

THE UNIVERSITY SENATE OF MICHIGAN TECHNOLOGICAL UNIVERSITY

PROPOSAL 19-08

“GRADUATE CERTIFICATE IN ADVANCED ELECTRIC POWER ENGINEERING “

Electrical and Computer Engineering Department

(Voting Units: Academic)

I. General Description

This proposal recommends establishing a “Graduate Certificate in Advanced Electric Power Engineering” through the Electrical and Computer Engineering Department. Students completing this Certificate will further develop their competencies in electric power engineering. Students enrolling in this certificate will have a Bachelor’s degree in Electrical Engineering, or a degree in a closely related field with at least 3 years experience working in the electric power engineering field.

II. Catalog Description

The Graduate Certificate in Advanced Electric Power Engineering program provides the student with advanced knowledge of the operation and design of electric power systems. It is expected that students beginning this Certificate have a working understanding of electric power system analysis equivalent to that gained in EE4221. Please check the Undergraduate Course Descriptions for details.

II. Rationale

The U.S. electric energy industry is facing a shortage of engineering talent. This was the topic of the NSF Workshop on the Future of Power Engineering Workforce held in November 2007. This workshop, co-sponsored by the IEEE Power Engineering Society, brought together utility executives, government regulators, and academics. In discussing employment trends with several energy industry employers, it is apparent that a large proportion of their engineering staff is within 5-7 years of retirement and there is a shortage of early to mid-career engineers. This workplace demographic is a result of the uncertainties that arose during the recent restructuring of the electric utility industry. During this period, utilities, uncertain of their future, cut back on the hiring of engineers.

To correct this problem, employers have become more aggressive in hiring graduating engineers and have become interested in retraining existing engineering staff. They recognize their need for highly trained staff in order to handle their research and development needs as well as the application of new technology.

Due to a decline in the number of Electric Power programs throughout the country, many of the new electrical engineers the utilities, consulting firms, and power equipment manufacturers will hire will not have a strong electric power background. In addition, many of these companies’ existing engineering staffs do not have a strong background in electric power.

This Certificate program is designed, in consultation with electric utilities, to address these educational needs. It is based upon our successful offering online of our course work Masters of Science in Electrical Engineering. Some of the engineers do not want an MS degree, but do want some formal recognition of having taken a coherent body of work.

All of the lecture courses will be offered online to accommodate engineers’ work schedules.

III. Related Programs

The Graduate Certificate in Advanced Electric Power Engineering is related to the proposed Certificate in Electric Power Engineering at the undergraduate level and to the Electric Power programs contained in the BS, MS and PhD programs in Electrical Engineering. This Certificate uses the same courses as the existing degree programs.

There are similar courses offered on-line from Arizona State, Kansas State, and the University of Idaho. A certificate program will be a differentiator which will make our program more appealing.

IV. Projected Enrollment

It is expected that we will have a steady state enrollment of 10-15 students.

V. Scheduling

No change in the time scheduling of the existing courses is anticipated. EE4221 and EE4222 will be delivered in a studio classroom to accommodate the on-line delivery. The other courses are already delivered on-line.

VI. Curriculum Design

Required Courses (3 Credits)

EE 5200 – Advanced Methods in Power Sys – 3

Elective Courses (12 Credits, no more than 3 Credits below 5000)

EE 4222 – Power System Analysis 2 – 3

EE 5220 - Transient Analysis Methods – 3

EE 5223 - Power System Protection – 3

EE 5230 - Power System Operations – 3

EE 5240 – Computer Modeling of Power Systems – 3

EE 5250 – Distribution Engineering – 3

EE 5260 - Wind Power – 3

EE 5290 - Selected Topics in Power Systems – 3

EE 6210 - Power System Dynamics and Stability – 3

Total 15 Credits

VII. New Course descriptions

Not applicable

VIII. Library and other Learning Resources

Students in this program will need only the Library resources presently available to all enrolled students.

IX. Computing Access Fee

Students enrolled in this Certificate will be charged the same fees and follow the same policies as those enrolled in the Master's of Science in Electrical Engineering program.

X. Faculty Resumes

(see attached) L.J. Bohmann, B.A. Mork, D.O. Wiitanen

XI. Need equipment

No special equipment is needed for this program

XII. Program Costs

All the courses are existing courses and are presently being taught on a regular basis.

All the existing courses except EE 4221 and EE 4222 are already taught online. ETS has indicated that they can accommodate these additional online courses.

XIII. Space

No additional space is needed

XIV. Policies, Regulations, and Rules.

Students may apply the credits earned for this certificate toward both a graduate degree at Michigan Technological University and this certificate.

XV. Accreditation Requirements

None

XVI. Internal Status of the proposal.

Approved by the College of Engineering

XVII. Planned Implementation Date

Fall 2008.

Introduced to Senate: 27 February 2008

Adopted by Senate: 19 March 2008

Approved by Administration: 7 April 2008