



## Course Syllabus

### Calendar description

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  
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CBEL Project Coordinator: Ara Beittoei  
 Officer, Community-Based Experiential Learning  
 Faculty of Applied Science & Centre for Community Engaged Learning  
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 604-822-0493

Consulting Support: Dr. Tatiana Teslenko (Senior Instructor, Mechanical Engineering)  
Kerri Leeper (International Service Learning Advisor, Centre for  
CommunityEngaged 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%)

<b>Written assignments</b>	40%
<ul style="list-style-type: none"><li>a series of one-page reading logs based on pre-lecture readings (normally one log per reading) to be handed in prior to each lecture</li></ul>	25%
<ul style="list-style-type: none"><li>4 individual reflections connecting topics from readings, lectures and the team projects; the first due May 19, the second, May 28, the third June 11, and the fourth June 25</li></ul>	15%
<b>Participation</b>	15%
Participation is based on both attendance of lectures and subsequent discussion sessions, as well as active engagement in discussions.	

## **Team (45%)**

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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.

<b>Proposal</b> (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 <b><u>Proposal Guidelines*</u></b> for details.	
<b>Presentation</b> (June 18)	10%
Ten-minute presentation followed by a 5 minute discussion. Refer to <b><u>Presentation Guidelines*</u></b> and <b><u>Presentation Evaluation Form*</u></b> for details.	
<b>Final Report</b> (due June 25)	20%
Document that describes and justifies the course of action taken to fulfil the request of the “community partner”. Refer to <b><u>Report Guidelines*</u></b> for details.	
<ul style="list-style-type: none"><li>● Up to 5/20 will be based on how comments to the proposal have been addressed</li><li>● Remainder will be for the report as a whole, with emphasis on the additions beyond the proposal</li></ul>	

\*Sign into [Connect](https://connect.ubc.ca/webapps/blackboard/content/listContentEditable.jsp?content_id=_2773460_1&course_id=_62207_1) 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](https://connect.ubc.ca/webapps/blackboard/content/listContentEditable.jsp?content_id=_2773460_1&course_id=_62207_1)

## Lecture Schedule/**Project Activities** (Speaker, topics and readings subject to change)

1

Tuesday

May 12

**Speakers:** Paul Winkelman, Tatiana Teslenko, Ara Beittoei

**Topic:** *Introduction and How to Write a Reflection*

**Readings:**

Ash, S. L., & Clayton, P. H. (2004). "The articulated learning: An approach to guided reflection and assessment." *Innovative Higher Education*, Vol. 29, pp. 137-154. <http://web.b.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=2&sid=8b0ba6ad-fe74-4bc4-94ad-4e849c9e1c0e%40sessionmgr112&hid=128> (CWL login required)

For reference only (no reading log).

**Due:** Responses to introductory questions

**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>*

2

Thursday

May 14

**Speaker:** Michael Meitner, Department of Forest Resources Management, UBC

**Topic:** *Adaptive Leadership*

**Readings:**

Sternin, Jerry (2003). Practice Positive Deviance for Extraordinary Social and Organizational Change. Chapter 3 in Ulrich, Dave, Marshall Goldsmith, Louis Carter, Jim Bolt, Norm Smallwood and Warner Burke. *The Change Champion's Fieldguide*. Best Practice Publications. **Read only pp. 20-32.** <http://www.hbs.edu/socialenterprise/pdf/Best%20Champion%20Chapter.pdf>

Standard reading log, BUT replace Question 4 with: How might this reading connect with the course in general?.

**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](#) and look under the "Projects" folder*

3

Tuesday  
May 19

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

**Readings:**

Cavise, Leonard L. (2008). Law School Programs that Reduce Poverty: The Example of the Chiapas Human Rights Practicum. *Vincentian Heritage Journal*: Vol. 28, Issue 2, Article 18, pp. 249-262. **Read only pp. 249-258.** <http://via.library.depaul.edu/vhj/vol28/iss2/18>

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> (Spanish only available) or <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)

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

4

Thursday  
May 21

**Speaker:** **Kerri Leeper** (Centre for Community Engaged Learning, International Service Learning)

**Topic:** *Leadership, Partnership and the Participatory Process*

**Readings:**

Arnstein, Sherry R. (1969) A Ladder of Citizen Participation. *JAIP*, Vol. 35, No. 4 (July), pp. 216-224. <http://www.tandfonline.com/doi/pdf/10.1080/01944366908977225> (CWL login required)

Standard reading log.

