



MEMORANDUM

To: Executive Committee of Faculty Council

From: Dr. Graeme Norval
Chair, Undergraduate Curriculum Committee

Date: February 2, 2012 for March 7, 2012 Faculty Council Meeting

Re: **Proposed Substantive Curriculum Changes for the 2012-2013 Academic Year**

REPORT CLASSIFICATION

This is a *Major Policy Matter* that will be considered by the Executive Committee for endorsing and forwarding to Faculty Council for vote as a regular motion (requiring a simple majority of members voting to carry).

BACKGROUND

Several programs are proposing substantive changes to their curriculum, which are worthy of discussion at Faculty Council.

STRUCTURE

Civil Engineering

Deletion of CIV497H1 F (Engineering Design and Professional Practice), and replacement with a Free Elective.

The Capstone Design experience was originally conceived as a two-course sequence in which the first course covered various topics related to the design process, including elements of professional engineering practice, as well as a small-scale design project in preparation for the full term design experience in Second Term. The First Term course CIV497 is now largely redundant because many of these elements are adequately covered in the APS111/112 course sequence in first year, as well as other courses in the program. In addition, replacing CIV497 with a Free Elective will better accommodate students seeking a Minor.

Change Name and Course Description for CIV523S

The current name is Urban Excavations, which will change to Geotechnical Design. The new course description will be “This course is built around a transportation project that contains all essential geotechnical investigation and design elements and illustrates how they all come together on a project. The students will be taken through the entire design process from project initiation to construction. The project will include a bridge over a river with property constraints requiring the use of a retaining wall as well as deep and shallow foundations and groundwater control. The highway will require a soil cut. One section crosses a low-lying swampy area that will require embankment construction over deep soft soils. A short tunnel section is planned beneath a railway that cannot be taken out of service. A pavement design will be required along the entire route as well as materials testing and construction monitoring.”

Cross-Disciplinary Office

The course FOR424H1S, Design and Manufacturing of Sustainable Materials, is proposed for inclusion as an Advanced technical elective for both the Environmental Engineering Minor and the Bioengineering Minor. The course will cover the design principles underlying manufacturing of sustainable materials; novel technologies systems used for biocomposites; with special emphasis of bioplastics, biofibre, nanobiofibre, Biocomposites and nanobiocomposites.

Engineering Science

Course description changes for Praxis and Capstone Design courses.

The following course description changes are proposed in order to update the descriptions to match the current practice. The contact hours for ESC101F are being updated from 2/0/2 to 3/0/2 to allow for a pilot project of an interchange of students between APS111F/APS112S and ESC101F/ESC102S.

ESC101H1

Praxis I introduces students to the theory and practice of engineering design and communication. Through an integrated suite of interactive lectures, structured Design Studio activities, and multiple small-team projects, students explore core elements of these disciplines. Emphasis is placed on problem framing, divergent, convergent, and critical thinking, idea generation and selection, modelling and prototyping, efficient and effective teamwork, structuring design activities, constructing credible engineering arguments, and selected additional elements of engineering communication. Praxis I challenges students to explore the theories and principles that underpin engineering design and communication, to develop rigorous, individualized approaches to solving engineering problems, to adopt an outward looking and entrepreneurial engineering perspective, and to take an active role in shaping their future engineering studies.

ESC102H1

Praxis II follows from Praxis I and challenges students to apply, enhance, and refine their engineering design and communication skills. The design projects in Praxis II are both identified and defined by the students themselves, and focus on issues associated with the City of Toronto, its agencies and services, and its communities and citizens. In the first half of the course students, working in small teams, identify, frame, and document appropriate engineering challenges; in the second half they design, prototype, and present engineering solutions to a subset of those identified challenges. In support of these activities students continue to explore in greater depth the theories, tools, and practices of engineering design and communication. Praxis II culminates in an open showcase where students present their design solutions to representatives from interested governmental and non-governmental agencies, to their project stakeholders, and to the general public.

ESC470H1

A half-year capstone design course in which students work in teams to apply the engineering design, technical, and communication skills learned previously, while refining their skills in teamwork and project management. The course focus is on context-appropriate energy systems design and simulation, incorporating generation, transmission and storage of energy from across a range of traditional and alternative energy sources. Students identify, frame, and design solutions to problems that align with that focus, and the resulting designs are assessed on their engineering quality and design credibility. In addition, each student engages in individual critical reflection on their course activities, team performance, and on their growth as an engineering designer across their undergraduate program. Students are supported by a teaching team comprising both design and domain experts.

ESC471H1

A half-year capstone design course in which students work in small teams to apply the engineering design, technical, and communication skills learned previously, while refining their skills in teamwork and project management. The course focus is the (re)design and implementation of experiments suitable for the undergraduate classroom or laboratory. Students identify, frame, and design solutions to problems that align with that focus, and the resulting designs are assessed on their engineering quality and design credibility. In addition, each student engages in individual critical reflection on their course activities, team performance, and on their growth as an engineering designer across their undergraduate program. Students are supported by a teaching team comprising both design and domain experts.

ESC472H1

A half-year capstone design course in which students work in small teams to apply the engineering design, technical, and communication skills learned previously, while refining their skills in teamwork and project management. The course focus is on innovative, entrepreneurial engineering design, that results in a functional prototype. Students identify, frame, and design solutions to problems that align with that focus, and the resulting designs are assessed on their

engineering quality and design credibility. In addition, each student engages in individual critical reflection on their course activities, team performance, and on their growth as an engineering designer across their undergraduate program. Students are supported by a teaching team comprising both design and domain experts.

PROCESS

The Committee is composed of representatives from each program; the Vice-Dean, Undergraduate Studies; the Chair, First Year; the Associate Dean, Cross-Disciplinary Programs; and the Registrar's Office. The Committee meets regularly, and reviews changes to the curriculum.

PROGRAM

All programs are involved in these changes, and the impact on students in the various programs has been considered.

PROPOSAL/MOTION

Recommendation and Motion for Faculty Council:

“THAT the proposed substantive curriculum changes be approved and introduced in the 2012-2013 academic year.”