

Course Syllabus

Course No: LAIS 498 Title: Engineering and Social Justice

Class Meetings: Tues and Thur, from 11:00 am to 12:15pm

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

Instructor: Juan C. Lucena, Ph.D.

- Email: jlucena@mines.edu (best way to contact. I check email regularly from 5am to 7 pm)
- Phone: 303-273-3564 (you can leave a message but this is NOT as reliable as email)
- Office Hours: Tues & Thurs: from 10am to 11am and from 2pm to 3pm (Stratton Hall 424)

Course Description: This course offers students the opportunity to explore the relationships between engineering and social justice through personal reflection and historical and contemporary case studies. The course begins with students' exploration of their own social locations, alliances and resistances to social justice through critical engagement of interdisciplinary readings that challenge engineering mindsets. Then the course helps students to understand what constitutes social justice in different areas of social life and the role that engineers and engineering might play in these. Finally, the course gives students an understanding of why and how engineering has been aligned and/or divergent from social justice issues and causes.

Required Course Readings:

- Riley, Donna. 2008. *Engineering and Social Justice*. Morgan and Claypool. (Electronically at CSM library or on paper at CSM bookstore)
- All other required readings will be available on Blackboard (BB) course website

Learning Objectives: Upon successfully completing this course, you will have

1. identified your own alliances or relationship to engineering mindsets and your own relationships to social justice.
2. demonstrated understanding of what constitutes social justice (rights, opportunities, resources) in different areas of social life and the role that engineers and engineering might play in these.
3. demonstrated understanding of historical and contemporary alignments and divergences between engineering and social justice.

Teaching Philosophy: Here are my core beliefs about teaching and learning:

I believe that **education should be about students' learning** more than about teachers' teaching. Teachers should trust students and facilitate their learning. Students come to my classes with a set of experiences, previous knowledges (note the plural), assumptions, expectations, conceptions and misconceptions that shape how they learn. Our collective job (yours and mine) is to make these explicit, to critically assess how these enhance or hinder your learning, and to provide you with a new

set of experiences, knowledges and other critical tools that will hopefully give you a new way of looking at the world. More than giving you a grade, my main responsibility is to help you acquire a life-long commitment to check your knowledge, i.e., to critically question what you know and don't know, how you came to know it, what you know it for, and how your privileges have shaped who you are and what you value as knowledge. **Your responsibility is to learn to check your knowledge, to question your privileges and to apply this critical thinking to the rest of your life.**

I believe that **student learning is an evolutionary process** that requires time to process and question new ideas and concepts. The acquisition of new knowledge, especially one that might challenge your core beliefs and values, often elicits strong resistance. Our shared responsibility is to acknowledge this and help you move beyond this resistance. **As resistance fades away as the semester unfolds, your learning should increase, your thinking should become more sophisticated and your attitude for new knowledge becomes more welcoming.** This course is built in such a way that will allow you the opportunity to evolve in your learning.

I believe that the **creation and acquisition of new knowledge is a social process.** You will have plenty of opportunities to develop and process your own individual ideas but soon you will be co-creating and co-acquiring knowledge with your peers. Pair and group activities in the classroom are fundamental elements of this collaborative process. **Hence your active participation in these will be highly valued.** Attendance and participation grading policies reflect this core belief.

I believe that our **writing is a reflection of our ideas.** To produce good, clear and powerful writing, we need to have good, clear and powerful ideas (and vice versa). This requires close and in-depth reading of course material, a commitment to listening, opportunities to test ideas with others, time to reflect about these exchanges, and a continuous engagement with your own drafts. Hence good writing cannot happen the night before a paper is due. My responsibility is to guide you towards good readings, help you develop your listening, provide you with opportunities to test ideas with others, and allow you ample time between the assignment of a paper and its due date. **Your responsibility is to engage the readings, be willing to listen, share your ideas with others, think and write critically and give yourself plenty of time to outline, draft, edit and re-edit your writing.**

Furthermore, I believe in the **power of diverse ideas and arguments.** All of us come into this course with opinions (weak and strong). Our collective responsibility is to turn these into powerful and well-supported arguments that can hopefully have an impact on the world. To do this we need a respectful and nurturing environment to share opinions and explore ways to turn them into well-crafted arguments. Hence one of my primary roles is to construct and maintain such classroom environment, constructively challenge your opinions and help you transform them into well-supported arguments. **Your role is to be open to this challenge and to be respectful of the classroom environment and of others' attempts at transforming their opinions.**

Course Policies:

This course consists of in-depth reading, lectures, in-class collaborative exercises, films, quizzes, individual written reflections and group assignments. As educator, one of my responsibilities is to put great deal of effort and thinking in developing these elements and offering them to you to help you learn. As student, your responsibility is to reciprocate this effort by seriously exploring the reading assignments, being prepared to discuss them in class, actively participate in

collaborative learning, and effectively and critically incorporate this material in quizzes, papers, group presentations and (hopefully) in your own thinking and practices.

As I expect you to evaluate the quality of my teaching and mentoring, you should expect me to evaluate the quality of your learning and intellectual growth in this course. Ours is a partnership of teaching, learning and exploration. Hence you should expect that higher quality of discussion, exploration and writing will warrant you higher grades while lesser quality or incomplete work will warrant you lesser grades. Your grades are based on both the **quality** of your performance (not so much on how many hours you spend working) and your level of **commitment** to the learning process and objectives. Specifically, here are my expectations of you to ensure a good grade in this course:

- complete all assigned readings on time, be ready to discuss and engage them, and use them effectively throughout the course.
- attend scheduled class meetings regularly since without you the learning environment will be void of your perspective and your potential to teach others.
- participate in class discussions and activities regularly by raising questions and making contributions that are relevant and enhance the learning of other students, including making mistakes so you and others can learn from these (**if you text, browse, do other homework or fall asleep you will be robbing the class from your ability to teach others and your participation grading will be affected accordingly**).
- complete ALL readings, quizzes, papers and presentations on the assigned dates, displaying commitment to learning, scholarship and further inquiry.
- commit to and apply CSM's Student Honor Code when completing quizzes and papers in this course.

GRADING:

Individual assignments (350 pts):

- *Beginning:* You will be conducting and recording a self-interview following 10-15 provided questions about social position and identification. **I will check the completion of this interview during a brief office visit that you are responsible for scheduling.** After completing readings on engineering mindsets, you will listen to this interview and write a reflection, detailing how your views might have changed, and synthesizing new readings into the reflection. **(50 pts)**
- *Middle:* After doing the readings following Spring Break and becoming aware of the multiple moments in which privilege makes a difference in your life and how injustices take place along a person's educational trajectory, you will reconstruct your own educational trajectory, from womb to present, identifying moments of privilege and injustice. You are expected to be mindful of engineering mindsets, how technical artifacts legislate opportunities in your life, and where engineers or engineering could intervene to ameliorate or exacerbate injustices. **(100 pts)**
- *End:* You will write a synthesis of how your perspective shifted throughout the course by re-listening to the initial interview, re-reading your two previous reflections and addressing additional questions provided. **(200 pts)**

ALL WRITTEN WORK WILL BE SUBMITTED BOTH IN DIGITAL DROPBOX AND IN CLASS.

Group assignments (300 pts):

- *Presentation and write-up 1:* Groups will read, synthesize and present on assigned clusters of readings in one specific subject related to mindsets and social justice. **(150 pts)**
- *Presentation and write-up 2:* Groups will also read, synthesize and present on specific case studies of engineers that have tried to enhance or curtail social justice through their work. **(150 pts)**

Each presentation will be followed by a group written analysis where each individual member will contribute to the development, writing, editing and completion of the report. The group must show a highly edited version of the report showing track changes and editing that reflects everyone input.

Quizzes (200pts):

Every now and then, you will write in-class and/or take-home quizzes on key concepts from the readings and/or key questions that emerge throughout the course. These will help you develop your ideas and gain clarity on key concepts as you move towards more complex writing in your papers. Points for each take-home quiz will be determined at the time of assignment. **There are no make up quizzes unless you have an excused absence (see below).**

Attendance (50 pts):

Now that you understand my teaching philosophy, it should be clear that class attendance is extremely important and valued. Hence 10 points will be deducted from these 50 points for each unexcused absence. Excused absences are ONLY the following: official sport varsity team travel, a medical condition excused **in writing by a doctor**, a personal matter excused **in writing by the Dean of Students**, jury duty, military duty or common examinations indicated **in writing by the department giving the exams**.

Participation (100 pts):

In this grading category I highly value four elements:

- **engagement** (e.g., are you legitimately interested in class activities or are you falling asleep in class or being distracted in class? Are you seriously engaging the material, readings, and questions?);
- **relevance** (e.g., how appropriate are your contributions to the learning environment?);
- **being on time with your work** (e.g., are you turning in work on time and keeping up with the readings when they are due?);
- and **respect** (e.g., are you respectful of others' perspectives and of the classroom environment? Are you turning in quality work that reflects respect and commitment towards this class?).