**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*

5

Tuesday  
May 26

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

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

**Readings:**

Biesta, G. (2004). The Community of Those Who Have Nothing in Common: Education and the Language of Responsibility. *Interchange*, Vol. 35, No. 3, pp. 307-324. **Read from bottom of p. 310 to mid 321.**  
<http://web.a.ebscohost.com.ezproxy.library.ubc.ca/ehost/detail/detail?vid=2&sid=f8d96cbf-72c5-4834-ae63-fd6ef3dbbc24%40sessionmgr4004&hid=4109&bdata=JnNpdGU9ZWZwY29wZT1zaXRl#db=eue&AN=26470507> (CWL login required)

Standard reading log.

**Due:** Reading log

*Proposal*

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

**Session** Student-led discussion

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

6

Thursday  
May 28

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

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

**Readings:**

Barder, Owen. (n.d.) [Video] Development and Complexity. Centre for Global Development in Europe.  
<http://www.cgdev.org/doc/CGDPresentations/complexity/player.html>

Standard reading log.

**Due:** Reading log

Individual project reflection, second submission

**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*

7

Tuesday  
June 02

**Speaker:** Daniel Justice, First Nations Study Program, UBC

**Topic:** Colonialism

**Readings:**

Anderson, Mark and Carmen Robertson (2007). The "Bended Elbow" News, Kenora 1974: How a Small-Town Newspaper Promoted Colonization. *American Indian Quarterly*, Vol. 31, No. 3, pp. 410-440. **Read only pages 410 to 423.** <http://www.jstor.org/stable/pdf/30114251.pdf?acceptTC=true>

Standard reading log.

**Due:** Reading log

Discussion facilitation, (Nicha and Rana) and (Ming and Janelle)

**Session** Student-led discussion

**On-Going Project Activities:** *Collate preliminary data  
Analyze data; reassess research methods  
Discuss with community partner*

8

Thursday  
June 04

**Speaker:** Paul Winkelman, Department of Mechanical Engineering

**Topic:** *Understanding Engineering Values through the Philosophy of Science*

**Readings:**

Lewontin, R.C. (1992) Chapter 1, A Reasonable Skepticism. In *Biology as Ideology*. New York: Harper Perennial. Available on [Connect](#), or <https://www.andrew.cmu.edu/course/76-101AA/readings/Lewontinfull.htm>

Standard reading log.

**Due:** Reading log

Discussion facilitation, (Ian and Smit) and (Tom and Matt)

**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

Tuesday  
June 09

**Speaker:** [Remote] **Ricardo Segovia**, E-Tech International

**Topic:** *Engineering as Humanizing Praxis*

**Readings:**

Sirolli, Ernesto (2012). [Video] Want to Help? Shut Up and Listen!  
[https://www.ted.com/talks/ernesto\\_sirolli\\_want\\_to\\_help\\_someone\\_shut\\_up\\_and\\_listen/transcript?language=en#t-633372](https://www.ted.com/talks/ernesto_sirolli_want_to_help_someone_shut_up_and_listen/transcript?language=en#t-633372)

Standard reading log.

Freire, Paulo (1993). *Pedagogy of the Oppressed*. New York: Continuum Books. Chapter 1. Read pp. 1-2 and 11-15. Available on [Connect](#). The entire book is available at <https://libcom.org/files/FreirePedagogyoftheOppressed.pdf>. Corresponding pp, 43-46; 62-69.

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

Thursday  
June 11

**Speaker:** **Anthony Candelario**, Recent Water and Sanitation Staff, Engineers Without Borders Canada

**Topic:** *Facilitating Environmental Health and Sanitation in Malawi*

**Readings:**

Booth, David (2013). *Facilitating Development: An Arm's Length Approach to Aid*. Overseas Development Institute. Read Sections 1-2 and 5-7. Available on [Connect](#), or at <http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/8791.pdf>.

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

11

Tuesday  
June 16

**Speaker:** Sheelagh Davis, Leadership, OD & Diversity Educator/Consultant

**Topic:** *Building Cultural Fluency: Skills for Working Across Difference*

**Readings:**

LeBaron, Michelle (2003). Excerpts from Chapters 1, 2 and 3. *Bridging Cultural Conflicts: A New Approach for a Changing World*. Jossey-Bass. Excerpts available on [Connect](#). Read pp. 10-11 and 32-43.

