

Math 493 - Engineering Mathematics Project

Fall Term 2008 and Winter Term 2009

Coordinator: Tamas Linder – Jeffery Hall 401
Phone: 533-2417, E-mail: linder@mast.queensu.ca

Office Hours: By appointment

Grading:

1. Signed Project Proposal (Week 4): 10%
2. Oral Progress Report (Week 12): 10%
3. Draft of Design Chapter (Week 16): 10%
4. Final Oral Report: (Week 22): 20%
5. Thesis (Week 24: last day of classes): 50%

Week 1:

- * *Organizational Meeting:* Friday, September 12, 3:30 pm, Jeffery Hall, Room 110.
- * *Social Meeting:* Friday, September 12, 4:00 pm, Jeffery Hall, main lobby.

Course Overview

Students pursue supervised research on an engineering topic and report on it periodically throughout the year. Research topics are selected from a list distributed early in the fall term, or by consultation with faculty members. Projects typically involve the design and implementation of some piece of equipment, or software; emphasis is placed on projects where engineering and mathematics fit together nicely. A written proposal for the project is due at the end of Week 4 (during the first term), and a draft of the Engineering Design Chapter of the Thesis at the end of Week 16 (during the second term). Communication skills are also stressed in the proposal, in the oral progress report in the first term, in the Engineering Design Chapter and in the final oral and written reports on the results of the investigation. In order to develop teamwork skills, students are required to work in groups (of up to three students). All projects are supervised (or co-supervised) by Mathematics and Engineering faculty members. The marks are assigned jointly by the supervisors, the course coordinator and by other Mathematics and Engineering faculty.

Course Road Map

1. **Choosing a Team and a Project:** You are expected to form your research team during the first two weeks of classes. The size of a team may be two or three members. It is paramount that the work load is uniformly distributed among all team members; this will be verified by the supervisors and the Teaching Assistants throughout the year. If some of you are having difficulty finding a team by the end of Week 2, then contact me for assistance.

The thesis topic you work on can be selected from the circulated list of projects. You may also consult with a particular faculty if you have a topic in mind (e.g., relating to a summer job). Your topic can also relate to a previous thesis that attracts your attention (theses from previous years are shelved in the Undergraduate Resource Room on the second floor of Jeffery Hall). All projects must be supervised by Mathematics and Engineering faculty. It is also possible to work with a faculty from another Department as long as a Mathematics and Engineering faculty is serving as a co-supervisor.

2. **Project Proposal – Week 4:** A written thesis proposal signed by the project team members and the supervising faculty, must be submitted by the end of Week 4 (drop it at the front desk in Room 310). Even though faculty are thoroughly involved in the thesis projects, you should adopt a style appropriate for your Mathematics and Engineering class. This is the audience you should keep in mind for all the written work in the course, and for the oral presentations.

The proposal should be no longer than 15 pages. Its contents should include the following sections: Introduction/Background, Problem Description, Proposed Solution/Design, Project Timeline (in *both* Tabular and Gant Chart formats), Team Members and Load Distribution/Assigned Tasks. Two examples of previous project proposals are attached.

3. **Oral Progress Report – Week 12:** A ten to fifteen minute progress report describing your thesis topic, your methodology, and progress to date, will be given during Week 12; a tentative date is *Wednesday, November 26, 2008*. The audience will be your Mathematics and Engineering class, Teaching Assistants, and faculty supervisors.
4. **Draft of Design Chapter – Week 16:** A draft of the design chapter of your thesis must be submitted to your supervisors by the end of Week 16 (during the second term). Around two

or three weeks later, you should meet with your supervisors for their comments on the chapter. For your reference, below is the definition of Engineering Design by the Canadian Engineering Accreditation Board (CEAB).

Engineering Design integrates mathematics, basic sciences, engineering sciences, and complementary studies in developing elements, systems, and processes to meet specific needs. It is a creative, iterative and often open-ended process subject to constraints which may be governed by standards or legislation to varying degrees depending upon the discipline. These constraints may relate to economic, health, safety, environmental, social or other pertinent factors.

5. **Final Oral Report – Week 22:** Work on the thesis should be almost completed by the end of Week 18, and completely wrapped up by the end of Week 22. The Mathematics and Engineering Conference will take place at the end of Week 22 (usually it is held on Saturday to avoid time conflicts); a tentative date is *Saturday, March 21, 2009*. Depending on size, each team will have between 20 to 30 minutes for the oral presentation.

6. **Thesis – Week 24:** You should start writing the thesis during Week 18, after you have received feedback from your supervisors regarding your design chapter draft. In the final six weeks, you are also encouraged to show a draft of your thesis to your supervisors for comments. The final copy of the thesis is due at the end of Week 24, on the last day of classes. *You should submit a hardcopy to each faculty supervisor, and two hardcopies and one soft copy on a CDROM to Ms. Johana Ng* (who will file one hardcopy for the Department and one hardcopy for the Library).

7. **Evaluation:** Marks will be assigned as follows.
 - (a) *Signed Project Proposal* (marked by course coordinator): 10%.
 - (b) *Oral Progress Report* (marked by attending Math. & Eng. faculty): 10%.
 - (c) *Draft of Design Chapter* (marked by supervisors): 10%.
 - (d) *Final Oral Report* (marked by attending Math. & Eng. faculty): 20%.
 - (e) *Thesis* (marked by supervisors): 50%.