PACS 315: Engineering and Peace

Class Time: Wednesdays 7:00-9:50 PM
Location: Room 1302, Conrad Grebel University College

Instructor: Paul Heidebrecht
Office Hours: Wednesdays 3:30-4:30 PM or by appointment
Office Location: Room 4203, Conrad Grebel University College
Phone: 519-885-0220 Ext. 24225
Email: pheidebr@uwaterloo.ca (best way to reach me)

Course Description:
This course is built on the conviction that the kinds of problems engineers seek to address, and the ways they seek to address them, should matter for anyone interested in advancing peace in the world. Topics include: historical connections between the discipline of engineering and warfare, understanding the engineering method and mindset, and technological frontiers for peacebuilding.

Intended to test the foundational assumption of the University of Waterloo’s Peace and Conflict Studies program—that peace is everybody’s business—initial offerings of this course verified that PACS has something important to offer to the field of engineering, and that engineering as a discipline has something important to contribute to the advancement of peace. This course is also intended to encourage and equip students to tackle pressing social challenges through other curricular (e.g., Capstone Design or Senior Research projects) and co-curricular (e.g., co-op work terms or entrepreneurship programming) offerings at Waterloo.

Course Learning Outcomes:
By the end of the term, students should be able to:
1. clearly articulate why peace is the business of engineers;
2. augment their approach to analyzing and solving problems with insights from both engineering and peacebuilding theory and practice;
3. convince non-engineers that engineers can contribute to building sustainable peace; and
4. identify opportunities to apply their expertise and passions to make a meaningful social impact.

Required Reading Materials:
Required readings for each class are highlighted in the weekly course outline and course bibliography that follows, and are all accessible online or via LEARN. The length will vary from week to week.

In addition, students will also be required to sign up for and read the “Weekly Roundup” e-mail from the PeaceTech Lab based in the U.S. Institute for Peace in Washington, DC, which highlights stories on technology, media, and data in peacebuilding: http://www.peacetechlab.org/news-roundup-signup

1 This class meets on the traditional territory of the Attawandaron (also known as Neutral), Anishinaabe and Haudenosaunee peoples. Conrad Grebel University College and the University of Waterloo are situated on the Haldimand Tract, land promised to the Six Nations that includes 10 kilometres on each side of the Grand River.
Guest Speakers:
Each class will begin with a conversation with a guest speaker that relates either to the topic of the day or to the overall learning outcomes for the class. These individuals have unique expertise and life experiences to share; they also have busy schedules, and so the roster of guests is subject to change on short notice.

Course Assessment:

<table>
<thead>
<tr>
<th>Element</th>
<th>Weighting</th>
<th>Due Date</th>
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<tbody>
<tr>
<td>In-class Assignments</td>
<td>50% (best 10 of 12 x 5% each)</td>
<td>Weekly</td>
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<tr>
<td>Course Engagement</td>
<td>25%</td>
<td>Various</td>
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<tr>
<td>Final Exam</td>
<td>25%</td>
<td>Dec. 14</td>
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Additional Assignment Instructions:

(i) In-class Assignments
Every class session will include an assignment that will require students to work individually and/or in teams to address a problem or complete an exercise related to the topic of the day. This will be a major component of student evaluation, and detailed instructions will be provided for each individual assignment. Assignments will NOT be accepted for any missed classes. The assessment rubric is as follows:

- **60%** – Met the minimum expectations for the assignment
- **75%** – Demonstrated a meaningful level of engagement with the assignment
- **90%** – Made a contribution that went above and beyond expectations

(ii) Course Engagement
Assessment of engagement will utilize a specifications grading approach, which aims to better align the evaluation of student performance with the learning outcomes intended for this course. Each engagement activity level is graded pass/fail, and the overall course engagement grade will be based on the number of levels that students complete successfully, as noted below:

- **Level 1**: 60% – All class surveys submitted
  - Provide feedback on course topics, readings, guests, and assignments via surveys posted on LEARN throughout the semester.
- **Level 2**: 70% – Level 1 successfully completed + active contributions to class discussions
  - Submit one or two relevant and probing questions via e-mail by noon on the day of class for at least four assigned readings and at least one guest speaker.
- **Level 3**: 80% – Levels 1 and 2 successfully completed + participation in one campus or community event
  - Submit a report via LEARN (and, when time permits, orally) on a campus or community event attended that was related to a topic discussed in class (due by Nov. 21).
- **Level 4**: 90% – Levels 1, 2, and 3 successfully completed + extended reading
  - Submit a book review via LEARN for one of the books listed in the “Extended Reading Bibliography” at the end of this syllabus (due by Nov. 28).
- **Level 5**: 100% – Levels 1, 2, 3, and 4 successfully completed + one of the following options:
  - Participate in the Quantum Valley Investments Problem Pitch Competition (applications for “Billion Dollar Problems” due Sep. 30): [http://velocity.uwaterloo.ca/problempitch/](http://velocity.uwaterloo.ca/problempitch/); or
  - Submit an entry into the University of Waterloo’s HeForShe writing contest (due Oct. 1): [https://uwaterloo.ca/heforshe/heforshe-writing-contest](https://uwaterloo.ca/heforshe/heforshe-writing-contest); or
  - Publish an Op Ed or article in an on-campus or community newspaper that answers the question: “Why is peace the business of engineers?” (published by Nov. 28).
Additional Assignment Instructions, continued:

(iii) Final Exam
This class will conclude with a take-home final exam distributed at the end of class on November 28; answers must be submitted via LEARN by the end of the day on December 14. The exam will be composed of essay questions that provide the opportunity to demonstrate your own knowledge of the topics and readings encountered throughout this course, and insights you have gleaned from class discussions and assignments. Evaluation will also be based on the overall presentation and organization of your answer, including sentence structure and mechanics.

