

# The Senate of Michigan Technological University

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## PROPOSAL 2-85

### DOCTOR OF PHILOSOPHY IN ENGINEERING: ENVIRONMENTAL ENGINEERING

#### BACKGROUND:

On May 2, 1984, the Senate adopted Proposal 3-84 which established the Ph.D. in Engineering Program. Proposal 3-84 requires that each of the program areas be approved by the university graduate council and the university nondepartmental committee followed by a recommendation for approval or disapproval from the University Senate to the Vice President for Academic Affairs. On November 12, the Senate Curricular Policy Committee voted to recommend that the Senate recommend the approval of the proposed program in Environmental Engineering.

#### PROPOSAL:

The Senate of Michigan Technological University recommends the establishment of the Environmental Engineering Program under the Ph.D. in Engineering Program. A description of the program follows:

#### PROGRAM DESCRIPTION:

##### Introduction

At Michigan Tech, the doctoral program in environmental engineering is focused primarily on the source, transport and fate of toxic and residual pollutants in the ground water, surface water and air environs. Areas of coursework and research emphasis can be broadly classified as:

- Engineering of process systems to control environmental pollution.
- Analysis and modeling of the impact of pollutants on the environment.

Each of these areas is built on fundamental principles of physical, chemical, biological, mathematical, and engineering science. A student's program of courses is designed on an individual basis, building on fundamentals and proceeding to advanced engineering applications and scholarly independent study. In this way, the student gains an in-depth knowledge of environmental engineering and is prepared to undertake the doctoral research dissertation. The program culminates with the student's demonstration of his or her ability to expand the field of knowledge in environmental engineering through defense and publication of the research dissertation.

##### Admission

The doctoral program in engineering is administered by the Graduate School and applications for admission should be submitted to the Dean of the Graduate School. The Environmental Engineering Faculty Committee is chaired by Dr. C. Robert Baillod, Professor of Civil and Environmental Engineering. Specific questions relating to the doctoral program in environmental engineering or to the availability of research assistantships should be directed to Dr. Baillod.

Applicants for doctoral study in environmental engineering are judged by their previous achievements in academic coursework and research. Applicants must hold a degree in either mathematics or the natural or physical sciences, or engineering and the academic record should indicate superior achievement in coursework related to environmental engineering. Usually, applicants will either hold or be working toward the Master of Science degree and the M.S. thesis research should indicate superior ability in research. Applications for doctoral study in environmental engineering are reviewed by the Faculty Committee, and this group will make a recommendation on acceptance to the Dean of the Graduate School.

### Program of Study and Research

The Doctor of Philosophy degree is a research degree and is awarded in recognition of demonstrated mastery of subject matter in environmental engineering and demonstrated competence in the conduct of individual research investigations that represent a significant expansion of knowledge in environmental engineering. Accordingly, the requirements for the degree are that the student must:

- a. Demonstrate a mastery of subject material in environmental engineering by successfully passing the Qualifying Part of the Comprehensive Examination.
- b. Prepare a specific proposal and plan for the doctoral research dissertation and demonstrate an in-depth knowledge and understanding of subject material and literature related to this research by passing the Oral Part of the Comprehensive Examination.
- c. Demonstrate the ability to understand life and science on a broad level by successfully completing a coherent group of at least two upper division courses not directly related to the research dissertation, e.g. humanities, social science.
- d. Plan and conduct an original research project and prepare a research dissertation describing the methods, data, results and conclusions of this research.
- e. Defend the validity and significance of the research dissertation by successfully passing a Final Oral Examination.

The coursework program is developed by the student's advisory committee on an individual basis. The purpose of the coursework program is to aid the student in satisfying the degree requirements outlined above. Students without an engineering background may be required to take some preparatory engineering coursework. Although there are no specific course or credit number requirements, the level of competence demanded by the degree requirements is such that the superior student will require about three to four years of full time study and research beyond the baccalaureate degree to satisfy these requirements.

**Adopted by Senate: 12 December 1984**

**Approved by Administration: Yes**

**BOC Approval: 18 January 1985**