Social and Ethical Implications of Engineering
Fall 2013 - LEAP 1501 – Sections [Social Science Foundation, Writing Emphasis Designation, Fulfills ABET criteria]
First Semester of Engineering Sequence for General Education

Instructor:
Rebecca Larsen, Ph.D.
Office: 009C Sill Center
Office phone: 801-585-9922
Email: R.Larsen@leap.utah.edu
Office hours: T/TH 4-5 pm or by appointment

Library Instructor:
Dale Larsen
Assistant Librarian
Marriott Library
801.581.8323
dale.larsen@utah.edu

<table>
<thead>
<tr>
<th>Peer Advisors</th>
<th>Section</th>
<th>Time</th>
<th>Class Room</th>
<th>Phone</th>
<th>Email</th>
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<tbody>
<tr>
<td>Trenton Staples</td>
<td>007</td>
<td>9:10 am – 10:30 am</td>
<td>MEB 2325</td>
<td>801-708-1338</td>
<td><a href="mailto:stapleyth@gmail.com">stapleyth@gmail.com</a></td>
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<tr>
<td>Spencer Ogden</td>
<td>008</td>
<td>10:45 am – 12:05 pm</td>
<td>MEB 2325</td>
<td>801-618-9789</td>
<td><a href="mailto:Spence.ogden@gmail.com">Spence.ogden@gmail.com</a></td>
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<tr>
<td>Matias Biese</td>
<td>006</td>
<td>2:00 pm – 3:20 pm</td>
<td>WEB L126</td>
<td>801-875-2702</td>
<td><a href="mailto:matias.biese@hotmail.com">matias.biese@hotmail.com</a></td>
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Engineering-LEAP [E-LEAP] Course Description
“Social and Ethical Implications of Engineering,” LEAP 1501, provides you with an understanding of the role of ethics in the engineering profession by focusing on specific issues set out by the Accreditation Board for Engineering and Technology [ABET]: adhering to “…engineering standards and realistic constraints - economic, environmental, sustainability, ethical, health and safety, social and economic” and “an understanding of professional and ethical responsibility” (Criteria 3 (c) and (f) respectively, Criteria for Accrediting Engineering Programs 2008-2009, ABET, Nov. 2007).
This semester, you will engage in a discussion of community by examining how the world of social sciences studies human institutions and you will apply social science concepts to engineering ethics and decision-making processes in national and global communities.

This course prepares you to recognize ethical issues in engineering contexts with the help of essays and case studies. You will identify and understand professional and ethical responsibility based on the codes of ethics from discipline-specific professional organizations and societies. You will look at some engineering failures in order to better understand why ethical thought is important for engineers and, in order to assess the consequences of these failures on public health, safety and human progress.

In order to understand the role of the engineer in local, national, and global settings, you will begin by asking:

- What is a society or community? How do engineers define a professional society? What is the purpose of professional engineering societies?
- How can engineers determine what is ethical in making decisions within different communities?
- What can engineers learn from social scientists and implement in dealing with other engineers, with corporations or government agencies, and with the public?
- How do social scientists study human behavior and institutions?
- What role do engineers and other social scientists play in our society in influencing public debate and public policy? What is the role of engineers as citizens and as technical advisors in shaping progress or changes in technology?
- How do social scientists and engineers analyze and respond to issues of globalization?

To understand the impact of engineering solutions in global and societal contexts, we will study concepts of local and global sustainability. We will examine the notion of sustainable development from the practicing engineer’s perspective. As a member of a team, you will research an engineering problem related to sustainability and ultimately present your team’s research project to the class in a mock-professional engineering conference at the end of the semester.

**Learning objectives for LEAP 1501**

At the end of the semester you should be able to

1. assess the social and ethical implications of creation and constructions of technology and its uses in the United States and in a global setting by using social science methods of inquiry
2. acquaint yourself with the LEAP learning community, one in which students know each other, the E-LEAP faculty members, peer mentors, and the College of Engineering faculty
3. Acquire a more sophisticated knowledge of library technologies
a. By being introduced to databases in the social sciences, applied sciences and engineering
b. By being introduced to research methodologies specific to their discipline
c. By learning how to evaluate internet sources

