

Course Outline (F2015)

COE 700: Engineering Design

Course Coordinator	Dr. V. Geurkov
Faculty Lab Coordinators (FLCs)	Drs. J. Alirezaie, A. Anpalagan, R. Cheung, K. Clowes, M. Jaseemuddin, S. Karim, M. Kassam, L. Kirischian, N. Mekhiel, K. Raahemifar, B. Venkatesh, D. Xu, C. Yang, A. Yazdani, A. Ye, F. Yuan, M. Zeytinoglu
Prerequisites	COE 628 , COE 608 , COE 528 , ELE 635 , ELE 639 and ELE 504
Compulsory Texts	<i>Teamwork and Project Management</i> , Karl A. Smith, 3 rd edition, McGraw Hill, 2004.
Reference Text	<ol style="list-style-type: none"> 1) M. Horenstein, "Design Concepts for Engineers", 3rd, Prentice Hall, 2006. 2) R. Eggert, "Engineering Design", Pearson Prentice Hall, 2005. 3) B. Hyman, "Fundamentals of Engineering Design", Prentice Hall, 2003. 4) J. Salt and R. Rothery, "Design for Electrical and Computer Engineers", John Wiley & Sons, Inc., 2002.
Course Calendar Description	<p>This one term course has two objectives. (1) The lectures provide students with advice on design, project management, reliability, practical advice on software, circuits and components and the documentation of their work. The lectures are organized as a seminar series presented by the faculty lab coordinators and practicing engineering professionals. The seminar series' goal is to provide students with knowledge that will assist them with project design and implementation. (2) The laboratory component of the course provides students with an opportunity to select a project to be completed in the Winter semester course COE 800 Design Project. Students search information, design and source components in consultation with the faculty lab coordinators who will supervise their projects in the Winter term. Project topics are provided from which students select a topic.</p>
CEAB Learning Objectives	<p>At the end of this course, the successful student will be able to:</p> <ol style="list-style-type: none"> 1) Predict user needs, define design parameters, and identify constraints in the process of defining Engineering Design Project (EDP). (4b) 2) Develop students' ability and technical skills to make decisions in engineering designs using judgment in solving problems with uncertainty and imprecise information, and selecting optimal choice among alternatives applying known constraints identified in the project definition. (4g, 2a)

- 3) Demonstrates written and oral communication skill through the ability of constructing effective arguments and drawing conclusions using evidence in discussing design choices, using technical vocabulary, and presenting information clearly and concisely. (7a, 7b)
- 4) Demonstrates team building and project management knowledge through inter-personal skills, team dynamics, understanding of systematically decomposing project into key tasks, determining tasks inter-relationship, and managing project to meet budget and time line. (6b, 11b)
- 5) Demonstrate ability to assimilate existing knowledge of the field, understand how literature is produced and maintain currency. (12b)

Note: Numbers in parentheses refer to the graduate attributes required by the Canadian Engineering Accreditation Board. For more information, see:
http://www.feas.ryerson.ca/quality_assurance/accreditation.pdf

**Course
Organization**

The engineering design projects are selected from a published list of project topics on the course web site, early in the term in accordance with the enclosed schedule. All topics are 3-student projects.

In Weeks 2 to 3, students carry out studies on their interested topics. Students meet with the professors teaching this course termed the Faculty Lab Coordinators (FLCs) to discuss their project topics available for student selection and the design challenges for those projects.

In Weeks 4 lecture hours, a seminar on “Design Process and Project Management” is scheduled.

Students must select their project topics by **the end of week 5** according to the procedure described at <http://www.ee.ryerson.ca/capstone/topicreservation.html>. If a student team did not select any topic till the end of week 5, the topic assignment will be done by the Department computer system from the remaining listed topics. The procedure of the computer selection will be announced.

In Week 6 lecture hours, students must do an examination (25% of total course grade) on the subject of Design Process and Project Management.

During Weeks 7 to 11, students either attend seminars or carry out design work in a specific location or laboratory and report to their designated FLC. Seminars are team-taught by the guest speakers or FLCs. These seminars will be scheduled and announced on the course D2L.

