MEMORANDUM

TO: Darryll Pines
   Dean, A. James Clark School of Engineering

FROM: Phyllis Peres
   Associate Provost for Academic Planning and Programs

SUBJECT: Proposals to modify the Post-Baccalaureate Certificate in Engineering (PCC log nos. 08062, 08063, and 08067)

At its meeting on today, the Senate Committee on Programs, Curricula and Courses approved your proposals to modify the Post-Baccalaureate Certificate in Engineering by adding specializations in Technology Ventures and Innovation, Systems Engineering, and Energetic Concepts, and to offer these specializations online. Copies of the approved proposals are attached.

The changes are effective Fall 2009. The College should ensure that the changes are fully described in the Graduate Catalog and all relevant descriptive materials, and that all advisors are informed.

CWR/

Enclosure

cc: Carmen Balthrop, Chair, Senate PCC Committee
    Sarah Bauder, Office of Student Financial Aid
    Reka Montfort, University Senate
    Barbara Hope, Data Administration
    Denise Nadasen, Institutional Research & Planning
    Anne Turkos, Archives
    Linda Yokoi, Office of the Registrar
    Thomas Castonguay, Graduate School
    Gary Pertmer, A. James Clark School of Engineering
    George Symos, A. James Clark School of Engineering
    Paul Easterling, A. James Clark School of Engineering
    James Green, A. James Clark School of Engineering
THE UNIVERSITY OF MARYLAND, COLLEGE PARK
PROGRAM/CURRICULUM PROPOSAL

DIRECTIONS:
- Provide one form with original approval signatures in lines 1 - 4 for each proposed action. Keep this form to one page in length.
- Early consultation with the Office of the Associate Provost for Academic Planning & Programs is strongly recommended if there are questions or concerns, particularly with new programs.
- Please submit the signed form to Claudia Rector, Office of the Associate Provost for Academic Planning and Programs, 1119 Main Administration Building, Campus.
- Please email the rest of the proposal as an MSWord attachment to pcc-submissions@umd.edu.

DATE SUBMITTED 4/21/09

COLLEGE/SCHOOL ENGR

DEPARTMENT/PROGRAM OAEE

PROPOSED ACTION (A separate form for each) ADD _X_ DELETE ___ CHANGE ___

DESCRIPTION (Provide a succinct account of the proposed action. Details should be provided in an attachment. Provide old and new sample programs for curriculum changes.)

Establish a new specialization in (Technology Ventures and Innovation) within the existing Post-Baccalaureate Certificate in Engineering.

JUSTIFICATION/REASONS/RESOURCES (Briefly explain the reason for the proposed action. Identify the source of new resources that may be required. Details should be provided in an attachment.)

See attached.

APPROVAL SIGNATURES - Please print name, sign, and date

1. Department Committee Chair David F. Barbe 04/21/09

2. Department Chair George Syrgos 4/21/09

3. College/School PCC Chair 4/21/09

4. Dean 4/21/09

5. Dean of the Graduate School (if required) 4/21/09

6. Chair, Senate PCC 5/15/09

7. Chair of Senate 5/15/09

8. Vice President for Academic Affairs & Provost 5/15/09

VPAAP 8-05
Proposal for a new specialization in Technology Ventures and Innovation
In the Post-Baccalaureate Certificate in Engineering

We believe technology students, faculty, and researchers benefit significantly from a grasp of entrepreneurial practices and tactics. Innovation has emerged as a primary catalyst of US economic growth and competitiveness. Entrepreneurial technologists, whether inside a university, government lab, established company, or startup, are well-positioned to develop and commercialize innovations that contribute to economic expansion. Additionally, our region and nation have prospered as a result of technology entrepreneurship in the past decade. We expect many of our technologists who are exposed to entrepreneurial best practices to become successful entrepreneurs, either with independent startup companies or through new ventures within existing companies.

Drawing upon the strengths of the faculty leadership within the Maryland Technology Enterprise Institute (Mtech) and more specifically Mtech Ventures’ cutting-edge entrepreneurship education and technology expertise, along with faculty expertise from the Mechanical Engineering department, we propose the creation of a specialization in Technology Ventures and Innovation within the existing Post-Baccalaureate Certificate in Engineering. We will start the new specialization in the Fall of 2009 by offering at least one course in that term and at least one course in every subsequent fall and spring semester.

The new specialization will be administered through OAEE making sure that the necessary student services are provided. As with all programs in OAEE, curriculum and academic oversight for the four courses in the series will be through a faculty advisory committee that will collaborate with the OAEE Executive Director, making sure that both commitment to support this new specialization and academic excellence are in place. Evaluation and assessment of this option will be performed by Mtech, the faculty advisory committee and OAEE. The new specialization will comply with all UMCP policies and requirements for graduate education.

