Introduction to concepts, theory and practice of engineering leadership. Engineering leadership characteristics; individual and cultural differences, service and management contexts; managing change, conflicts, and crises; real-world ethics and core values.

Rationale
Engineering students are typically well-prepared with technical knowledge and skills that are prerequisite to solving problems. However, recent changes to the Canadian Engineering Accreditation Board recognize that contributions made by engineers to our society also depend upon proficiency in key non-technical areas, both in terms of knowledge and skills. Furthermore, service is a core value for the engineering profession and one that is strongly held and promoted by the Faculty of Applied Science at UBC. The goal of this course is to provide students with leadership education, and engineering service experiences to hone their non-technical skills and enhance the service ethic within their professional development.

Learning Objectives
Through guest lectures, reading, reflections and project work, students will gain a deepened understanding of the inter-connected nature of global challenges and develop a passion for leadership through service. Building on the four key themes of leadership, ethical community engagement, participatory planning and understanding differences, students successfully completing the course will:

- Understand the importance of service as a core value in leadership
- Articulate the role of the engineer in a wide range of projects, social and cultural contexts, and responsibility levels
- Identify and apply key concepts in leadership theory
- Be able to carry out systematic mapping of global/technical issues within human, economic, and environmental systems
- Develop critical thinking skills outside of traditional engineering problems to meet local and international challenges by:
  - Asking important questions
  - Looking at a broad range of issues and options from various perspectives
  - Balancing qualitative assessments with quantitative metrics in evaluation processes
  - Considering a broad range of solutions
  - Evaluating the impact of decisions
  - Incorporating sound ethical stances in technical and non-technical decision-making
● Develop inter-cultural communication skills
● Develop self-assessment skills
  ▪ Being aware of one's own world view and values
  ▪ Being aware of the impact of one's actions on others and oneself
● Enhance integrative thinking
● Apply/practise leadership and project management skills:
  ▪ Planning and visioning techniques
  ▪ Personnel management
    ◦ Listening skills
    ◦ Negotiation, persuasion and conflict management
    ◦ Coaching and mentoring skills
    ◦ Team-building strategies and techniques
  ▪ Time management
  ▪ Priority setting

Configuration
APSC 461 is the first of a two-course series:

APSC 461 (3 credits, Technical Elective) is offered on the UBC campus during the Spring Session (May and June). Course material is generally delivered in a classroom environment. Students also participate in a Community-Based Experiential Learning (CBEL) project. Those registered in APSC 461 need not register in APSC 462.

APSC 462 (3 credits, Technology in Society credit) is a full-time, immersive, hands-on International Service Learning project practicum offered off-campus over a six- to twelve-week period. This year the course site is in Mexico and Costa Rica. Those registered in APSC 462 must also be registered in APSC 461 or have previously completed APSC 461.

Personnel
Instructor: Dr. Paul Winkelman
Department of Mechanical Engineering
Kaiser 1134
604-822-6762
pwinkel@mech.ubc.ca

CBEL Project Coordinator: Ara Beittoei
Officer, Community-Based Experiential Learning
Faculty of Applied Science & Centre for Community Engaged Learning
ara.beittoei@ubc.ca
604-822-0493
Consulting Support:  
Dr. Tatiana Teslenko (Senior Instructor, Mechanical Engineering)  
Kerri Leeper (International Service Learning Advisor, Centre for Community Engaged Learning)

**Meeting Times:**  

Dates:  
May 12 to June 18, 2015 (Summer Session 1)

Meeting times:  
- Tuesdays, 15:00 to 17:30 (Lecture/Discussion: 6 in total)  
- Thursday, 15:00 to 17:30 (Lecture/Discussion: 6 in total)

Location:  
Chemical and Biological Engineering Building, Room 103

**Course Structure**

Course material will be delivered through lectures, workshops, assigned readings and community interaction. Lectures will normally be delivered by guest speakers invited from industry, government and academia who have demonstrated leadership success and can speak to the key themes of the course. These lectures are generally followed by group discussions. As part of their project requirements, students will form liaisons with community partners.

**Grading Scheme**

Students will be assessed on an individual and team basis. The team mark will be based on the course project.

**Individual (55%)**

<table>
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<tr>
<th>Written assignments</th>
<th>40%</th>
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<tr>
<td>● a series of one-page reading logs based on pre-lecture readings</td>
<td>25%</td>
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<td>(normally one log per reading) to be handed in prior to each lecture</td>
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<tr>
<td>● 4 individual reflections connecting topics from readings, lectures and the team</td>
<td>15%</td>
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<td>projects; the first due May 19, the second, May 28, the third June 11, and the</td>
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<td>fourth June 25</td>
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**Participation**

Participation is based on both attendance of lectures and subsequent discussion sessions, as well as active engagement in discussions.
Team (45%)

All team grades are based on a Community-Based Experiential Learning project. Each team will have from 4 to 6 students; the team project is identified in consultation with the course instructor and CBEL project coordinator. Students may bring their own project, but are subject to approval as qualifying projects must allow for the development and demonstration of servant leadership qualities by drawing on technical and non-technical knowledge in a community setting. Students should expect to spend about four hours a week meeting, with additional time for implementation.