4. Develop sophisticated writing and oral communication strategies which allow the student to:
   a. Demonstrate critical thinking skills in crafting written and oral assignments
   b. Analyze professional communication skills
   c. Assess levels of technical expertise in audiences
   d. Use quantitative information in visual aids such as graphs and charts
   e. Integrate library resources into a final, team-based research project

5. Learn team building skills
   a. By practicing leadership skills in teams
   b. By negotiating task assignments
   c. By evaluating the outcomes of team projects

6. Explore a variety of campus activities and organizations in order to become part of the larger University community

**Required Reading (All these articles can be found on CANVAS under the “files” tab)**


**Audiovisual Materials Used in Class**


**Reference:** Check the Writing 2010 sections in the bookstore for a current handbook if you have questions about writing, editing, or citations. The IEEE citation method is the reference style that will be required for this course and as a result, will be discussed in class. The best online guide to IEEE reference style that I have found is at the University of Murdoch in Australia: [http://libguides.murdoch.edu.au/content.php?pid=144623&sid=1229928](http://libguides.murdoch.edu.au/content.php?pid=144623&sid=1229928)

**Please note:**
Whatever reading is listed for a particular day should be done BEFORE you come to class on that day. Assignments due ONLINE are due by 11:59 pm of the day indicated. Also note that assignments and due dates are subject to change with prior notice.

**Assignments and Grades**

<table>
<thead>
<tr>
<th>Assignments</th>
<th>Total for assignments: 110 points</th>
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<tbody>
<tr>
<td><em>Interview with an Engineer</em></td>
<td>15</td>
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<tr>
<td><em>Memo on Social Implications of Technology</em></td>
<td>25</td>
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<tr>
<td><em>Midterm</em></td>
<td>25</td>
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<tr>
<td><em>Library quizzes/assignments [4 pts x 5]</em></td>
<td>20</td>
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<tr>
<td><em>Reading Quizzes [5 pts x 4]</em></td>
<td>20</td>
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<tr>
<td><em>Mandatory Attendance days [1 pt x 5]</em></td>
<td>5</td>
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<tr>
<th>Student conference presentation</th>
<th>Total for team assignments: 140 points</th>
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<tbody>
<tr>
<td>Team Meeting #1: <em>Choose research topic</em></td>
<td>10</td>
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<tr>
<td><em>Write research proposal</em></td>
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<tr>
<td>Team Meeting #2: <em>Edit Research proposal</em></td>
<td>10</td>
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<tr>
<td><em>Add explanation of science and technology</em></td>
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<tr>
<td><em>Add description of one industry/corporation</em></td>
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<tr>
<td>Team Meeting #3: <em>Write research memo</em></td>
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<tr>
<td><em>Articulate criteria for evaluating sustainability</em></td>
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<tr>
<td><em>Evaluate technology in relation to criteria</em></td>
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<tr>
<td><em>Include progress report on research/team issues</em></td>
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Team Meeting #4: Edit research memo  
Add ethical analysis of technology  
Add evaluation of current policy  
Propose suggested policy changes  

Team Meeting #5: Draft PowerPoint presentation  
Organize Power Point Presentation  
Present draft to librarian in library class #5  

Team presentations [30 min. max.]  
Presentation evaluations  
Final report – team written research report  

Total 250 points

Grading: I do not grade on a curve. Grades are assigned by percentages.

<table>
<thead>
<tr>
<th>Percentages</th>
<th>Letter Grade</th>
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<tbody>
<tr>
<td>94% and above</td>
<td>A</td>
</tr>
<tr>
<td>90-93%</td>
<td>A-</td>
</tr>
<tr>
<td>87-89%</td>
<td>B+</td>
</tr>
<tr>
<td>84-86%</td>
<td>B</td>
</tr>
<tr>
<td>80-83%</td>
<td>B-</td>
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<tr>
<td>77-79%</td>
<td>C+</td>
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<tr>
<td>74-76%</td>
<td>C</td>
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<tr>
<td>70-73%</td>
<td>C-</td>
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<tr>
<td>67-69%</td>
<td>D+</td>
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<tr>
<td>64-66%</td>
<td>D</td>
</tr>
<tr>
<td>60-63%</td>
<td>D</td>
</tr>
<tr>
<td>Below 60%</td>
<td>E</td>
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Assignments

- **Generally late assignments will not be accepted.** However, if you have an emergency or a valid reason for turning in an assignment late, you may be able to turn in the assignment after the due date BUT ONLY if you have made arrangements with me prior to the due date and have established a specific time you will turn in the assignment.

