ELG 4912 F - Electrical Engineering Design Project: Part I  
Projet de Design en Génie Électrique: Partie I

September 04 – December 03, 2019
Lecture:     Friday 14:30 - 15:50; 591 Cumberland (SCR) 002

* Students must attend all lectures and laboratory sessions *

Description  Cours et exercices sur la méthodologie du design et du développement de produits, et le rôle de l'ingénieur professionnel à cet égard. Sélection d'un projet qui pourra développer les habiletés de design, du travail d'équipe et d'entrepreneuriat. Formation des équipes. documentation et présentation de la première itération du projet de design.

Lectures and tutorials on product design and development methodology, and the role of the professional engineer in this regard. Selection of a project that will build, team work and entrepreneurial skills. Formation of teams. Documentation and presentation of first iteration of design project.

Laboratory Required, Lecture Required
https://catalogue.uottawa.ca/en/courses/elg/

Prerequisites: ELG 3106 Electromagnetic Engineering, ELG 3136 Electronics II, ELG 3175 Introduction to Communication Systems, ELG 3155 Introduction to Control Systems

Professor:
Emil M. Petriu, P.Eng., http://www.site.uottawa.ca/~petriu/, petriu@uottawa.ca

Course organization:
It is expected that, in this course, students will apply previously acquired theoretical and experimental knowledge and skills (as guaranteed by the mandatory prerequisites) in order to carry out a significant capstone engineering design project.

The lectures will be delivered in 1.5 hour/week sessions aiming to provide a general framework for project design. A team of usually 4 students will work together on a project. The weekly project lab sessions will be under the supervision of the TA.

"Engineering design integrates mathematics, natural sciences, engineering sciences, and complementary studies in order to develop elements, systems, and processes to meet specific needs. It is a creative, iterative, and open-ended process, subject to constraints which may be governed by standards or legislation to varying degrees depending upon the discipline. These constraints may also relate to economic, health, safety, environmental, societal or other interdisciplinary factors. The engineering curriculum must culminate in a significant design experience conducted under the professional responsibility of faculty licensed to practise engineering in Canada, preferably in the jurisdiction in which the institution is located. The significant design experience is based on the knowledge and skills acquired in earlier work and it preferably gives students an involvement in team work and project management." [CEAB – Accreditation Criteria and Procedures, sections 3.4.4.3 and 3.4.4.4]

During this engineering design project, the students are expected to demonstrate the following graduate attributes: (i) competence and mastery of the specialized knowledge that they acquired in the electrical engineering program, (ii) ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve the complex engineering problems in order to reach the substantiated conclusions pertinent to the specific project, (iii) ability to investigate complex problems using appropriate design methodologies including appropriate experiments, data analysis and interpretation, and information synthesis, (iv) ability to pursue an open-ended design process that uses the existent body of engineering knowledge and practice in that field in order to formulate, critically evaluate, and experimentally validate the appropriate design solutions for solving the specific design problems with appropriate attention paid to health and safety risks, applicable standards, and economic, environmental, cultural and societal considerations, (v) ability to create and critically select, apply, adapt, and extend appropriate engineering techniques, resources, and tools while recognizing their limitations, (vi) ability to work effectively as a member as well as a leader of the design team, (vii) ability to
communicate complex engineering concepts within the engineering community as well as with the society at large (including listening, reading, writing, speaking, and comprehension, effectively giving and responding to clear instructions, as well as writing reports and producing design documentation), (viii) understanding the role and responsibilities of a professional engineer in society, especially the primary role of protection of the public and the public interest, (ix) ability to analyze social and environmental aspects of the engineering practice including understanding of the economic, social, health, safety, legal, and cultural implications of the engineering practice and of the available solutions to avoid and mitigate possible negative effects of these implications, as well as ability to understand and pursue sustainable engineering design and development solutions and environmental stewardship, (x) ability to recognize ethical and equity situations and appropriately apply the professional ethics and equity principles while demonstrating individual accountability, (xi) ability to develop sound project management plans by appropriately incorporating economic, financial, technical & human resources aspects, and business practice considerations including risks, (xii) ability to identify and address their own life-long learning needs in order to maintain their competence and contribute to the advancement of the engineering in a changing world by independently acquiring and evaluating information from a wide variety of sources of engineering knowledge and practice.

Marking Scheme

* Please note that due to the nature of this course, it will not be possible to evaluate and return academic work pertinent to this course that is worth at least 25% of the final course mark no later than one week prior to the deadline for withdrawal without academic penalty.

* Midterm Project Report: (20% of the final mark) The midterm exam will be in the form of a progress report that should show the teamwork as well as each member’s contribution up to the midterm date. The report should be submitted to the professor and TA no later than Oct. 21, 2019, noon. The midterm reports will be discussed individually with each team member, during the scheduled lab sessions.

* Project Progress Review: (20% of the final mark) The design teams will review during the regular lab sessions the design methodology and experimental aspects of their project. The design teams will schedule together with the professor and the TA a specific time for their presentations during the regular lab hours on Oct. 29, Oct. 30, Oct. 31, Nov. 5, or Nov. 6, 2019.

* Final Project Presentation: (20% of the final mark) The presentation will be conducted in front of the evaluation committee and with the attendance of all the course students and any other students wishing to attend. Each member of the team will have to talk about her or his own contribution to the design project including the project report, lab and lecture participation, and individual contribution to the collective team effort. Team members will be evaluated individually based on their personal performance. Each team will have max 20 minutes for slides and 10 minutes for discussions. The teams will schedule together with the professor and the TA a specific time for their presentations on one of the following time slots during the last two weeks of the Fall term: Nov. 19, Nov. 20 (after 3:30 PM), Nov. 21, Nov. 22, Nov. 26, Nov. 27, Nov. 28, and Nov 29, 2019 during the regular lab or lecture hours.

* Final Project Report (40% of the final mark) This will be a comprehensive formal report including the background of the work conducted, the design methodology, the design diagrams, the analysis of the results obtained, and the conclusion and recommendation of further development. The report should demonstrate how the students have addressed the graduate attributes (detailed in the Course Organization section) during the engineering design project. It is expected that each team member underlines his/her personal contribution to the project. 60% of the mark given on the report will be assigned collectively to all the members of the team. 40% of the mark given on the report will be assigned individually to each member of the team. The final-exam report should be submitted to the professor and TA no later than: Dec. 3, 2019, 23h00.