



MEMORANDUM

To: Executive Committee of Faculty Council

From: Professor Jean Zu, Graduate Chair
Department of Mechanical & Industrial Engineering

Professor Markus Bussman
Department of Mechanical & Industrial Engineering

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

Re: **Proposal for Flex-time Ph.D. Option in MIE**

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).

PROPOSAL/MOTION

As per the attached revised proposal, the Executive Committee recommends to Faculty Council the following regular motion –

“THAT the Flex-time Ph.D. Option in the Department of Mechanical & Industrial Engineering be established.”



Proposal - Flex-time Ph.D. Option in MIE

The Department of Mechanical & Industrial Engineering proposes to introduce a flexible-time (or "flex-time") option to the existing full-time Ph.D. program, to begin September, 2012. The new flex-time Ph.D. option would allow MIE to admit a few highly-qualified and highly-motivated Ph.D. students who are also employed full-time as practicing engineers. The School of Graduate Studies considers this a "minor modification to the graduate curriculum." This proposal presents the rationale for introducing this option, the program requirements for flex-time Ph.D. students, the approach to selecting and supervising such students to ensure their success, and addresses the issue of how to safeguard intellectual freedom. Appendices to this proposal contrast this option with the professional doctorate and part-time Ph.D. programs offered elsewhere, and briefly summarize the experience of the U of T Faculty of Pharmacy with their flex-time option.

Rationale

The Department of MIE seeks to develop avenues by which to conduct world-class research while promoting the mutually beneficial transfer of knowledge between the University of Toronto and industry partners. One means by which we would like to enable university/industry collaboration is by offering the opportunity for select highly-qualified engineers, working in an industrial R & D setting, to pursue a Ph.D. while continuing to work. This proposal for a flex-time Ph.D. option would allow us to develop three-way partnerships between students, industry, and MIE professors, where the research would be both industrially motivated and of academic interest.

Requirements of the flex-time Ph.D. option

The SGS guidelines for the flex-time Ph.D. option require that applicants demonstrate (i) that the research and proposed program of study are related to the applicant's professional work, and (ii) that they will continue their professional activities while registered in the program.

Students in the flex-time Ph.D. program option will register full-time during the first 4 years and part-time during subsequent years of the program. Students will pay full-time fees for the first 4 years and part-time fees thereafter. Students in this option are expected to be self-funded.

Transfers between the full-time Ph.D. and flex-time Ph.D. will not be permitted.

Students in the flex-time Ph.D. program option will be subject to the same requirements as students in the full-time program: completion of 2.5 full-course equivalents (FCE) and a thesis, attendance during the first two years of study at 70% of seminars that are part of the MIE Seminar Series (SRD 4444Y), participation in the non-credit seminar course JDE 1000H, and attendance at annual progress review meetings. Students whose professional background is such that they would be deemed to have fulfilled the breadth requirement SRD 4444Y may be exempted upon consultation with the admissions committee.

To accommodate the additional time likely to be required to take 5 half courses, the deadline for a qualifying exam will be extended to 16 months from initial registration. The time to achieve Candidacy will remain at 3 years, as it is for the full-time program. The normal program length will be extended to 6 years for the flex-time Ph.D. program option, from 4 for the full-time program. The time limit for the degree will be 8 years.

Procedures for admission and student supervision

The Department of MIE seeks to attract highly-qualified and highly-motivated practicing engineers who already hold a master's degree, who are employed full-time by a company or organization that is willing to support the long-term professional development of their employee, and that has an interest in partnering with an MIE professor on research of mutual interest.

The flex-time Ph.D. option will be posted on the MIE website, with information that clearly explains the motivation behind the program, and the type of student to whom this is directed. The SGS application system will be set to allow applications by invitation only; prospective applicants will be directed to first contact the MIE Graduate Coordinator to discuss the program. If the Coordinator feels that a prospective applicant may be a good fit for the program, the Coordinator will invite the applicant, a representative of the applicant's employer, and a prospective MIE supervisor to prepare a brief proposal for the MIE Graduate Studies committee, articulating a thesis topic, the extent to which the employer will provide time and resources for the student to work on their Ph.D., and a proposal on how the IP policies of the University will be respected, all of which the Graduate Studies Committee will assess. When the Committee is satisfied that the prospective student, his/her employer, and an MIE professor are all committed to the success of a student's program, the student will be invited to submit a formal application.