During Weeks 12 and 13, students must do their Oral Exam with their designated FLCs and electronically submit their Final Report.

Hours: 2 hours per week

Course Evaluation

Course evaluation will be based on students' performance and design reports.

Design Process and Project Management Exam	25%
Weekly Project Progress	10%
Seminars Attendances and Quizzes	10%
Project Oral Exam	20%
Final written report summarizing design activities	35%

Note: Each project group consists of 3 students. Each student will be evaluated individually.

Examination on “Design Process and Project Management” is carried out in Week 6.

Students must attend specified seminars and submit project milestones (Week 8) and weekly (Weeks 9 to 11) project progress reports to their FLC for evaluation prior to meeting with their FLCs.

The final written reports will be assessed not only on their technical merit, but also on the communication skills of their author as exhibited through the reports. The written report will be evaluated as follows:

i) *Introduction and Objective*

-Statement of the problem, clarification of need and requirements

ii) *Approach and Methods*

-Relevant literature review, use of suitable engineering concepts and methods
-Alternative design approaches examined and analyzed

iii) *Design Analysis & Synthesis*

-Design specifications, challenges and methodology
-Use of modern concepts and methods for data gathering, analysis, and synthesis
-Charts on the design process

iv) *Technical Writing, and General Organization*

-English, spelling, conciseness, clarity, cover page, index, sequence of chapters, references, appendices, overall adequacy, and integration of the report

Approved Projects List

In order to assist students in selecting a suitable project, a list of EDP Topics is posted on the Departmental EDP Web site (<http://www.ee.ryerson.ca/capstone/>).

All topics are 3-student projects. Each project on the list has been approved as a possible design project. The Web site description contains a preamble that gives an overview of the project and explains why it is of interest. Partial specifications, objectives, and suggested approach are included.

Student Generated Topics

Students are encouraged to propose a project that does not appear in the approved project list or to suggest modifications to published projects to accommodate their interests. A proposal must be in a similar format as the topics posted on EDP Course Web site and include a general outline incorporating a block diagram that is used to clarify the functionality and project scope. A detailed system specification target, cost estimate, and suggested applications for the concepts incorporated are required. The project proposal must be submitted to the course coordinator for further approval and assignment to a potential FLC before Week 6.

Activity Schedule

Week	Presenters/ Evaluators	Activities
1 Sep 7-13	EDP Coordinator	Course Management
2 Sep 14-20	FLCs	Studying and Selection of Topics
3 Sep 21-27	FLCs	Studying and Selection of Topics
4 Sep 28-Oct 4	Dr. M. Jaseemuddin	Design Process and Project Management Seminar
5 Oct 5-11	FLCs	Computer Selection of Topics
6 Oct 12-18	FLCs	Design Process and Project Management Exam
7 Oct 19-25	FLCs	Students meet with their assigned FLCs
8 Oct 26-Nov 1	FLCs	Project Milestones submitted to the FLCs
9 Nov 2-8	Guest Speaker/ FLCs	Seminar/ Lab Weekly Progress Report #1 submitted to the FLCs
10 Nov 9-15	Guest Speaker/ FLCs	Seminar/ Lab Weekly Progress Report #2 submitted to the FLCs
11 Nov 16-22	Guest Speaker/ FLCs	Seminar/ Lab Weekly Progress Report #3 submitted to the FLCs
12 Nov 23-29	FLCs	Project Design Oral Exam
13 Nov 30-Dec 6	FLCs	Project Design Oral Exam, Final Report Submission

Project Cost, Equipment, and Laboratories

Project costs for components and other supplies will be borne by the students. Some specialized components may be provided by the Department. This will be noted in the project description. Students should carefully assess the cost implications of a particular project before making a commitment. Requests for equipment or laboratory usage outside of your scheduled lab hours should be directed to your FLC.

Roles of FLC & FA

This course presents administrators with a major challenge in coordination. There is a broad project spectrum as each person, in the entire fourth-year student body, selects a unique project. Laboratory resources must be managed to ensure their adequacy, longevity, student safety, and security. Students are to be placed with a FLC who can advise them.