The curriculum to complete the specialization would consist of four courses, two core courses and two courses from the list of electives.

**CORE COURSES (2 required)**

**ENPM 690 Fundamentals of Technology Startup Ventures (3 credits)**
Entrepreneurship offers an individual the opportunity to directly control their career and to create great value for society and themselves. Notable successes routinely in the news include: Bill Gates, Microsoft; Larry Page and Sergey Brin, Google; Steve Case, AOL; Larry Ellison, Oracle; and Steve Jobs, Apple & Pixar. These people have changed the way people live and work in very fundamental ways. Yet, very few entrepreneurs achieve this level of success and many fail entirely. Through this course, students will learn the basics of entrepreneurship including the various types of entrepreneurship, what makes the difference between success and failure, the importance of networking to obtain advice without letting others know about the idea and how to create success from almost nothing. Students will also be led through an exercise to determine the strength
of their leanings toward entrepreneurship. The information in this course will be delivered through in-class instructions, out of class readings and visits by successful entrepreneurs and entrepreneurs in the making across a broad range of businesses in the DC region.

**ENPM 691 Strategies for Managing Innovation** (3 credits)
Strategies for Managing Innovation explores how innovation in organizations operates as a process, how the marketplace affects it, how to identify innovation opportunities, how individuals find innovative roles in their organization, how managers foster innovation in their organization, and how innovation plays a part in an organization’s overall strategy. We will examine the innovation process from the origination of a new idea through its transformation into commercially useful products or results. We will analyze the continuum of interdependent steps (scanning the business environment, invention, prototype development, venture sponsorship, and meeting recognized social and market needs) that are required to generate an innovative and commercially successful technological product or service. Successful students in this course will be able to: 1. Describe how the process of innovation operates in the organization and marketplace at large; 2. Identify those factors (scientific, human, economic, and environmental) that facilitate or inhibit innovative strategies in organizations; 3. Match a conceptual template of the innovation process to an actual organization to assess its potential for innovation; 4. Perform a basic innovation opportunity audit for an organization; and 5. Distinguish the roles of technology and the marketplace as they stimulate innovation.

**ELECTIVE COURSES (select 2/4 courses)**

**ENPM 692 Innovative Thinking** (3 credits)
Innovative Thinking is an interactive course introducing students to new and powerful tools to boost their creative problem solving skills. Participants re-discover their personal thinking preferences, identify and eliminate mental blocks, and enhance their communication and teaming skills. Students unlock their creative potential, and explore win-win approaches to define and solve problems of different kinds. A breadth of insightful tools and methods are discussed that can be used to develop innovative product and service offerings to improve competitiveness and profitability of start-ups and corporate ventures alike. Intellectual property aspects are also introduced from an innovative thinking perspective.

**ENPM 693 Corporate Technology Venturing** (3 credits)
Innovation and new business development can be initiated by individuals (independent entrepreneurship) or by existing enterprises (corporate entrepreneurship). Corporate entrepreneurship is ever more considered as a valuable instrument for rejuvenating and revitalizing existing companies and enhancing the practice of innovation for improved competitiveness. This course focuses on how to use innovation as a tool for business development, revenue growth, and profitability enhancement and for pioneering the development of new products, services and processes. Strategies will be explored for how corporate entrepreneurship can lead to new business ventures, the development of new products, services or processes and the renewal of strategies and competitive postures. As such, it can be seen as the sum of a company’s innovation, renewal, and expansion efforts.
**ENME 608 Engineering Decision Making** (3 credits)
An introduction to structured decision making, including several decision analysis and product design selection methods. The course will cover material on individual and group decision making methods, organization and structure of decision making, and selection under uncertainty. Main topics will include: methods for modeling decisions, uncertainty, and preferences.

**ENME 808B Emerging Manufacturing Processes: 21st Century Manufacturing** (3 credits)
Prerequisite: Graduate standing or permission of instructor. This course will provide an introduction to several emerging and evolving modern manufacturing processes and their effect on the development of consumer products. The processes selected are solid free from fabrication and rapid prototyping, semiconductor manufacturing, micro electromechanical manufacturing techniques, electronic packaging, biotechnology, nanotechnology, and self-assembling materials. These processes will be presented in both their historical and economic contexts. In addition, their advantages, disadvantages, applications, limitations, competing technologies and future trends will be discussed. Future trends will include the effect of the customer selection of product features (e.g., mass customization via Internet ordering), on manufacturing process selection.