Standard reading log.

**Due:** Reading log

**Session** Review of presentation guidelines  
Connecting concepts

*On-Going Project Activities: Prepare class presentation*

12

Thursday  
June 18

**Speaker:** Paul Winkelman, Department of Mechanical Engineering, UBC

**Topic:** *Closing Session: "Book Stuff"*

**Readings:**

Khol, Ronald (1993). That Book Stuff Ain't Always Right. *Machine Design*, Vol. 3. Available on [Connect](#),

Standard reading log.

**Due:** Reading log

**Session** *Project presentations (at 3:00)*

*On-Going Project Activities: Further develop final report; determine weaknesses  
Address weaknesses with further research or data collection  
Make presentation to community  
Complete final report*

12+

Thursday  
June 25

**Due:** *Final report (in most cases)*

Individual project reflection, fourth submission

### Readings to Support Project Development

Baillie, Caroline 2009 *Engineering and Society: Working Towards Social Justice, Part I: Engineering and Society Synthesis Lectures on Engineers, Technology and Society.*  
<http://www.morganclaypool.com/doi/abs/10.2200/S00136ED1V01Y200905ETS008> . (doi:10.2200/S00136ED1V01Y200905ETS008)

- Malcolm, Shirley M. 2008 The Human Face of Engineering. *Journal of Engineering Education*, 97(3; July), pp. 237–238.  
[http://www.engr.wisc.edu/services/elc/21st\\_Century\\_Engr\\_Educ\\_editorials.pdf](http://www.engr.wisc.edu/services/elc/21st_Century_Engr_Educ_editorials.pdf)
- Yin, Robert K. 2003 Case Study Research: Design and Methods. Sage Publications: Thousand Oaks, CA.

## Additional Suggested Readings

- Burgos, Elizabeth 1991 Me Llamo Rigoberta Menchu y Así me Nació la Conciencia. Mexico City: Siglo Veintiuno Editores.
- Dietz, Thomas; Ostrom, Elinor and Stern, Paul C. 2003 The struggle to govern the commons. *Science* 302(5652):1907-1913.
- Ekins, P. and Max-Neef, M. 1992 Real-life economics: understanding wealth creation. London: Routledge.
- Evans, M.D. and Evans, D.M. 2001 "Community service project planning for ASCE student chapters/clubs." *Journal of Professional Issues in Engineering Education and Practice*, Vol. 127(4): 175-183.
- Friedman, T. 2005 The World is Flat, <http://www.thomasfriedman.com/bookshelf/the-world-is-flat>
- Guthrie, P., J. Calestous and S. Hayaatun (editors) 2008 Engineering Change Towards a sustainable future in the developing world. *Engineering Management Journal*. Vol. 1. London: The Royal Academy of Engineering.
- Korhonen, J. 2004 Industrial ecology in the strategic sustainable development model: strategic applications of industrial ecology. *Journal of Cleaner Production* 12: 809-823.
- Lucena, Juan; Schneider, Jen and Leydens, Jon A. 2010 Engineering and Sustainable Community Development. Morgan and Claypool Publishers
- Lima, M and W. Oakes 2006 Service-Learning: Engineering in Your Community, Great Lakes Press, 2006.
- Manion, M. 2002 Ethics, engineering, and sustainable development. *IEEE Technology and Society Magazine*, 21(3): 39-48.
- Meadows, D. Thinking in Systems. Chelsea Green Publishing.  
<http://www.amazon.com/Thinking-Systems-Donella-H-Meadows/dp/1603580557>
- Mulder, K. 2006 Sustainable Development for Engineers: A Handbook and Resource Guide. Sheffield, UK, Greenleaf.
- National Academy of Engineering 2004 The Engineer of 2020: Visions of Engineering in the New Century. Washington, DC, The National Academies Press.

- Polak, Paul 2008 Out of poverty: what works when traditional approaches fail.  
[http://waterforhumans.org/documents/Out\\_of\\_Poverty.pdf](http://waterforhumans.org/documents/Out_of_Poverty.pdf).
- Senge, P. M., and G. Carstedt 2002 Innovating our way to the next industrial revolution. *MIT Sloan Management Review*. 42(2): 24- 38.  
[www.cognitive-edge.com](http://www.cognitive-edge.com) and David Snowden blog on complex adaptive systems