- Team assignments are precisely that – **team** assignments. By definition they demand that a team collectively invest effort and submit the assignment for a grade.

- You must attend all five library sessions and contribute to your team research project to receive credit. Library sessions are designed to aid and assist you in successfully
completing your team research project. Attendance at library classes is mandatory as are team work class sessions. If you miss a library session, you will be ineligible to make up the library quiz/assignment assigned for that class.

- Directions for major assignments (interview, memo, team presentation at mock engineering conference, and final report) will be distributed in written form and available on Canvas after they are explained in class.
- **In addition, you will have scheduled reading quizzes on the day’s reading and/or previous class discussion. So do the reading!**

**Extra Credit Points**

You may earn up to five (5) extra credit points during the semester if you attend/participate in any of the following:

- An engineering activity sponsored by the College or one of the engineering departments
- A LEAP activity
- A lecture on campus
- Your peer advisor’s office hour for a consultation on a class assignment
- A short course organized by the library. To find a list of these courses, go to the library home page and look for the “Classes & Workshops” link

To receive the credit for the extra credit options listed above, please write a 150-word report on the activity - what you experienced and what you gained – and send it as an email to your peer advisor. All extra credit emails must be to the Peer Advisor by the end of the last week of class.

**LEAP 1060:** To receive credit for LEAP 1060, “Methods and Technologies for Library Research,” a 1-unit course you need to attend all ten library instruction sessions during the 2013-2014 academic year [5 during fall 2013 and 5 during spring 2014 semesters]. You will be eligible for this credit if you continue with LEAP for the spring 2014 semester. I will provide you with more information as we approach Spring-2014 semester registration.

**CANVAS:** We will be using the Canvas course management system to promote discussion and learning. I will post this syllabus on CANVAS, along with your grades, assignments and announcements. In addition, you will be using CANVAS to post assignments and to keep in touch with your team. **Note that participation and use of Canvas is required for this course.** Log in on a regular basis to check for postings from the professor and the Peer Advisor.
Please note: CANVAS is a public space and is owned by the University of Utah. When you are posting responses please follow commonly accepted rules of decorum and courtesy as you would in the classroom in responding to questions and interacting with other students, the peer advisor and the professor.

Classroom Policies
Because we have so much material to discuss in any given class period, and class will consist largely of discussion rather than lecture, you must come prepared by having done the reading in a thoughtful, responsive manner. Read the articles with critical skepticism, i.e., to identify the main ideas presented, to weigh and evaluate these ideas with an open mind, and to be prepared to share your responses about what you've read.

I expect regular, full-time, on time class attendance and participation. Note that attendance is mandatory on particular days during the semester. These days are indicated on the course schedule. Missing these classes may entail a loss in grade.

Plagiarism: Claiming or suggesting that words or ideas of others are your own is a form of cheating. The University's policy on cheating is clear: plagiarism is appropriation of any other person’s work and the unacknowledged incorporation of that work in one's own work offered for credit." It is theft. Punishment for plagiarism is an automatic NC [no credit for the course] and further disciplinary action may be taken.

Contacting the instructor or peer advisor
My office hours and office location are listed on the first page of this syllabus. Please email me to make an appointment if my office hours are not convenient. The peer advisor will post his/her office hour and contact information on Canvas.

Reasonable accommodation: Read the following statement and, if it applies to you, please visit the University's Center for Disability Services, 162 Student Union, or contact them at 581-5020 for information on how they can help you.

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice needs to be given to the instructor and to the Center for Disability Services, 162 Olpin Union Building, 581-5020 (V/TDD) to make arrangements for accommodations.

