UNIVERSITY OF TORONTO

OFFICE OF THE VICE PRESIDENT & PROVOST

TO: Planning and Budget Committee

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DATE: February 10, 2010 for March 3, 2010

AGENDA ITEM: 4

ITEM IDENTIFICATION: University of Toronto Scarborough and School of Graduate Studies: Proposal for a Ph.D. in Environmental Science

JURISDICTIONAL INFORMATION:
Excerpt from the terms of reference for the Planning and Budget Committee:

> *4.4.2. The Committee advises the Academic Board on the planning and resource implications of plans and proposals to establish disestablish or significantly restructure academic programs. Implications might include significant planning and budgetary changes within the division or significant effects on other divisions, the University as a whole and the public.*

PREVIOUS ACTION TAKEN:

HIGHLIGHTS:

The proposed Ph.D. in Environmental Science is a tri-campus graduate program to be housed at the Department of Physical and Environmental Sciences at the University of Toronto Scarborough (UTSC). The program will build directly on the Department's undergraduate program in Environmental Science and Master of Environmental Science Program (M.Env.Sc.). The program is one of the key initiatives put forth by the Department in its academic plan. The program, academic rationale and requirements are outlined in the attached executive summary.

This will be the first tri-campus doctoral program to be housed at UTSC and the Department will assume the associated graduate responsibilities. The Environmental Science program was envisioned in the Department's academic plan and aligns with its current undergraduate and professional programs. The proposal reflects the University of Toronto long term aspirations as presented in *Towards 2030.* The stated broad strategic directions affirm the importance of tri-campus graduate collaboration and university-wide oversight of any campus-specific graduate offerings at the same time acknowledging the aspirations for increased professional master's and doctoral-level enrolments at the east and west campuses.

There are several U of T academic divisions that offer courses and programs in areas related to the environment. The proposed program will appeal to those students wishing to carry out research into environmental issues that involve an interdisciplinary approach, yet at a

fundamental scientific level. Such students may have done an undergraduate degree in a subject area (e.g. Environmental Science) that may be deemed to have insufficient chemistry, engineering, geology or forestry content to be considered for admission to these other disciplines. The Ph.D. program is designed to provide both a broad knowledge of current environmental research issues, especially those that exist at the interface between traditional disciplines, and specific training in the most appropriate research methodologies to tackle these scientific problems in the environment. The addition of core faculty from other departments at UTSC, from departments within the tri-campus system, as well as from the ranks of government scientists, will provide a program that will be unique. Ph.D. course work and research training may be carried out anywhere within the tri-campus system, although the core seminar course, ENV2200H, and the bulk of the other course offerings will be held at UTSC, and all students will have access to office space at UTSC.

Extensive consultation regarding the proposed Ph.D. program has taken place over the past two years, including discussions with the deans of the Faculty of Arts and Science and University of Toronto Mississauga and chairs of relevant departments and centres both in Arts and Science, UTM and the Faculty of Forestry and the Faculty of Applied Science and Engineering. A significant number of current students in the Department's extremely successful Master of Environmental Science Program wish to pursue doctoral research in an interdisciplinary mode.

The proposal was approved by the University of Toronto Scarborough Council on December 1, 2009, and the Three Campus Graduate Curriculum Committee on December 15, 2009. The School of Graduate Studies Graduate Education Council approved the proposal on January 19, 2010.

FINANCIAL AND/OR PLANNING IMPLICATIONS:

The University of Toronto Scarborough and the Planning and Budget Office has reviewed the budget for the proposed program. The program projects an initial intake of 5 full-time students, increasing the targeted maximum of 20-25 per year students. The PhD program will draw primarily upon existing Department of Physical and Environmental Sciences faculty members who are already associated with graduate programs through their faculty appointments.

The Department of Physical and Environmental Sciences and the University of Toronto Scarborough have committed to provide all the resources needed for this program. The resources necessary to offer the program will be provided by a combination of funding from tuition and BIU revenue generated by student enrolment. In steady state projected revenue is $800K from operating grant and $274K from tuition. The grant projection is based on the assumption of full funding for 34 spaces. Currently 10 spaces have been allocated to the new program and this number will be augmented as required over the next few years. The program will be accommodated within the Department of Physical and Environmental Sciences, primarily in office, shared teaching labs and student workspace. No new faculty members are required to mount the program. However, three additional faculty members in Environmental Science are scheduled to be hired over the next three years, increasing the Ph.D. supervisory capacity substantially. Funding may be available for scholarships and awards and to assist students with incidental fees.

