

New Graduate Degree – Certificate Program Proposal Form

Academic Unit: ECE Department

Date: February 6, 2006

Program Name: Master of VLSI and Microelectronics (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 VLSI and microelectronics. The Professional Master of VLSI and Microelectronics is a course-only degree program that prepares students for professional practice.

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 these proposed areas of electrical and computer engineering that highlight trends in industry.

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

It is expected that more than 30 students will enroll 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 Gerald Saletta, Jafar Saniie, Marco Saraniti, Dimitrios Velenis, Albert Wang, and Thomas Wong. In addition, ECE Senior Instructor Jeffrey Mills and Visiting Assistant Professor Erdal Oruklu are associated with this program.

4) Program Description:

Students can pursue a professional master's degree in the area of VLSI and Microelectronics by completing the required core courses; ECE 425, ECE 429, ECE 529, and ECE 575 and selecting six additional courses from a combination of computer engineering electives, electronics electives, and other areas in electrical and computer engineering.

Total required credit hours: 30

Required core courses:

ECE 425 Analysis and Design of Integrated Circuits
ECE 429 Introduction to VLSI Design
ECE 529 Advanced VLSI Systems Design
ECE 575 Electron Devices and/or ECE 415 Solid State Electronic

Computer Engineering Elective Courses (minimum of one course)

ECE 485 Computer Organization and Design
ECE 530 High Performance VLSI/IC Systems
ECE 542 Design and Optimization of Computer Networks
ECE 545 Advanced Computer Networks
ECE 583 High Speed Computer Arithmetic
ECE 584 VLSI Architectures for Signal Processing and Communications
ECE 585 Advanced Computer Architecture
ECE 586 Fault Detection in Digital Circuits
ECE 587 Hardware/Software Codesign
ECE 588 CAD Techniques for VLSI Design

Electronics Elective Courses (minimum of one course)

ECE 521 Quantum Electronics
ECE 524 Advanced Electronic Circuit Design
ECE 525 RF Integrated Circuit Design
ECE 526 Active Filter Design
ECE 527 Performance Analysis of RF Integrated Circuits
ECE 551 Advanced Power Electronics
ECE 570 Fiber Optic Communication Systems
ECE 571 Nanodevices and Technology
ECE 578 Microwave Theory
ECE 579 Numerical Methods in Electromagnetics and Solid-State Electronics

Note: With advisor approval the student may take up to two ECE courses in other areas of electrical and computer engineering such as signal processing, communications, power and control.

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 218 (Digital Systems), ECE 307 (Electrodynamics), ECE 308 (Signals and Systems), ECE 311 (Engineering Electronics), 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.