

Course Syllabus (Spring 2017)

Course No: LAIS 478

Title: Engineering and Social Justice

Class Meetings: Tues and Thur, from 12:30 pm to 1:45pm

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

Instructor: Juan C. Lucena, Ph.D., Professor and Director, Humanitarian Engineering

- Email: jlucena@mines.edu (best way to contact. I check email regularly from 5am to 8 pm)
- Phone: 303-273-3564 (you can leave a message but it can take me up to 48 hrs to return calls)
- **Office Hours: Tues & Thurs: from 2:00 pm to 4:00pm or Wed by appointment (Stratton Hall 424)**

Course designation: This course serves as a LAIS 400-level requirement for all majors. **It is an Area I course for Humanitarian Engineering students.**

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, privileges, 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 divergent from social justice issues and causes.

Required Course Readings:

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

Student Learning Outcomes: Upon successfully completing this course, you will have

1. identified your own privileges, alliances and/or relationships to structures of power, engineering mindsets and your own relationships to social justice.
2. demonstrated understanding of what constitutes social justice, and its constitutive elements (human capabilities, opportunities, resources, human capabilities) 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.

Brief List of Topics Covered:

1. Privilege, social categories and social inequality
2. Engineering mindsets in the history of engineering
3. Definitions of social justice
4. Ideologies of engineering
5. Engineering education and social justice
6. Extractive industries and social justice
7. Technical artifacts, systems 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 and students should trust and facilitate each other's learning. Students and professor come to this class 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 our learning, and to provide you with a new set of experiences, knowledges and other critical tools that will hopefully give us 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 assumptions about the engineering-social justice relationship and to apply this critical thinking to the rest of your life.**

I believe that **student learning is an evolutionary process** that requires time for processing and questioning new ideas and concepts. The acquisition of new knowledge, especially one that might challenge your core beliefs and values about engineering and society, often elicits strong resistance, especially because we will be questioning many long-held assumptions about these two core concepts (reflect on your assumptions about engineering that might have led you or your peers to attend CSM!). Our shared responsibility is to acknowledge this and move beyond 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 and out of the classroom are fundamental elements of this learning 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). Sloppy writing often reflects sloppy ideas (and vice versa). Hence in order to improve both, you will need a 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. Good writing cannot happen the night before a paper is due. You need to revise your own writing and perhaps have the Writing Center help you as well. 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 (and even visit the Writing Center).**

Furthermore, I believe in the **power of diverse ideas and arguments.** All of us come into this course with opinions--weak and strong, clear and unclear, well-supported and not-so-well supported-- about engineering and society. 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, learn to disagree, 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, learn not to take challenges against your ideas as challenges against yourself, 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, written assignments and presentations. 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, better yet, 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, exploration and, hopefully, trust. **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 lower grades.** Your grades are based on both the *quality* of your performance (not so much on how many hours you spend working), your level of *commitment* to the learning process and objectives and your willingness to take risks by challenging your beliefs about energy and society. **Specifically, here are my expectations of you in this course:**

- complete all assigned readings on time, be ready to discuss and engage them in class, 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 and learn from 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 online, 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 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 all written work in this course.

Policy on academic integrity/misconduct: The Colorado School of Mines affirms the principle that all individuals associated with the Mines academic community have a responsibility for establishing, maintaining and fostering an understanding and appreciation for academic integrity. In broad terms, this implies protecting the environment of mutual trust within which scholarly exchange occurs, supporting the ability of the faculty to fairly and effectively evaluate every student's academic achievements, and giving credence to the university's educational mission, its scholarly objectives and the substance of the degrees it awards. The protection of academic integrity requires there to be clear and consistent standards, as well as confrontation and sanctions when individuals violate those standards. The Colorado School of Mines desires an environment free of any and all forms of academic misconduct and expects students to act with integrity at all times.

Academic misconduct is the intentional act of fraud, in which an individual seeks to claim credit for the work and efforts of another without authorization, or uses unauthorized materials or fabricated information in any academic exercise. Student Academic Misconduct arises when a student violates the principle of academic integrity. Such behavior erodes mutual trust, distorts the fair evaluation of academic achievements, violates the ethical code of behavior upon which education and scholarship rest, and undermines the credibility of the university. Because of the serious institutional and individual ramifications, student misconduct arising from violations of academic integrity is not tolerated at Mines. If a student is found to have engaged in such misconduct sanctions such as change of a grade, loss of institutional privileges, or academic suspension or dismissal may be imposed.

The complete policy is [online](#).