Once enrolled, flex-time Ph.D. students will be subject to the same requirements as full-time students. Flex-time students will be required to meet with a supervisory committee at least once a year, to demonstrate research progress, to hear feedback from the committee, and to allow an evaluation of whether the student remains in good academic standing.

Intellectual property

It is very important that this flex-time Ph.D. option be structured to safeguard the intellectual freedom required to do good research, to ensure a student's right to publish, and to clearly outline how IP will be shared. Every partnership between a flex-time Ph.D. student, a company or organization, and an MIE professor will require that a written agreement be in place to address these issues.

This program will result in a number of scenarios for university-industry interaction, but it is expected that most of these scenarios will fall into one of the following cases:

1. The work is done at a U of T lab and does not use resources from the industry partner. The IP developed will be owned by the inventors and the U of T, and will be governed by the U of T Inventions Policy.

2. The work is done at a U of T lab; the industry partner provides financial resources in the form of a grant. The IP developed will be owned by the inventors and the U of T, and will be governed by the U of T Inventions Policy. If the industry partner wishes to use the IP commercially, the U of T may grant a license to use it on terms to be negotiated, which will include a commercially reasonable royalty rate.
3. The work is done at a U of T lab; the industry partner provides financial resources in the form of a contract. The IP developed will be owned by the inventors and the U of T; the industry partner will have an option to obtain an exclusive licence to use IP on terms to be negotiated, which will include a commercially reasonable royalty rate.
4. The work is done at the industry partner site and at the U of T, and will involve U of T personnel beyond the flex-time Ph.D. student (e.g. the supervisor, other members of a U of T lab). The IP developed will reside jointly with the inventors, the U of T and the industrial partner. A specific IP sharing agreement will need to be negotiated.
5. The work is done solely at the industry partner site and will involve only the U of T supervisor and the flex-time Ph.D. student and his/her colleagues. A specific IP sharing agreement must be developed to acknowledge any contribution of the U of T supervisor to the development of the IP.

Appendix A - A comparison to alternative Ph.D. programs elsewhere

The proposed flex-time Ph.D. program option is not a "professional doctorate" program, as have become increasingly popular in, for example, the U.K., Europe and Australia. Examples of such programs include the Engineering Doctorate (EngD) that is promoted by the U.K. Engineering and Physical Sciences Research Council (EPSRC), and the two-year post-M.Sc. Professional Doctorate in Engineering offered by the three technological universities (Delft, Eindhoven and Twente) in the Netherlands. The flex-time Ph.D. option is also not an extension of the MIE M.Eng. program to the doctoral level. It is the same Ph.D. program that MIE already offers, but extended to allow admission of a few students who are working in industrial R & D.

Many engineering programs at other Ontario universities allow Ph.D. students to register as part-time. Discussions with Graduate Coordinators at Waterloo, McMaster, UWO and Carleton confirmed that part-time Ph.D. students are almost exclusively students who begin their Ph.D. studies full-time and switch to part-time status towards the end of their studies in order to slow the academic clock and to reduce tuition fees, because they have accepted employment before completing a thesis. The proposed flex-time Ph.D. option will not be used in this way. SGS will not allow students who begin their studies as full-time students to transfer to the flex-time option. Flex-time Ph.D. students will be expected to choose this option from the start, and to remain in this option, even if they are sometimes able to devote themselves full-time to their Ph.D.

Appendix B - The flex-time Ph.D. option in the Faculty of Pharmacy

While a number of graduate units at the U of T offer a flex-time Ph.D. option, most of these are in the social and life sciences (e.g. Education, Social Work, Nursing, Public Health). The program in the Faculty of Pharmacy may be the most appropriate against which to compare the current proposal. Pharmacy has offered a flex-time Ph.D. option since 2005. They have had two students graduate; another 11 are currently enrolled in the option. Most of these students work for drug companies. Professor Heather Boon, the Associate Dean for Graduate Education, indicates that the Faculty of Pharmacy selects its flex-time students very carefully. The admissions process requires that an applicant's employer sign a letter that confirms employment, commits to providing adequate time and resources to complete the program, and acknowledges that the work adheres to University of Toronto guidelines on intellectual property. No students have yet dropped out of the program, although Professor Boon has had to assist a few students whose programs were put at risk when companies merged. Professor Boon indicated that the Faculty of Pharmacy is very happy with the program.