Role of Faculty Laboratory Coordinator (FLC)

- 1) Assist the course coordinator in assessing the acceptability of students' generated projects when requested, particularly in terms of the mandatory minimum 50% design component.
- 2) Ensure that the minimum 50% design component is in each project under their supervision.

- 3) Provide, where feasible, technical and project management advice without unduly removing the challenge from the student.
- 4) Advise the student, where necessary and possible, in the acquisition of parts, test equipment, and specialized laboratory facilities, as required.
- 5) Monitor the student's weekly progress during the two hours of lab sessions.
- 6) Evaluate the overall project results based on performance on their project, milestone demonstration, and design content in the engineering project report.

Role of Faculty Advisor (FA)

The FA is a faculty member who has voluntarily suggested a project or is formally or informally advising the student. When a FA generates a project, the FA is acknowledged in the Engineering Design description. A FA may or may not be interested in assisting the student beyond the project generation phase. As a courtesy, the student should always discuss the project with the FA when one exists and establish the nature and extent of any advice the FA wishes to provide. Upon project completion, in the Winter Term, it is suggested that the student provide an Engineering Design report copy to the FA if the advisor so wishes. This copy does not have to be bound.

Scope of EDP

The project component COE 700 will make significant demands on the student's time. The key to completing all aspects of this course is to carefully define reasonable limits to what is being undertaken and to budget time on a regular basis to minimize last minute rushes. Two-hour lab sessions per week are assigned in Week 7 to 13. In these lab sessions, the student has the chance to discuss challenges that arise and log their progress in their project with their FLC. As stated earlier, the intended value of the engineering design project is to provide a major experience in engineering design. Therefore, it is important that the project is thoroughly researched and well under way in COE 700 during the Fall Term and a plan of actions for the Winter Term course COE 800 is carefully drawn up. Your FLC may refuse to assist the student who has not made a reasonable effort to solve their problem.

Ultimately, the successful completion of the project is the sole responsibility of the student.

Important Notes

1. All of the required course-specific written reports will be assessed not only on their technical/academic merit, but also on the communication skills exhibited through these reports.
2. Should a student miss an exam or equivalent, with appropriate documentation, a make-up will be scheduled as soon as possible in the same semester. Make-ups should cover the same material as the original assessment but need not be of an identical format. Only if it is not possible to schedule such a make-up may the weight of the missed work be placed on another single assessment. This may not cause that exam or assessment to be worth more than 70% of the student's final grade. If a student misses a scheduled make-up test or exam, the grade may be distributed over other course assessments even if that makes the grade on the final exam worth more than 70% of the final grade in the course.
3. Students who miss a exam for a verifiable reason and who cannot be given a make-up exam prior to the submission of final course grades, must be given a grade of INC (as outlined in the *Grading Promotion and Academic Standing Policy*) and a make-up exam (normally within 2 weeks of the beginning of the next semester) that carries the same weight and measures the same knowledge, must be scheduled.
4. Medical or Compassionate documents for the missing of an exam must be submitted within 3 working days of the exam. Students are responsible for notifying the FLC/course coordinator that they will be missing an exam as soon as possible.

5. Requests for accommodation of specific religious or spiritual observance must be presented to the FLC/ course coordinator no later than two weeks prior to the conflict in question. In extenuating circumstances this deadline may be extended. If the dates are not known well in advance because they are linked to other conditions, requests should be submitted as soon as possible in advance of the required observance. Given that timely requests will prevent difficulties with arranging constructive accommodations, students are strongly encouraged to notify the FLC/course coordinator of an observance accommodation issue within the first two weeks of classes.
6. Students are required to adhere to all relevant University policies including the Student Code of Academic Conduct (www.ryerson.ca/senate/policies/pol60.pdf) and Non-Academic Conduct (<http://www.ryerson.ca/senate/policies/pol61.pdf>).
7. Students are required to obtain and maintain a Ryerson Matrix e-mail account for timely communications between the instructor and the students.
8. Any changes in the course outline, test dates, marking or evaluation will be discussed in class prior to being implemented.

EDP Coordinator _____ Date _____

Approved by _____ Date _____

Program Director