mitcham ([cmitcham@mines.edu](mailto:cmitcham@mines.edu))

Jen Schneider ([jjschnei@mines.edu](mailto:jjschnei@mines.edu))

Jay Straker ([jstraker@mines.edu](mailto:jstraker@mines.edu))

Office Hours for Lucena Lucena: Tues & Thurs from 11am to 12m and 1:30 pm – 3:30pm

Required Course Readings:

- Hershey, John. 1989. *A Single Pebble*. Vintage Publishers
- All other required readings available on Blackboard (BB) course website (password protected)

Course Description: This course is an introduction to the relationship between engineering and sustainable community development (SCD) from historical, political, ethical, cultural, and practical perspectives. Students will study and analyze different dimensions of sustainability and the role that engineering might play in them. Also students will critically explore strengths and limitations of dominant methods in engineering problem solving and design for working in SCD. Through case-studies, students will learn to analyze and evaluate projects in SCD and develop criteria for their evaluation.

Learning Objectives: By completion of this course, students will be able to

1. identify events, institutions, and actors in the history and politics of development as related to SCD and engineering
2. identify, relate, and describe the role that engineering might play in the different aspects of sustainability: economic, environmental, ethical, and socio-cultural
3. evaluate the strength and limitations of Engineering Problem Solving (EPS) and at least one engineering design methodology with respect to working with communities
4. analyze and evaluate project-based case studies in SCD and select criteria for such evaluations.
5. provide and critically assess definitions of SCD and their relationships with engineering

2-07-08

## **Grading:**

### **Class attendance, participation, and respect for the learning process (200 pts):**

This area of grading includes attendance, in-class engagement, and relevant participation, e.g., contributing meaningfully to discussion as well as when working in groups or pairs. It also includes turning in work on time, and keeping up with the reading and papers. Attendance and engaged participation will be seriously considered in our final assessment

- **Attendance:** 10 points will be deducted for each unexcused absence. Excused absences are ONLY the following: official sport varsity team travel, a medical condition excused in writing by doctor, a personal matter excused in writing by the Dean of Students office, jury duty, and military duty.
- **Participation:** We welcome many types of contributions to class discussion, and two in particular. Comments that feature a knowledge claim supported by well-structured, logical, and relevant evidence advance everyone's collective understanding, regardless of our own perspectives. Note that well-supported claims are not just stated opinions. Second, we recognize that not all thoughts come out fully formed, so we also invite exploratory contributions to class discussion, comments that are characterized more by questioning and inquiring than by answering and defending a position. We will begin actively seeking student participation after the fifth class meeting in order to give everyone an opportunity to first feel comfortable with the classroom climate, topics, nature of discussion, instructors, and process writing.

### **Papers (600 pts):**

There will be 4 papers. Specific paper requirements will be provided before the papers are due. There might a number of public presentations at CSM that will enhance your knowledge and understanding of ESCD and provide you with further evidence and reflection to be used in your papers.

- Paper 1 on historical and ideological dimensions of development
- Paper 2 on sustainability
- Paper 3 on community dimensions of development
- Paper 4 synthesizes E+S+C+D

### **Quizzes (200 pts)**

After carefully completing the assigned readings on time, you will have the opportunity to enhance and assess your learning by taking unannounced quizzes in class and/or BlackBoard. **There are no make up quizzes unless you have an excused absence (see above).**

### **Writing Center**

You are strongly encouraged to use the resources and experience available at CSM's Writing Center for writing your papers. The Center is located in Stratton 309, and their phone number is 303-273-3085. The Center's hours for Spring 2008 are:

Monday 9-6

Tuesday 9-3

Wednesday 9-5

Thursday 9-5

Friday 9-4

2-07-08

**SCHEDULE**

*(Due to the experimental nature of this course, readings might change at times. Students will be informed in advance.)*

**WHAT IS DEVELOPMENT?**

<b>DATE</b>	<b>TOPIC &amp; INSTRUCTORS</b>	<b>READING DUE</b>
Thu 1/10	Introduction Self-assessment  (ALL)	Film <i>Darwin's Nightmare</i> is on reserve and should be watched by all students before class on 1/29
Tue 1/15	What is development?  (Gianquitto & Mitcham)	<i>A Single Pebble</i>  Jackson, Jeffrey. 2005. "Building Dams" and "Fixing Dams" from <i>The Globalizers</i>
Thu 1/17	What is development?  (Gianquitto & Mitcham)	<i>A Single Pebble</i>
Tue 1/22	What is development?  (Lucena & Leydens)	Kloby, Jerry. 2003. "The Legacy of Colonialism" from Rothenberg, Paula (ed) <i>Beyond Borders</i>  Rodney, Walter. 1982. "How Europe Underdeveloped Africa" from Rothenberg, Paula (ed) <i>Beyond Borders</i>  Adas, Michael. 2007. "Imposing Modernity" from <i>Dominance by Design</i>
Thu 1/24	What is development?  (Frossard & Schneider)	Gustavo Esteva, "Development," from <i>The Development Dictionary</i>  Jackson, Jeffrey. 2005. "Introduction: The Globalizers in Honduras" from <i>The Globalizers</i>
Tue 1/29	<b>Student process</b>  <b>(Leydens &amp; Lucena)</b>	<b>On What is Development?</b> <b>Watch film <i>Darwin's Nightmare</i> on reserve</b>
Thu 1/31	Does development work?  (Schneider & Frossard)	Easterly, William. 2006 "Planners vs. Searchers" from <i>The White Man's Burden</i>
Tue 2/5	Engineers and Development  (Lucena & Mitcham)	Pursell, Carroll. 2003. "Appropriate Technology, Modernity and US Foreign Aid."