Proposal (due May 26) 15%
Document which describes and justifies a course of action to be taken in response to a request by a community partner. Refer to the Proposal Guidelines* for details.

Presentation (June 18) 10%
Ten-minute presentation followed by a 5 minute discussion. Refer to Presentation Guidelines* and Presentation Evaluation Form* for details.

Final Report (due June 25) 20%
Document that describes and justifies the course of action taken to fulfil the request of the “community partner”. Refer to Report Guidelines* for details.

- Up to 5/20 will be based on how comments to the proposal have been addressed
- Remainder will be for the report as a whole, with emphasis on the additions beyond the proposal

*Sign into Connect and look under “Projects” - “Project Guidelines” or click https://connect.ubc.ca/webapps/blackboard/content/listContentEditable.jsp?content_id=_2773460_1&course_id=_62207_1
<table>
<thead>
<tr>
<th>Speakers:</th>
<th>Paul Winkelman, Tatiana Teslenko, Ara Beittoei</th>
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<tbody>
<tr>
<td>Topic:</td>
<td><em>Introduction and How to Write a Reflection</em></td>
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<tr>
<td>Due:</td>
<td>Responses to introductory questions</td>
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</tbody>
</table>
| Session:            | Project introductions (Ara Beittoei)  
|                     | Ethical Community Engagement (Ara Beittoei) |
| On-Going Project Activities: | Review Project Descriptions document  
|                     | Determine top three project choices  
|                     | Complete Tri-Council Policy Statement tutorial, [https://tcps2core.ca/login](https://tcps2core.ca/login) |

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<thead>
<tr>
<th>Speaker:</th>
<th>Michael Meitner, Department of Forest Resources Management, UBC</th>
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<tbody>
<tr>
<td>Topic:</td>
<td><em>Adaptive Leadership</em></td>
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</table>
| Due:                | Reading log  
|                     | Tri-Council Policy certificate  
|                     | Project selection  
|                     | Team formation; exchange contact information |
| Session:            | Project Planning (Ara Beittoei) |
| On-Going Project Activities: | Conduct research on selected project  
|                     | Establish contact with community partner  
|                     | Prepare questions for community partner  
|                     | Meet with community partner; set scope and scale; set dates and times for future meetings  
|                     | Begin filling in Consent Form Template (log into [Connect](http://www.hbs.edu/socialenterprise/pdf/Best%20Champion%20Chapter.pdf) and look under the “Projects” folder) |
3

**Speaker:** [Remote] Santiago Hinojosa, Tsomanotik  
**Topic:** Challenges of Asset-Based Development in Chiapas  

1. Compare/contrast Cavise's description of the value system of lawyers (law students) with the traditional value system of engineers (engineering students).
2. To what extent do you identify with either the traditional or the proposed value system of law students as described by Cavise? Where did/does your value system come from? It may be helpful to think back to the time when you first seriously considered studying engineering and compare those impressions of engineering with your present-day impressions. Have your values shifted as all? If so, have they shifted in an identifiable direction?

**Tsomanotik (2014). Conocenos, Proyectos, Vida en Comunidad.** [http://www.manotik.org](http://www.manotik.org) (Spanish only available) or [https://www.youtube.com/watch?v=Vf9k11fBn1A](https://www.youtube.com/watch?v=Vf9k11fBn1A)  

1. Based on the Tsomanotik website, provide three questions you would like to ask Bet Barrios and Santiago Hinojosa.
2. Based on the article by Leonard Cavise, provide one question you would like to ask Bet and Daniel Barrios.

**Due:** Reading logs  
Reflection, first submission  
Discussion pair formation  

**Session** Is This *Engineering* Leadership? (Paul Winkelman)

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**On-Going Project Activities:**  
Research background information  
Begin preparation of proposal  
Complete revisions to Consent Form Template  

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4

**Speaker:** Kerri Leeper (Centre for Community Engaged Learning, International Service Learning)  
**Topic:** Leadership, Partnership and the Participatory Process  

**Due:** Reading log  
Situational analysis  

**Session** Situational Analysis (Kerri Leeper)  
Review of Proposal Guidelines
### On-Going Project Activities:
- Determine research methodology
- Contact community partner with additional questions
- Further develop and complete proposal

#### Speaker: Cristina Delgado, School of Education and Childhood Studies, Capilano University

**Topic:** *The Necessary Impossibility of Community*


http://web.a.ebscohost.com.ezproxy.library.ubc.ca/ehost/detail/detail?vid=2&sid=f8d96cbf-72c5-4834-ae63-fd6ef3dbce24%40sessionmgr4004&hid=4109&bdata=JnNpdGU9ZWhvc3QtbGl2ZS5uZXRh#db=ejq&AN=26470507 (CWL login required)