Additional UWaterloo Course Policies:

Academic Integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo are expected to promote honesty, trust, fairness, respect and responsibility. See the Office of Academic Integrity webpage for more information.

Discipline: A student is expected to know what constitutes academic integrity, to avoid committing academic offences, and to take responsibility for his/her actions. Check the Office of Academic Integrity for more information. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about “rules” for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to Policy 71 - Student Discipline. For typical penalties check Guidelines for the Assessment of Penalties.

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70 - Student Petitions and Grievances, Section 4. When in doubt, please be certain to contact the department’s administrative assistant who will provide further assistance.

Appeals: A decision made or penalty imposed under Policy 70 - Student Petitions and Grievances (other than a petition) or Policy 71 - Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72 - Student Appeals.

Accommodation for Students with Disabilities:
A note for students with disabilities: The AccessAbility Services office, located on the first floor of the Needles Hall extension (1401), collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the AS office at the beginning of each academic term.

Mental Health Support:
All of us need a support system. The faculty and staff at Conrad Grebel University College encourage students to seek out mental health supports if they are needed.
Mental Health Support, continued:

On Campus:
- Counselling Services: counselling.services@uwaterloo.ca / 519-888-4567 Ext. 32655
- MATES: one-to-one peer support program offered by Federation of Students (FEDS) and Counselling Services
- Health Services Emergency service: located across the creek from Student Life Centre

Off campus, 24/7:
- Good2Talk: Free confidential help line for post-secondary students. Phone: 1-866-925-5454
- Grand River Hospital: Emergency care for mental health crisis. Phone: 519-749-433 ext. 6880
- Here 24/7: Mental Health and Crisis Service Team. Phone: 1-844-437-3247
- OK2BME: set of support services for lesbian, gay, bisexual, transgender or questioning teens in Waterloo. Phone: 519-884-0000 extension 213

Full details can be found online at the Faculty of ARTS website
Download UWaterloo and regional mental health resources (PDF)
Download the WatSafe app to your phone to quickly access mental health support information
Course Schedule:
The following schedule will be revised on an ongoing basis to reflect changes in reading assignments and refinements to the course schedule. All changes will be announced in advance in class and updated on Waterloo LEARN.

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<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Reading Assignment</th>
<th>Additional Notes</th>
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<tbody>
<tr>
<td>1</td>
<td>Sep. 12</td>
<td>Course introduction: Why peace is everybody’s business</td>
<td>N/a</td>
<td>Guests: Sarah Steiner, Jared Baribeau; In-class assignment #1 due</td>
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<td>2</td>
<td>Sep. 19</td>
<td>Why has war been the business of so many engineers?</td>
<td>1. Blank, “Hidden in Plain Sight: The Secret History of Silicon Valley”&lt;br&gt;2. Nieusma and Blue, “Engineering and War”</td>
<td>Guest: Melanie Baker; In-class assignment #2 due</td>
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<td>3</td>
<td>Sep. 26</td>
<td>Peace movements as a response to changes in the technology of warfare</td>
<td>1. Gillis, <em>Disarmament: A Basic Guide</em> (chapters 3-11)</td>
<td>Guest: Pat Martinson; In-class assignment #3 due</td>
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<td>8</td>
<td>Oct. 31</td>
<td>Peacebuilding for people who aren’t peacebuilding professionals</td>
<td>1. Docherty and Lantz-Simmons, “What is Old is New Again”</td>
<td>Guest: Rachel Reist; In-class assignment #8 due</td>
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Course Schedule, continued:

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<td>11</td>
<td>Nov. 21</td>
<td>Conflict on the project team</td>
<td>1. Efti, “Conflict resolution 101 for startups”</td>
<td>Guest: Crista Renner; In-class assignment #11 due</td>
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<td>12</td>
<td>Nov. 28</td>
<td>Engineers as social innovators</td>
<td>1. National Academy of Engineering, “Grand Challenges for Engineering” 2. Riley, “We’ve Been Framed!”</td>
<td>Guest: Nada Basir; In-class assignment #12 due; Take home Final Exam distributed</td>
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<td>Dec. 14</td>
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<td>Final Exam due via LEARN Dropbox</td>
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Required Reading Bibliography:


Required Reading Bibliography, continued:

https://ssir.org/book_reviews/entry/the_fuzzy_and_the_techie_why_the_liberal_arts_will_rule_the_digital_world


National Academy of Engineering. “Grand Challenges for Engineering.”
http://www.engineeringchallenges.org/

https://ojs.library.queensu.ca/index.php/IJESJP/article/view/3519

https://www.faithandleadership.com/henry-petroski-value-failure

https://ojs.library.queensu.ca/index.php/IJESJP/article/view/4307


Extended Reading Bibliography:


