

The University Senate of Michigan Technological University

PROPOSAL 16-00

CERTIFICATE IN DESIGN ENGINEERING

Michigan Technological University will award the Certificate in Design Engineering to students who have completed at least 25 credits in the courses listed on this proposal and have earned a 2.50 GPA in the certificate program courses. The certificate will be noted on the student's transcript.

Proposal Background

The Certificate in Design Engineering was developed to meet the needs of students in the Bachelor of Science in Engineering (BSE) curriculum being offered at a distance to Michigan Tech's corporate partners, as well as to prepare non-degree students who have an interest in sitting for the ASBE (American Society of Body Engineers) exam in design engineering. In addition, the course work described in the certificate program can provide guidance to any student, degree or non-degree seeking, with an interest in design engineering.

A. The College of Engineering and Department of Mechanical Engineering-Engineering Mechanics has reorganized the BSE with options in Mechanical Design or Manufacturing for the semester transition. The proposed certificate courses included in the degree program allow degree-seeking students to complete the Certificate in Design Engineering as part of the degree by taking carefully planned electives. However, the proposed certificate also stands alone so that a student not seeking the BSE degree can be given formal recognition by MTU as completing a core of designing engineer courses.

B. General Motors, one of MTU's corporate partners in distance education, identified a core of competencies in design engineering that it would like its employees to achieve. Also identified was the pool of employees that would be encouraged to pursue the acquisition of competencies included in the area of design engineering. GM realized that the educational and experiential background of these individuals would be highly variable. The backgrounds range from Masters degrees and some experience in design to a high school degree and 20+ years of design experience. MTU was already providing a BSE degree with options in mechanical design or manufacturing to GM employees through the GM Technical Education Program office. While not all of these individuals will pursue a BSE degree, the degree program already contained most of the courses that were needed in the certificate. The courses in the certificate provide the students with the core competencies to sit for the ASBE exam. The certificate has been designed in response to industry request.

Objective

The objective of the certificate program is to provide students with a clear outline of courses necessary to develop competencies as a designing engineer and to provide the academic background necessary to sit for the designing engineer exam. The certificate designation on the transcript also reward students who successfully complete the course sequence.

Significance

Michigan Tech already provides a distance delivered Bachelor of Science in Engineering degree program to General Motors and other corporate clients. This certificate is important to students in the BSE and non-degree seeking students because it:

- identifies a specified set of courses that together provide a consistent and appropriate background for individuals who desire to be a designing engineer.
- rewards students by the designation on the student transcript.

- provides a non-degree option for those individuals who are interested only in the certificate.
- enhances career opportunities for those individuals completing the certificate.

Costs and Revenues

The corporations sponsoring the certificate program will fund all necessary computer and infrastructure changes, as well as pay all administrative and delivery costs for the distance learning candidates. The fees charged will be on a per credit hour basis and will be roughly equivalent to the estimated on campus tuition rate for Fall 2000. All program expenses will be covered by the revenue. On campus students at Michigan Tech may complete the certificate at no additional cost to the University since the courses are already being offered on campus as a part of the regular curriculum.

Course Requirements

The students will be required to take a minimum of 25 credits to complete the certificate. These credits can also be applied to the BSE with a mechanical design concentration. An additional 12 credits of course work will be offered for students with insufficient academic background in the fundamentals of mechanics and mathematics.

Administration

The program will be administered by the MTU Extended University Programs (EUP) office and the Mechanical Engineering-Engineering Mechanics Department (ME-EM). Academic issues will be deferred to ME-EM while logistical issues of registration, records, billing, delivery, etc. will be handled by EUP.

Enrollment

GM and its suppliers in the automotive design area, or suppliers who want to move into automotive design, will recommend their employees complete the certificate. GM estimates that 3,000 individuals at GM would be interested in pursuing the certificate and or the BSE over the next 10 years.

Fit with other programs

The certificate builds on MTU strengths in mechanical design with solid modeling and finite element methods. It fits within the ABET requirements for the BSE degree.

Curriculum

The Certificate in Design Engineering program is organized to provide BSE students an option that prepares them specifically for a career path in design engineering. In addition, it offers non-degree seeking students the appropriate background to sit for the exam that provides professional credentials in design engineering. Students must maintain a minimum 2.50 average on a 4.0 scale in these courses and must earn at least a C in the class for it to count toward the certificate.

The 25 semester credits required in the certificate program are:

MY 2100	3 cr.	Introduction to Materials Science and Engineering
ME-EM 2500	4 cr.	Integrated Design and Manufacturing
ME-EM 4405	3 cr.	Introduction to Finite Element Methods
ME-EM 4991D*	6 cr.	Solid Modeling
ME-EM 4992D**	3 cr.	Vehicle Packaging
ME-EM 4993D***	3 cr.	Design for Manufacturing
ME-EM 4900	3 cr.	Senior Design Project I

*MTU will accept from General Motors University the successfully completed (C average minimum) series of four courses in Unigraphics (16234, 16240, 17531, and 17854) in transfer for this requirement.

**MTU will accept from the University of Michigan the successfully completed (C average minimum) course ME 599P in transfer for this requirement.

***MTU will accept from the Purdue University the successfully completed (C average minimum) course ME 457 in transfer for this requirement.

Adopted by Senate: May 10, 2000

Approved by President: May 30, 2000

Amended in Proposal 10-02