Students with disabilities support:

The Colorado School of Mines is committed to ensuring the full participation of all students in its programs, including students with disabilities. If you are registered with Disability Support Services (DSS) and I have received your letter of accommodations, please contact me at your earliest convenience so we can discuss your needs in this course. For more information about Disability Support Services, please visit: disabilities.mines.edu or contact Katie Ludwin -- kludwin@mines.edu; x3297.

GRADING:

Two individual personal reflection assignments (250 pts):

- *One at the beginning:* You will be conducting and recording a self-interview following 10-15 provided questions about social position and identification. **This interview should be done right after the privilege walk in the second week of class.** After completing some readings on social justice, you will listen to this interview and write a reflection on your relationship to social justice (50 pts) **Note: This initial interview and paper is mandatory in order for me to grade the last paper of the class. No exceptions.**
- *One at the end:* After having gone through the course and becoming aware of the multiple moments in which privilege makes a difference in your life and how rights, opportunities and resources significantly influence a person's educational trajectory, you will reconstruct your own educational trajectory, from womb to present, identifying moments of privilege and (in)justice. For this assignment, **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.** You will write a synthesis of how your perspective shifted throughout the course by listening to the initial interview and addressing additional questions. (200 pts) **Note: Beware that this is not to be a cut and paste exercise from previous work as that will be considered plagiarism. I expect original work that shows intellectual and personal growth throughout the semester to go on this paper.**

Individual analysis and group presentations (250 pts):

- *Individual analysis 1:* Individually, students will be assigned specific readings in one specific subject related to engineering mindsets and social justice to write an analysis on questions provided later. (50 pts). *Group Presentation 1:* Based on specific readings, groups will be formed and present a synthesis and integration to the entire class (50 pts).
- *Individual analysis 2:* Individually, students will also be assigned specific readings on how engineered systems interact, enhance or curtail rights, opportunities and resources (social justice) to different groups of people. (75 pts). *Group Presentation 2:* Based on specific readings, groups will be formed and present a synthesis and integration to the entire class (75 pts).

Quizzes (250 pts):

Almost weekly, 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 thinking and writing. Points for each take-home quiz will be determined at the time of assignment. **There are no make up quizzes. No exceptions.**

Attendance (100 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 100 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, job interviews documented by employer, jury duty, military duty or common examinations indicated in writing by the department giving the exams. IF YOU TEXT OR DO OTHER HW IN CLASS, YOU WILL BE MARKED ABSENT.**

Participation (150 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 or texting or chatting with your neighbor or doing homework for another class? Are you seriously engaging the material, readings, and questions as demonstrated by how you answer your quizzes and papers?);
- **relevance** (e.g., how relevant and constructive are your contributions to the learning environment? how relevant are your written and oral answers to the questions at hand?);
- **being on time with and respectful of your work** (e.g., are you turning in work well presented, on time, and keeping up with the readings when they are due?);

- **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, Facebooking, 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 your grade. Please do not be surprised if in-class TEXTING results in a low participation AND attendance grade.**

ALL WRITTEN WORK MUST BE SUBMITTED BOTH ELECTRONICALLY ON BLACKBOARD AND ON PAPER IN CLASS.

Grading scale: : A = 933+; A- = 900-932; B+ = 866-899; B = 833-865; B- = 800-832; C+ = 766-799; C = 733-765; C- = 700-732; D+ = 666-699; D= 633 -665; D- = 600- 632; F < 600. This scale will be strictly observed. Please do not expect any rounding off. No quibbling over points.

SCHEDULE

(changes to topics and homework dates might be necessary; quizzes will be announced via email so check your email regularly)

INTRODUCTION

Thu 1/12 *Introduction*. Class activity: self-assessment; understanding the syllabus; **assign self-interview**

Tue 1/17 *Privilege and social justice*. **Reading due: McIntosh, P. White Privilege: Unpacking the Invisible Knapsack**. Class activity: Privilege walk and Tim Wise video.

Thu 1/19 *What might social justice be?* **Reading due: Riley, D. 2008. What do we mean by social justice? (chap 1 from textbook) and Cannon, Mae E. 2009. Social Justice: Defining the Issue. In *Social Justice Handbook*.**

Tue 1/24 *What might engineering be?* **Reading due: Pawley, Alice. What counts as "engineering": Toward a redefinition. In *Engineering and Social Justice in the University and Beyond*.** For homework: Assign Riley's video on rigor.