There are no resource implications for the University's operating budget resulting from this proposal. The financial plan has been reviewed and approved by UTSC and by the Vice-Provost

Academic Operations Office. The proposal does not involve significant new academic directions or anticipated significant new directions for UTSC.

RECOMMENDATION:

The Planning and Budget Committee concurs with the recommendation of the Committee on Academic Policy and Programs:

> THAT the proposed Ph.D. in Environmental Science be approved, with enrolment commencing September, 2010.

Proposal for a PhD in Environmental Sciences
Department of Physical and Environmental Sciences
University of Toronto Scarborough

Executive Summary

Canada and the world currently face a number of significant and serious environmental challenges: thawing of vast areas of permafrost in the north, shrinking of the surface area of Arctic pack ice, changing water levels in rivers and lakes, the active retreat of many glaciers, risk associated with rising deforestation, and the remediation of abandoned mine and industrial sites. Unfortunately, our ability to find solutions to these challenges is increasingly constrained by a severe shortage of suitably qualified scientists who are trained in Environmental Science at the graduate level.

This proposal is for a new tri-campus graduate program to be housed in the Department of Physical & Environmental Sciences at the University of Toronto Scarborough (UTSC) leading to a degree of Ph.D. in Environmental Science.[1] This program will build directly on the Department's undergraduate program in Environmental Science and Master's level programs. The Department's extremely successful Master of Environmental Science Program (M.Env.Sc.) was established in 2005 and currently has enrolments of 54 full-time and 20 part-time students[2]. A significant number of these students now wish to pursue doctoral research in a truly interdisciplinary mode, and it is appropriate that the University of Toronto provide these, and other like-minded students, from across Canada and abroad, the opportunity to further their education at a higher level.

The University of Toronto is recognized internationally for its disciplinary graduate programs focusing on scientific environmental issues. In particular, Environmental Chemistry in the graduate Department of Chemistry, the Environmental Engineering Collaborative graduate program, Environmental Geosciences in the graduate Department of Geology, Physical Geography and Natural Systems in the graduate Departments of Geography, and the Faculty of Forestry have all offered high quality Ph.D. programs in their disciplines for many years. In all likelihood, chemistry graduates wishing to pursue research in environmental interactions at the molecular level are expected to register in the graduate Department of Chemistry. Similarly, those students wishing to research the engineering needs and solutions to environmental problems (generally engineering graduates) will pursue their degrees through the Faculty of Applied Science and Engineering. Students focusing on environmental geosciences, including biogeochemistry, contaminant hydrogeology, oceanography and global climate change can still choose a Ph.D. program in Geology. Students pursuing graduate studies in forestry, forest-sciences and forest ecosystems are likely to enter the Faculty of Forestry. The proposed program will appeal to those students wishing to carry out research into environmental issues that involve an interdisciplinary approach, yet at a fundamental scientific level. Such students may have done an undergraduate degree in a subject area (e.g. Environmental Science) that may be deemed to have insufficient chemistry, engineering, geology or forestry content to be considered for admission to these other disciplines. Yet such students are well-suited to the interdisciplinary nature of the proposed program.

[1] The Department of Physcial & Environmental Sciences at UTSC will assume graduate responsibilities, the first department to do so at UTSC.
[2] Once the graduate Chair of the Department of Physical & Environmental Sciences has been established, the Master of Environmental Science will be moved from the Centre for Environment to the Department of Physcial & Environmental Sciences so as to align its administrative and operational homes.

The main requirement for this Ph.D. will be the execution of an original piece of laboratory or field research in Environmental Science carried out under faculty supervision and presented in thesis form. To ensure students are aware of emerging issues not only in their own research field but also in closely allied fields, and to ensure the interdisciplinary nature of the program in Environmental Science, there will be a mandatory advanced seminar on environmental research. The program also requires a minimum of 1.5 full-course equivalent courses from an approved course list in the graduate program, bringing the full course load to 2.0 FCE.

The initial enrolment in the proposed Ph.D. is expected to be between 5 and 10 students, with numbers continuing to increase as the program develops, as new faculty are brought on stream and as existing faculty focus their graduate supervision on students in the new doctoral program. A stable annual enrolment of between 20 and 25 students will be attained within the first 7 years.