

**SCHOOL OF ENGINEERING
UNIVERSITY OF GUELPH**

**ENGG*4110 BIOLOGICAL ENGINEERING DESIGN IV
ENGG*4120 ENGINEERING SYSTEMS AND COMPUTING DESIGN IV
ENGG*4130 ENVIRONMENTAL ENGINEERING DESIGN IV
ENGG*4150 WATER RESOURCES ENGINEERING DESIGN IV**

COURSE OUTLINE - Winter, 2004

Course Coordinator: **R.B. Brown, PhD, P.Eng.,**
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Course Description: **A comprehensive final project involving detailed design of elements, processes and systems which provide a solution for a specific engineering problem in the program of specialization.**

Course Restrictions: *This course may only be taken by engineering students in their final academic semester.* Each design group and project must be approved by the course coordinator during the course selection pre-registration period.

Course Objectives: The goal is to prepare students to deal with open-ended, multi-faceted design problems similar to those that they will encounter as working professionals. To that end, students will: (1) apply their academic knowledge to the solution of a specific engineering problem, (2) collect and analyse information and synthesize solutions taking into account significant technological, commercial, social and environmental factors, (3) summarize and communicate the design solution in written and graphical form as a final report, and, (4) present their design in a poster format at the end of the semester. The following specific activities will be required of the design teams:

- (a) **Submit a proposal** - An engineering project proposal will be submitted to the faculty advisor for grading (and to the external advisor if there is one). The proposal will define the scope, duration, schedules and deliverables for the interim and final design reports.
- (b) **Submit an interim project report** - An interim report will be prepared by the midpoint of the semester and submitted to the faculty advisor for grading (and to the external advisor) detailing progress and presenting information and design alternatives for discussion.
- (c) **Submit a final design report** - The final design report and all deliverables agreed to at the proposal stage will be submitted at the end of the semester. The faculty advisor will evaluate the work submitted and assign a grade to it.
- (d) **Create a poster** - Each team will create a poster presenting their work. Members of

the faculty, the University community and local engineers will be invited to view the posters, discuss them with the participants and offer comments to the course coordinator who will evaluate both the poster and the group's support of their work.

(e) **Submit Progress Report Memos** - Each team will prepare and submit progress report memoranda **to the course coordinator** at the time of submission of the proposal, at the submission of the interim report, at the end of the 9th class week and on the last day of the semester. The contribution of each student in the group must be clearly stated along with a summary describing each aspect of the work and describing overall progress to date. The group members must all sign the memo indicating agreement and acceptance of the content.

Course Format

There is a scheduled class meeting time (Tuesdays, 11:30-12:20 - Thornbrough 1200).

Attendance at the class meetings is required. It is expected that each group member will spend an average of ***15 hours per week on the project over the semester, i.e., this course is equivalent to two regular senior engineering science courses.*** The Design Studio and Resource Library is reserved for design group activity days and evenings. Contact Mrs. Lewis for after-hours card access.

Students work in teams of three or four individuals. ***It is expected that the selection of the team, the project and the faculty advisor was arranged before the start of the semester.*** Smaller (or larger) groups are only considered by the course coordinator under extraordinary circumstances, and approval is conditional on availability of sufficient resources. Inter-disciplinary groups are encouraged if a particular problem has sufficient scope to provide appropriate experience to all team members.

Each team is advised by a School faculty member responsible for helping to delineate the terms of reference for the project, providing guidance where necessary, and evaluating all written reports. The projects are self-administered: each team must carry out planning and execution of the project on its own. There will be no extension of the deadlines for submissions, except for serious health or compassionate reasons. ***Team members and their faculty advisor should discuss and record concerns about the group's progress at the interim report stage and take appropriate action.***

School Resources: Students are encouraged to build models and/or prototypes of devices or products designed. The facilities of the School of Engineering machine shop are available to design groups, as is access to the electrical and environmental laboratories. The need for, and costs of, materials, special services or use of other facilities should be foreseen. Requests must be made in writing to the course coordinator specifying the exact nature of the service required. Small grants (i.e., less than \$200) are available to purchase materials or components which are essential to the project but cannot be sourced within the School. A brief proposal in memo form must be submitted to the course coordinator for such items ***within the first two weeks of the***

semester. The funds available depend upon the School's budget, and are not guaranteed.

Report Requirements: Reports will follow the standard engineering report format followed in ENGG*2100 and ENGG*3100. Text will be supplemented with diagrams, charts, graphs and illustrations that contribute to overall clarity. Appendices should be typed if they are descriptive text but may be neatly handwritten in **black ink** if they contain a large number of engineering calculations. All calculations and drawings must be checked and approved (signed and initialled) as in standard engineering practice.

Grade Assigned: The final grade will be determined from the work submitted to the faculty advisor and course coordinator, and from evaluation of the poster presentation, and will be weighted as follows:

| | |
|---------------------|------|
| Proposal | 10 % |
| Interim Report | 15% |
| Final Report | 50% |
| Poster Presentation | 15% |
| Memos | 10% |

Individual grades assigned to members of the group may vary only if substantial differences in effort are apparent from the contribution sheets submitted with progress memos. Adjustments will be made by the course coordinator in consultation with the faculty advisor and the group members.

| Week No. | Student activity |
|----------|---|
| 0 | - Selection of project, formation of team, and selection of faculty advisor |
| 1 | - Confirm terms of reference and schedule faculty advisor meeting times - Prepare project proposal, including task list, logic network, and time schedule - Submit written proposal to faculty advisor on or before Friday, January 9, 17:00 h. |
| 2 | - Return of proposal from faculty advisor and discussion of project. |
| 6 | - Submission of written interim report on or before Friday, February 13, 17:00 h. |
| 12 | - Submission of written final report on or before Friday, April 2, 17:00 h. |
| 12 | - Poster presentations - Location, date and time TBA |

Attendance: Note! Attendance of all group members at the final poster presentation and evaluation is a course requirement.

Major Holy Days: The student must contact the instructor within the first two weeks of class if

academic consideration is to be requested due to religious reasons.