2-07-08

Thu 2/7	<b>Student process</b>  (Leydens & Lucena)	<b>Paper 1 due</b> Watch Film <i>Waste = Food</i> by no later than 3/6
---------	--	---

**WHAT IS SUSTAINABLE COMMUNITY DEVELOPMENT (SCD)?**

Tue 2/12	Sustainability  (Schneider & Lucena)	Bridger and Luloff, "Toward an interactional approach to sustainable community development"  Sullivan, Nicholas. 2007. Chaps 1, 2 and 3 from <i>You Can Hear Me Now: How Microloans and Cell Phones are Connecting the World's Poor to the Global Economy</i>
Thu 2/14	Sustainability: Economic  (Lucena & Frossard)	Sullivan, Nicholas. 2007. Chaps 9 and 10 from <i>You Can Hear Me Now: How Microloans and Cell Phones are Connecting the World's Poor to the Global Economy</i>
Tue 2/19	Sustainability: Environmental  (Schneider & Lucena)	McDonough, William and Michael Braungart. 2002. "Why Being 'Less Bad' Is No Good," and "Waste Equals Food" from <i>Cradle to Cradle</i>  Weisman, Alan. 2007. "Polymers are Forever." <i>Orion Magazine</i>
Thu 2/21	Sustainability: Socio-cultural  (Frossard & Straker)	Achebe, Chinua, "Dead Men's Path."  Basso, Keith. 1996. "Stalking with Stories" from <i>Wisdom Sits in Places</i>  Watch Film <i>Waste = Food</i> (by Ron van Hattum) by 3/6
Tue 2/26	<b>Guest speaker</b>	<b>Gustavo Esteva</b>
Thu 2/28	Ethics of sustainability: Part I  (Mitcham & Gianquitto)	Mitcham, Carl. 1995. "The Concept of Sustainable Development: its Origins and Ambivalence." <i>Technology and Society</i> .
Tue 3/4	Ethics of sustainability: Part II  (Mitcham & Gianquitto)	Various online readings on ethical principles of sustainability
Thu 3/6	<b>Student process day</b>  (Mitcham)	<b>Paper 2 due</b>  Film <i>Waste = Food</i> and ethics of sustainability
3/11, 3/13	<b>SPRING BREAK</b>	
Tue 3/18	<b>Guest speaker</b>	Silvia Perez-Vitoria
Thu 3/20	What is community?	Salmen, L. 1987. "Steps in Conducting Participant-Observation

2-07-08

	(Leydens & Lucena)	Evaluation” from <i>Listen to the People</i>
Tue 3/25	What is best for communities?  (Leydens)	Salmen, L and E. Kane. 2006. “Participatory Approaches for Learning, Policy, and Action” and “Beneficiary Assessment: An Approach Described” from <i>Bridging Diversity: Participatory Learning for Responsive Development</i>
Thu 3/27	What is best for community?  (Leydens & Frossard)	Malson, Kevin. 2001. “Participatory Technology Development” from <i>Brick by Brick</i>  <b>View film</b> <i>The Dreamers of Arnhem Land</i> for 4/3

### ENGINEERING AND SUSTAINABLE COMMUNITY DEVELOPMENT

Tue 4/1	How have engineers engaged communities?  (Lucena & Schneider)	Williams, Bess. 2007. “Small-Scale Technologies for the Developing World: Volunteers for International Technical Assistance, 1959-1971.”  Jackson, Jeffrey. 2005. “The Expats” from <i>The Globalizers: Development Workers in Action</i>
Thu 4/3	<b>Student process or invited speaker</b>	View film <i>The Dreamers of Arnhem Land</i>
Tue 4/8	Engineering Science: strengths and limitations in dealing with communities  (Lucena)	Downey, G and J. Lucena. 2003. “When Students Resist: Ethnography of a Senior Design Experience in Engineering Education.” <i>Intl Journal of Eng Education</i> .
Thu 4/10	Engineering Design: strengths and limitations in dealing with communities  (Lucena)	Mulder, Karel. 2006. “Design and Sustainable Development” (chap 8) from <i>Sustainable Development for Engineers</i>
Tue 4/15	Participatory approaches: Case study I  (Schneider & Frossard)	Case study on Wind Power in India  <b>Paper 3 due</b>
Thu 4/17	<b>Invited speaker: Anu Ramaswami</b>	Ramaswami, Anu et al. 2007. Integrating Developed and Developing World Knowledge into Global Discussions and Strategies for Sustainability. 2. Economics and Governance. <i>Environmental Science and Technology</i>
Tue 4/22	<b>Invited speaker</b>	Bev Sauer
Thu 4/24	Participatory	Case-study on Community Mapping in Honduras

2-07-08

	approaches: Case Study II  (Lucena & Schneider)	
Tue 4/29	Can engineers be partners and leaders in SCD? Problem definition and solution  (Lucena)	Brand, Ralf and Andrew Karvonen. 2007. "The ecosystem of expertise: complementary knowledges for sustainable development." <i>Sustainability: Science, Practice &amp; Policy</i>  Dewulf, Art et al. 2005. "How indigenous farmers and university engineers create actionable knowledge for sustainable irrigation." <i>Action Research</i>
Thu 5/1	Last class	Student self-assessment on their relationship with SCD  <b>Paper 4 due</b>  <b>Paper 5 due during finals week</b>