CSI/ELG/SEG2911: Professional Practice
Ideas for Projects

Project 1
Engineering and Computing Education
Partnership Course Development Portfolio

"Thinking out of the box" to develop a joint course or program with an industrial partner. This could be an idea for an open-ended innovation task based on student's understandings, ideas, and competencies. To narrow down the search you may consider developing an outline for a full credited course (actual or virtual) by your university and *Shopify* as an industrial partner. You may consider another industrial partner based on the nature of the course, company, and proximity.

Shopify is a company based in the Canadian city of Ottawa. It is the leading cloud-based, commerce platform designed for small- and medium-sized businesses. Merchants can use Shopify software to design, set up, and manage their stores across various sales channels, including web, mobile, social media, marketplaces, brick-and-mortar locations, and pop-up shops. Shopify currently powers over 300, 000 businesses in approximately 150 countries and is trusted by leading companies such as Tesla Motors, Budweiser, Red Bull, the New York Stock Exchange, and others.

- Identify the nature of the course, actual or virtual.
- Name the course.
- Develop a course outline including course objectives, elements, description, learning outcome, materials and reading, evaluation process, components and weights, and course policies.
- Propose a feasible approach where Shopify (or another industrial partner of your choice) can contribute to the course.
- Highlights the importance of professional practice learning in developing the module.
- Use a proper course outline template.
- Analyze information and data to create a digital portfolio that may be formatted as prescribed by the instructor and would be a key component in assessing the competencies.
- Organize your work in a well written technical report as well as oral presentation according to the requirements of the course.

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Project 2
Engineering and Computing Education
Portfolio on design studio for sustainability

Design studios provide a hands-on environment for working on design projects (Carlson and Sullivan 1999). How does an engineering school create a design studio for sustainability in which students understand and practice design from year 1 to year 4? The design studio learning often moves learners from dependent and instructional learning formats to more independent projects and inquiries, building self-knowledge and entrepreneurship. A range of exercises may be introduced to encourage relational and creative complex problem-solving techniques that would help in reinforcing their design solutions. The following represents a guideline to develop the task.

- What is learning through making?
- What are the key components of the proposed design studio?
- What are the best strategies and practices for designing group projects?
- What are the best strategies and practices to engage students in deep design learning?
- As a year 1 task: propose an approach and/or a model based on conceptual design scenario that reflects a technical transport problem of unsustainable (inefficient) car.
- As a year 2 task: propose an approach and/or a model based on conceptual design scenario that reflects a technical transport problem of sustainable (efficient) car.
- As a year 3 task: propose an approach and/or a model based on detail design that reflects a technical transport problem of sustainable (efficient) car.
- As a year 4 task: propose an approach and/or a model based on implementation and operation that reflects a technical transport problem of sustainable (efficient) car.
- In the above task, narrow down the objectives of the task. You may focus on one transport model such as the car.
- Highlights the importance of professional practice learning in developing the module.
- Organize your work in a well written technical report as well as oral presentation according to the requirements of the course.

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Project 3
Engineering and Computing Education
What Montessori can do for Engineering?

Montessori methods underscore the importance of three main elements that current engineering education usually includes, but may not have articulated as clearly as the Montessori system. These are the power of the story to engage and need for a meaningful context, the role of the sensorial while teaching (hands-on activities), and the learning spiral in evaluation (evaluating gradual building of knowledge).

- Based on the above three elements, develop a portfolio with a 2-min video for organizing a 1-h lesson, to be offered to primary school students.

- This engineering-based lesson should leverage Montessori's knowledge of moving from whole to parts, concrete to abstract, and known to unknown.

- Select one engineering topic and determine its activities that would lead to the next level of engineering in the spiral.

- Frame the activities in a way that would excite the students as they are re-exposed to the lesson in the future.

- Highlights the importance of professional practice learning in developing the module.

- Organize your work in a well written technical report as well as oral presentation according to the requirements of the course.

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Project 4
Engineering and Computing Education
Entrepreneurial Think-Tank on Student Engagement

Both teacher and students should participate in the learning process, but the teacher must involve students in the knowledge-building process and encourage collaboration and togetherness in the classroom. This approach is more effective when learners are autonomous, self-directed, and willing to construct their own learning experience and valuable competencies.

- For this task, a team of two students are asked to develop three-week entrepreneurial learning activity to be embedded in typical engineering course.

- The activity should involve open-ended engaging questions and adopt a student-centered approach to teaching and learning.

- An evaluation criterion as part of the course assessment should also be included. The team may reflect the outline of the activity in a digital poster format.

- Highlights the importance of professional practice learning in developing the module.

- Organize your work in a well written technical report as well as oral presentation according to the requirements of the course.