All printed information for this course can be made available in alternative format with prior notification to the Center for Disability Services.
SCHEDULE
Subject to change with prior notice

Week I -- Introduction
Aug 27 - [T]
  1. Introduce course; distribute syllabus
  2. Peer Advisor introductions
  3. Announce LEAP Convocation

Aug 28 – [W]
  • LEAP Convocation 4:00 – 5:00 pm at Officer’s Circle, Fort Douglas
    Extra credit given for attendance

Aug 29 - [TH]
  1. Theme: What is social science? How do we know what we know?
  2. Hand out interview assignment (due online by 11:59 pm, Saturday, September 21)
    Readings (posted on CANVAS):
    • E.R. Babbie, Ch. 1 “An introduction to inquiry”
    • E.R. Babbie, Ch. 3 “The nature of causation”

Week II -- Society and Technology
Sept 3 - [T]
  1. Theme: Society and Technology
  Readings:
    • C.E Harris, Jr., M.S. Pritchard and M.J. Rabins, Ch. 5, “The Social and Value Dimensions of Technology”
    • N. Canton (for CNN), “Cell phone culture: How cultural differences affect mobile use”
    • M. Richten (for NYTimes), “Attached to technology and paying a price”

Sept 5 - [TH]
  1. Theme: Society and Technology – is technology neutral?
  2. Reading Quiz 1
    Readings:
    • R. L. Whelchel, “Is technology neutral?”
    • J.M. Wetmore, “Amish technology: Reinforcing values and building community”
**Week III – Society and Technology**

Sept 10 - [T]
1. Theme: Technology and ethics
2. Discuss how to write a memo
3. *Hand out: Memo Assignment (due online by Saturday, October 5 at 11:59 pm)*
   
   **Readings:**
   - F. Dyson, “Technology and social justice”
   - V. di Norcia, “Technological complexity and ethical control”

Sept 12 - [TH]
1. Risk Assessment and Technology
2. Case study: Three Mile Island
3. Watch movie: “Meltdown at Three Mile Island” [60 minutes]
   
   **Reading:**
   - J.R. Herkert, “Technology policy and ethical issues”

**Week IV – Risk Assessment and Engineering “Failures”**

Sept 17 - [T]
1. Theme: Risk Assessment in an international and domestic context
2. *Reading Quiz 2*
3. Begin watching movie: Bhopal: The Search for Justice” (if time)
   
   **Readings:**
   - G. Stix, “Bhopal: A tragedy in waiting”
   - T. Donaldson, “The ethics of global risk”

Sept 19 – [TH]
1. Theme: Risk Assessment in an international context
2. Watch movie: “Bhopal: The Search for Justice” [~60 minutes]
   
   **Readings:**
   - Please **read** at least two other articles found on the BBC webpage on Bhopal; ([http://news.bbc.co.uk/2/hi/programmes/bhopal/default.stm](http://news.bbc.co.uk/2/hi/programmes/bhopal/default.stm))
Sept 21 – [Sat]  *Interview with an Engineer due online by 11:59 pm*

**Week V -- Risk Assessment**

Sept 24 - [T]
1. Case study: The Challenger
2. *Reading Quiz 3*

Readings:
- C. E. Harris, “Explaining disasters: A case for preventive ethics”

Sept 26 - [TH]
- MIDTERM (in class)

**Week VI – Engineering Ethics**

Oct 1 - [T]
1. Theme: Engineering Ethics and Professionalism
2. Discuss case studies
3. *Reading Quiz 4*

Readings:
- C.B. Fleddermann, “Professionalism and codes of ethics” Engineering Ethics
- S.K.A. Pfatteicher, “Learning from failure: Terrorism and ethics in engineering education”

Oct 3 - [TH] – Guest speaker [unconfirmed]

- Oct 5 – [Sat] – *MEMO DUE ONLINE via CANVAS by 11:59 pm*

**Week VII – Sustainability, Ethics, and Engineering**

Oct 8 - [T] Sustainability and Engineering
1. Discussion of Teams
2. *Hand out description of semester team project*

Readings:
- H. Petroski, “Alternative energies”
Oct 10 - [TH]
First Library Class, meet in Marriott library
- Section 7 is in rm 1009 Marriott Library *(room may change)*
- Section 8 is in rm 1160 Marriott library
- Section 6 is in rm 1120 Marriott library
Team Assignment #1: Team drafts research proposal to be posted on Canvas by 11:59 pm, Saturday, October 12th. [10 pts]

Week VIII – Fall Break [Oct 13 - 20]

Week IX -- Sustainability and Team Project
Oct 22 - [T]
1. Theme: Sustainability
2. Review how to effectively work in teams
   Readings:
   - J.R. Herkert, “Engineering and sustainable development.”
   - S. Beder, “The role of technology in sustainable development”

