

The Senate of Michigan Technological University

PROPOSAL 6-85

DOCTOR OF PHILOSOPHY IN ENGINEERING STRUCTURAL 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 Studies Committee followed by a recommendation for approval or disapproval from the University Senate to the Vice President for Academic Affairs. The Dean of the Graduate School forwarded a statement describing the proposed program on January 2, 1985 with his endorsement. The Curricular Policy Committee reviewed the program and on March 14 voted to recommend that the Senate recommend to the Vice President for Academic Affairs the approval of the proposed program in Structural Engineering.

PROPOSAL:

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

Introduction

The doctoral program in structural engineering deals with the technology associated with the design, analysis and behavior of structures of all types. The technological areas which comprise this field of study are:

- Solid mechanics
- Properties of engineering materials
- Characterization of structural loadings
- Mathematical modeling of structures
- Applied mathematics
- Experimental mechanics and structural testing
- Structural synthesis and optimization

Each of these areas is built on fundamental principles of physics, mathematics and materials science. A student's program of courses is designed on an individual basis, building on fundamentals and proceeding to advanced engineering application and scholarly independent study. In this manner, the student gains an in-depth knowledge of structural engineering and is prepared to undertake the doctoral research program. The program culminates with the completion of the student's research dissertation which must constitute a contribution to or an expansion of the field of structural engineering.

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 Structural Engineering Faculty Committee is chaired by Dr. V.B. Watwood, Professor of Civil Engineering. Specific questions relating to the doctoral program in structural engineering or to the availability of financial assistance should be directed to Dr. Watwood.

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

Program of Study and Research

The Doctor of Philosophy in Engineering Degree (Structural Engineering) is awarded in recognition of demonstrated mastery of subject matter in the areas of technology which constitute the field of structural engineering. This must include the conduct of individual research investigations that represent a significant expansion of knowledge in the field. In summary, the student must:

- a. Demonstrate a mastery of subject material in structural engineering by successfully passing the Qualifying Part of the Comprehensive Examination. This exam will be prepared by the applicant's Advisory Committee and will be an in-depth examination into the general area of structural engineering plus those areas selected as minor fields.
- 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 breadth of understanding in cognate fields by completing significant coursework in at least two areas outside of structural engineering and solid mechanics such as mathematics, fluid mechanics, thermodynamics, or material sciences.
- d. Plan and conduct an original research project and prepare a dissertation describing the methods, data, results and conclusions of this research. This work must represent a significant contribution to the field of structural engineering.
- e. Defend the validity and significance of the research dissertation by successfully passing a Final Oral Examination.

The program of coursework will be developed by the student and his/her advisory committee on an individual basis. The purpose of the coursework program is to aid the student in satisfying the degree requirements outlined above. Although there are no specific course or credit requirements, the level of competence demanded is such that the superior student will usually require at least three calendar years of full time study and research beyond the bachelor's degree to complete the program.

Adopted by Senate: 27 March 1985
Approved by Administration: Yes