Thu 1/26 *Engineering and Social Justice: What keeps them apart? How can we bring them together?* **Readings due: Riley, D. 2008. Mindsets in Engineering (chap 2 from textbook).**

ENGINEERING MINDSETS AND IDEOLOGIES

Tue 1/31 *Engineering mindsets: centrality of military/corporate organizations and uncritical acceptance to authority*. **Readings due: Wisniosky, Matt. "From System Builders to Servants of The System". From *Engineers for Change: Competing Visions of Technology in 1960s America*. (MIT, 2012).**

Thu 2/2 *Engineering mindsets: desire to help*. **Readings due: Schneider, J. et al. 2009. Engineering to Help. *IEEE Technology & Society*.**

Tue 2/7 *Engineering mindsets: technical narrowness*. **Reading due: Rolston, Jessica and Elizabeth Cox. 2013. Engineering for the Real World: Diversity, Innovation and Hands-on Learning.**

Thu 2/9 *Engineering mindsets: positivism and the myth of objectivity*. **Reading due: Vinck, Dominique. 2003. Socio-Technical Complexity: Redesigning a Shielding Wall.**

Tue 2/14 *Engineering mindsets: uncritical acceptance of authority*. **Reading due: Cech, Erin. 2013. The (Mis)Framing of Social Justice: Why Ideologies of Depoliticization and Meritocracy Hinder Engineers' Ability to Think About Social Injustices.**

Thu 2/16 *Student process class*. **FIRST PERSONAL REFLECTION ASSIGNMENT DUE.**

SOCIAL JUSTICE AND ENGINEERING MINDSETS

(in the next two weeks, students who are NOT presenting on a given day MUST submit an ARM on the reading due for that day. 10 pts for each ARM = 30 pts)

Tue 2/21 Presidents day weekend. No class

Thu 2/23 *SJ and centrality of military/corporate organizations in engineering.* Reading due: Wisnioski, Matt. 2003. **Inside “The System”: Engineers, Scientists, and The Boundaries Of Social Protest In The Long 1960s.** *History and Technology.* GROUPS 1 & 2 PRESENTATIONS.

Tue 2/28 *SJ and desire to help.* Readings due: Lupton, Robert. 2011 *Toxic Charity: How Churches and Charities Hurt Those They Help (chaps 1-2).* GROUPS 3 & 4 PRESENTATIONS.

Thu 3/2 *SJ and positivism and the myth of objectivity.* Reading due: Collins and Pinch. 1998. “The naked lunch: assigning blame for the Challenger explosion.” GROUPS 5 & 6 PRESENTATIONS.

Tue 3/7 *SJ, technical narrowness and uncritical acceptance to authority.* Reading: Riley, Donna. 2013. **Power. Systems. Engineering. Traveling lines of resistance in academic institutions.** GROUPS 7&8 PRESENTATIONS.

SOCIAL JUSTICE AND ENGINEERING EDUCATION

Thu 3/9 Education and SJ. Reading: Foor, Cynthia et al. 2007. “I Wish that I Belonged More in this Whole Engineering Group:” **Achieving Individual Diversity.**” Class on Juju/Xime class.

Tue 3/14 *Is Engineering Education Value Neutral?* Reading due: Cech, E. et al. 2011. **Navigating the Heteronormativity of Engineering: The Experiences of Lesbian, Gay, and Bisexual Students.**

Thu 3/16 LGBTQ+ student panel. **GROUPS WRITE-UP DUE**

Tue 3/21 Low Income/First Generation students in engineering. Reading due: Smith, Jessica and Juan Lucena. **Invisible Innovators.**

Thu 3/23 LIFG student panel

Tue 3/28 Spring Break

Thu 3/30 Spring Break

Tue 4/4 Film: People Like Us

Thu 4/6 Panel by seniors and grad students who have made a commitment to SJ

SJ, ENGINEERING SYSTEMS AND THE POTENTIAL ROLE OF ENGINEERS

Tue 4/11 *Engineers, extractive industries, and SJ*. Prof. Jessica Smith will guide the watching of and discussion about **Tambogrande. Part I**

Thu 4/13 *Technical artifacts and systems*. Readings due: Winner, L. Do artifacts have politics? From *The Whale and the Reactor*.

Tue 4/18 *Engineering systems and social justice*. Reading due: Valderrama, Andres. 2013. What can engineering systems teach us about social (in)justices? The case of public transportation systems.

Thu 4/20 **GROUP PRESENTATIONS 1-2-3 DUE**

Tue 4/25 **GROUP PRESENTATIONS 4-5-6 DUE**

Thu 4/27 **GROUP PRESENTATIONS 7-8 DUE**

Tue 5/2 Student process

Thu 5/4 Last class; final assessment. **GROUP WRITE UPS DUE.**

FINAL PERSONAL WRITTEN REFLECTION DUE DURING FINALS WEEK (DATE TBA)