Oct 24 - [TH]
Second Library Class, meet in Marriott Library
- Section 7 is in rm 1009 Marriott Library *(room may change)*
- Section 8 is in rm 1160 Marriott library
- Section 6 is in rm 1120 Marriott library
Team Assignment #2: Team produces a research memo that evaluates science and engineering details of the technology. Research memo with powerpoint slides is to be posted on Canvas by 11:59 pm, Tuesday, October 29. [10 points]

Week X – Sustainability and Team Project
Oct 29 - [T]
1. Discuss Concept of Materials Life Cycle
2. Team Meeting in class (45 minutes)
3. Mandatory Attendance Day: please bring laptop
   Readings:
   - M. Specter, “Big Foot. In measuring carbon emissions, it’s easy to confuse morality and science”
Oct 31 - [TH]
Third Library Class, meet in Marriott Library
- Section 7 is in rm 1110 Marriott Library
- Section 8 is in rm 1160 Marriott library
- Section 6 is in rm 1120 Marriott library

Team Assignment #3: Team produces a research memo that evaluates technology and sustainability connections. Memo includes a progress report on research problems to date. Research memo with powerpoint slides is to be posted on Canvas by 11:59 pm, Tuesday, November 12. [10 points]

**Week XI – Guest speakers and Materials Life Cycle**

Nov 5 - [T]
1. Team meeting in class (45 minutes)
2. Mandatory Attendance Day: please bring laptop
3. Continue discussion of the Materials Life Cycle

Guest speaker possible (for ½ the class)

Nov 7 - [TH] Sustainability and Materials Life Cycle
Guest speakers possible [unconfirmed]

Reading: To be announced

**Week XII -- Technology, Society and Public Policy**

Nov 12 - [T]
1. Theme: Technology and Public Policy
   Guest speaker possible [unconfirmed]
   Reading:
   - B.C. Field, “Environmental policy: concepts and issues”

Nov 14 - [TH]
Fourth Library Class, meet in Marriott Library
- Section 7 is in rm 1110 Marriott Library
- Section 8 is in rm 1160 Marriott library
- Section 6 is in rm 1120 Marriott library

Team Assignment #4: Team edits the research memo and includes the ethical and policy implications of the technology/research. The edited research memo with powerpoint slides is to be posted on Canvas by 11:59 pm, Tuesday, November 19. [10 points]
Week XIII – Team Research and Preparation for Presentation
Nov 19 - [T]
1. Team meeting: 45 minutes in class
2. **Mandatory Attendance Day: please bring laptop to class**
3. Problem-solve research issues with policy and ethical implications of a particular technology
4. Discuss “Professional presentation strategies – How to present effectively”

Nov 21 - [TH]
**Fifth Library Class, meet in Marriott Library**
- Section 7 is in rm 1110 Marriott Library
- Section 8 is in rm 1160 Marriott library
- Section 6 is in rm 1120 Marriott library

Team Assignment #5: Please post the team’s PowerPoint, which includes a “Notes” section, on Canvas by midnight, Wednesday, November 27. [10 points]

Week XIV – Team Research and Preparation for Presentation
Nov 26 - [T]
1. Team Meeting #5 in-class:
2. **Mandatory Attendance Day: please bring laptop to class**
3. Team Final Report assignment handed out in class, due online via Canvas by 11:59 pm on Tuesday, December 17.

Nov 28 - [TH]
Thanksgiving – No class

Week XV – Prepare for Team Presentation
Dec 3 - [T]
1. In class workshop – work on research reports/presentations for mock engineering conference
2. Faculty and Peer Advisors review PowerPoint and presentation notes in class with individual teams
3. **Mandatory Attendance Day 5: please bring laptop to class.**

Dec 5 - [TH]
Two Team Presentations
Week XVI – Team Presentations
Dec 10 - [T]
   Two Team Presentations

Dec 12 - [TH]
   Two Team Presentations

Week XVII -- FINALS WEEK
Dec 17 – Team Final Report due online via Canvas by 11:59 pm December 17, 2013
   * Individual evaluation of teammates’ work on the Final Report due by
     11:59 pm, December 18, 2013 via email (R.Larsen@leap.utah.edu)