**Due:** Reading log

**Session** Discussion facilitation, (Sasha and Kaibo) and (Zach and Stelios)

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### On-Going Project Activities:
- Determine weaknesses/strengths of proposal
- Continue development of research strategy

#### Speaker: Ara Beittoei, Faculty of Applied Science, UBC

**Topic:** *Systems Thinking and Complex Problems*


http://www.cgdev.org/doc/CGDPresentations/complexity/player.html

**Due:** Reading log

**Session** Review of Proposal with teams (Paul Winkelman)

---

### On-Going Project Activities:
- Review proposal with community partner
- Refine research approach with community partner
- Begin data collection
### Day 7

**Speaker:** Daniel Justice, First Nations Study Program, UBC  
**Topic:** Colonialism  
**Due:** Reading log  
**Session** Student-led discussion  
**On-Going Project Activities:** Collate preliminary data  
Analyse data; reassess research methods  
Discuss with community partner

### Day 8

**Speaker:** Paul Winkelman, Department of Mechanical Engineering  
**Topic:** Understanding Engineering Values through the Philosophy of Science  
**Due:** Reading log  
**Session** Student-led discussion  
**On-Going Project Activities:** Begin developing final report  
Continue with data collection  
Collate data into "reports" (to become appendices in the final report)  
Present preliminary recommendations to community partner
9  Speaker: [Remote] **Ricardo Segovia**, E-Tech International  
**Topic:** Engineering as Humanizing Praxis  
**Readings:**  
https://www.ted.com/talks/ernesto_sirolli_want_to_help_someone_shut_up_and_listen/transcript?language=en#t-633372  
Standard reading log.  
It is easy as an engineer doing "development" work to take the role as a "keeper of knowledge" whose job it is to teach this knowledge to non-experts. Paulo Freire, a Brazilian educator challenged this one-directional learning in his 1968 book, Pedagogy of the Oppressed. He is a firm believer in "praxis", a continuous process of reflection in order to best perform any work, and considers education a two-way street towards liberation of the oppressed.  
**Questions:** 1. What do you think is an "uncompleted being"? 2. How can education (and engineering) "dehumanize"? How can it "humanize"? 3. What would Freire say is the purpose of engineering in a setting where individuals might exist under oppression or extreme poverty?  
**Due:**  
Reading log  
Discussion facilitation, (Avis, Goomin and Brian C.)  
**Session**  
Student-led discussion  
Class discussion: project challenges  
**On-Going Project Activities:** Continue developing Final Report  
Review collected data  
Collect additional data, if required

10  Speaker: **Anthony Candelario**, Recent Water and Sanitation Staff, Engineers Without Borders Canada  
**Topic:** Facilitating Environmental Health and Sanitation in Malawi  
**Readings:**  
Standard reading log.  
**Due:**  
Reading log  
Individual project reflection, third submission  
Discussion facilitation, (April and Brian W.)  
**Session**  
Class discussion  
**On-Going Project Activities:** Continue developing Final Report  
Review collected data  
Collect additional data, if required
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<thead>
<tr>
<th>Date</th>
<th>Speaker</th>
<th>Topic</th>
<th>Readings</th>
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<th>Session</th>
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<tbody>
<tr>
<td>Tuesday</td>
<td>Sheelagh Davis, Leadership, OD &amp;</td>
<td>Building Cultural Fluency: Skills</td>
<td>LeBaron, Michelle (2003). Excerpts from Chapters 1, 2 and 3. <em>Bridging</em></td>
<td>Reading log</td>
<td>Review of presentation guidelines</td>
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<td></td>
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<td>Excerpts available on <a href="#">Connect</a>. Read pp. 10-11 and 32-43.</td>
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<td>Standard reading log.</td>
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<td>Mechanical Engineering, UBC</td>
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<td>Vol. 3. Available on <a href="#">Connect</a>.</td>
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<td>Standard reading log.</td>
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<td>Final report (in most cases)</td>
<td>Individual project reflection, fourth submission</td>
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<td>Make presentation to community</td>
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<td>Readings to Support Project</td>
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<td>Development</td>
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<td></td>
<td>Baillie, Caroline 2009</td>
<td>Engineering and Society: Working</td>
<td>[Engineering and Society Synthesis Lectures on Engineers, Technology and</td>
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### Additional Suggested Readings


Lucena, Juan; Schneider, Jen and Leydens, Jon A. 2010 *Engineering and Sustainable Community Development*. Morgan and Claypool Publishers


<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Year</th>
<th>Title</th>
<th>Publisher</th>
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<tr>
<td></td>
<td></td>
<td><a href="http://www.cognitive-edge.com">www.cognitive-edge.com</a> and David Snowden blog on complex adaptive systems</td>
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