I 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 that advance everyone's collective understanding. Note that well-supported claims are not just stated opinions. Second, I recognize that not all thoughts come out fully formed, so I also invite exploratory contributions to class discussion, comments that are characterized more by questioning and inquiring than by answering and defending a position. I will begin actively seeking student participation early in the course in order to give everyone an opportunity to first feel comfortable with the classroom climate, topics, nature of discussion, instructor, and process writing. **Since texting, online searching and/or doing homework for other courses have become pervasive activities, I must clearly state that doing any of these in class will significantly impact this part of your grade.**

Grading scale: A (900-1000 pts); B (800-899 pts); C (700-799 pts); D (600-699 pts); F (0-599 pts).

Schedule

- Thu 1/13 Introduction; self assessment; assign self-interview
- Tue 1/18 Engineering and social justice: intro to a complex relationship
Reading due: Riley, D. 2008. What do we mean by social justice? (chap 1)
Recorded interview due; schedule brief office meeting with Prof. Lucena
- Thu 1/20 What might social justice be?
Reading due: McIntosh, P. White Privilege: Unpacking the Invisible Knapsack
Class activity: Privilege walk activity with visiting speaker Jesus Trevino

Engineering mindsets

- Tue 1/25 Engineering mindsets: centrality of military/corporate organizations
Readings due: Riley, D. 2008. Mindsets in Engineering (chap 2); Downey, G. 2007. Low cost, mass use: American engineers and the metrics of progress. *History and Technology*.23 (3): 289-308.
- Thu 1/27 Engineering mindsets: technical narrowness
Reading due: Florman, S. 1996. “Look long on an engine. It is sweet to the eye.” (chap 10) and “Then I Was Carried Beyond Pleasure” (chap 11) from *The Existential Pleasures of Engineering*
- Tue 2/1 Engineering mindsets: positivism and the myth of objectivity
Readings due: Sarewitz, D. 1996. The Myth of Authoritativeness (chap 5) from *Frontiers of Illusion*
- Thu 2/3 Student process
- Tue 2/8 Engineering mindsets: desire to help and uncritical acceptance of authority
Readings due: Schneider, J. et al. 2009. Engineering to Help. *IEEE Technology & Society*; Harris, C. E. et al. 2009. Engineers in Organizations (chap 8) from *Engineering ethics: concepts and cases*.
- Thu 2/10 Student process: synthesis of engineering mindsets
First individual written assignment due; assign group presentations



Engineering mindsets and relationship to SJ

- Tue 2/15 SJ and centrality of military/corporate organizations in engineering

Reading due: Noble, D. 1977. Technology as people: The industrial process of higher education I from *America by Design*

Thu 2/17 SJ and technical narrowness

Reading due: Zussman, Robert. 1985. The division of labor (chap 5) from *Mechanics of the middle class: work and politics among American engineers.*

Class activity: Groups 1&2 presentations

Tue 2/22 SJ & the myth of objectivity

Reading due: Vaughn, D. 1996. The culture of production (chap 6) from *The Challenger Launch Decision.* (Only p. 196 to p. 208)

Class activity: Groups 3&4 presentations

Thu 2/24 Student process

Tue 3/1 Film: *Tambogrande: Mangos, Murder, Mining*

Thu 3/3 SJ and desire to help

Reading due: Illich, Ivan. To hell with good intentions

Class activity: Groups 5&6 presentations

Tue 3/8 SJ and uncritical acceptance of authority

Reading due: Vaughn, D. 1996. The culture of production (chap 6) from *The Challenger Launch Decision.* (Only p. 209 to p. 237)

Class activity: Groups 7&8 presentations

Thu 3/10 Student process

Tue 3/15 Spring Break

Thu 3/17 Spring Break

SJ in areas of engineering and the potential role of engineers

Tue 3/22 Education

Reading due: Barry, B. chap on education in *Why Social Justice Matters*

Thu 3/24 Student process

- Tue 3/29 No class
- Thu 3/31 Engineering education
Reading due: Cech, E. et al. 2011. Navigating the Heteronormativity of Engineering: The Experiences of Lesbian, Gay, and Bisexual Students. *Engineering Studies*.
- Tue 4/5 Technical artifacts and systems
Readings due: Winner, Langdon. Do artifacts have politics? From *The Whale and the Reactor*.
- Thu 4/7 Student process
- Tue 4/12 Technical artifacts and systems
Readings due: Striphas, Ted. 2010. The Abuses of Literacy: Amazon Kindle and the Right to Read. *Communication and Critical/Cultural Studies*. 7 (3): 297-317.
- Thu 4/14 Student process and presentation demonstration and preparation
Middle written assignment due

Historical/contemporary alignments or divergences between engineering and social justice

- Tue 4/19 Case study 1&2 presentations
- Thu 4/21 Case study 3&4 presentations
- Tue 4/26 Case study 5&6 presentations
- Thu 4/28 Case study 7&8 presentations
- Tue 5/3 Student process
- Thu 5/5 Last class; final assessment
Final personal written reflection due during finals week (date TBA)