New Graduate Degree – Certificate Program Proposal Form

Academic Unit: **ECE Department** Date: **February 6, 2006**

Program Name: **Master of Power Engineering (Professional Master's Degree)**

Program Director(s): **Dr. Jafar Saniie**

(Persons named as the Program Director are eligible to receive the New Program Development Incentive from the Graduate College. If someone other than the Program Director should be considered for this incentive, please attach a memo to this effect.)

APPROVAL SIGNATURES REQUIRED:

(1) Academic Unit Curriculum Committee Chair:

(2) Academic Unit Head:

(3) Graduate Dean:

(4) Graduate Studies Committee Chair:

(5) Main Campus Faculty Council Chair:

Attach additional pages on which a detailed discussion regarding the following items is provided.

1) Program Overview: Describe the objective of the new program.

2) Program Justification:
   a) Provide a detailed discussion on why the program is needed.
   b) Provide a detailed description of the relationship of the proposed program to other degree programs offered by IIT and by the academic unit.
   c) Provide an estimate of the expected number of students.

3) Program Resources:
   a) Describe the personnel requirements necessary to offer the program. Include faculty, teaching Assistant, and support staff. For faculty, indicate current faculty to be associated with the program, detail any requirements for additional faculty hires, and note the number of part-time faculty needed to support the program. Describe how and when resources will be made available to hire any additional personnel that are required.
   b) Describe the facilities necessary to offer the program. Describe how and when resources will be made available to obtain any additional facilities that are required.

4) Program Description:
   a) Provide the detailed degree requirements for the program.
   b) Indicate the admission criteria for the program.
   c) Provide a timeline and schedule for offering the program.

1) Program Overview:

The purpose of this degree program is to prepare students for leading edge positions in industry in the areas of electric power, power electronics, motor drives, and electric machines. The Professional Master of Power Engineering is a course-only degree program that prepares students for professional practice in power engineering.

2) Program Justification:

The Electrical and Computer Engineering (ECE) Department has received numerous inquiries from current and prospective graduate students (both domestic and international) for pursuing professional master's degrees with an emphasis on this proposed area of electrical engineering that highlight trends in industry.

The ECE Department has long maintained high quality education and research programs in electric power and energy systems. The proposed new professional master's degree will complement our existing offerings in the fields of electric power, power electronics, electric machines, motor drives, and vehicular power systems. It will also address the pertinent national and international needs for developing hardware and software technologies for electric power and power electronic engineering applications.

It is expected that more than 20 students enrolled in this program annually. The ECE Department has already started negotiations with industries worldwide for the possibility of offering such degree programs as a package for the employees in those industries.

3) Program Resources:

The proposed degree program will not require any additional resources in the ECE Department and could enhance enrollment in certain ECE courses. Therefore, the ECE faculty have approved these professional master's degrees.

ECE faculty members who are associated with this program are: Professors Ali Emadi, Alexander J. Flueck, Zuyi Li, Mohammd Shahidehpour, and Geoffrey Williamson. In addition, ECE Instructors Leslie Axelrod and Joseph Pinnello as well as Adjunct Professor Nicholas J. Nagel, are associated with this program.

4) Program Description:

The program of study includes a minimum of 30 credit hours of acceptable coursework with a minimum of 24 credit hours from the following list of core and elective courses (up to 6 credit hours may be selected from other ECE courses). A minimum of 18 credit hours at the 500-level or higher must be selected. Up to 2 credit hours of theMaster's Seminar (ECE 595 or ECE 596), up to 3 credit hours of a Graduate Special Project in

power engineering (ECE 594 or ECE 597), and up to 6 credit hours of ECE short courses may be applied to the degree. Such degree offerings may include courses on the Internet as well as live and TV courses.

Total Required Credit Hours: 30

Required Core Courses (minimum of 3 courses):

ECE 564 Control and Operation of Electric Power Systems and/or ECE 420 Analytical Methods in Power Systems
ECE 551 Advanced Power Electronics and/or ECE 411 Power Electronics
ECE 419 Power Systems Analysis
ECE 412 Electric Motor Drives

Elective Courses in Power Systems (minimum of 2 courses):

ECE 553 Power System Planning
ECE 554 Power Systems Relaying
ECE 555 Power Market Operations
ECE 556 Power Market Economics and Security
ECE 557 Fault-Tolerant Power Systems
ECE 558 Power System Reliability
ECE 559 High-Voltage Power Transmission
ECE 560 Power Systems Dynamics and Stability
ECE 561 Deregulated Power Systems
ECE 562 Power System Transaction Management
ECE 563 Computational Intelligence in Engineering
CHE 543 Energy, Environment and Economics

Elective Courses in Power Electronics and Motor Drives (minimum of 2 courses):

ECE 437 Digital Signal Processing I
ECE 438 Control Systems
ECE 531 Linear System Theory
ECE 549 Motion Control Systems Dynamics
ECE 550 Power Electronic Dynamics and Control
ECE 552 Adjustable Speed Drives
ECE 752 Industrial Applications of Power Electronics and Motor Drives
ECE 764 Vehicular Power Systems
CHE 541 Renewable Energy Technologies
CAE 524 Design Building Enclosures

The admission requirements for the proposed degree will follow the existing admission requirements for such professional master's degrees in ECE Department.

Students whose accredited B.S. degree is not in electrical engineering may pursue the professional master's degree provided that they have an adequate background and can demonstrate proficiency in the material contained in undergraduate courses equivalent to IIT's ECE 211 and ECE 213 (Circuit Analysis I and II), ECE 311 (Engineering

Electronics), ECE 319 (Fundamentals of Power Engineering), MATH 251 (Multivariate and Vector Calculus), and MATH 252 (Introduction to Differential Equations). A student may demonstrate proficiency by successfully completing the courses or by demonstrating satisfactory performance in one or more special examinations administered by the ECE department.

This program will be offered beginning Fall 2006.