May 5, 2008

MEMORANDUM

TO: Herbert Rabin
Interim Dean, A. James Clark School of Engineering

FROM: Phyllis Peres
Associate Provost for Academic Planning and Programs

SUBJECT: Proposal to establish a Minor in Nuclear Engineering (PCC log no. 07060)

At its meeting on May 2, the Senate Committee on Programs, Curricula and Courses unanimously approved your proposal to establish a Minor in Nuclear Engineering. A copy of the approved proposal is attached.

The approval is effective Fall 2008. The College should ensure that the Minor is fully described in the Undergraduate Catalog and in all relevant descriptive materials, and that all advisors are informed.

CWR/

Enclosures

cc: Carmen Balthrop, Chair, Senate PCC Committee
Sarah Bauder, Office of Student Financial Aid
Laura Slavin, University Senate
Barbara Hope, Data Administration
Denise Nadasen, Institutional Research & Planning
Anne Turkos, Archives
Linda Yokoi, Office of the Registrar
Scott Wolpert, Undergraduate Studies
Gary Pertmer, A. James Clark School of Engineering
Mohammad Modarres, Department of Mechanical 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  7 March 2008  PCC LOG NO. 07060

COLLEGE/SCHOOL  Engineering

DEPARTMENT/PROGRAM  Mechanical Engineering

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.)

Proposal to establish a Minor in Nuclear Engineering, requiring 15 credits of coursework.

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.)

Please see attached.

APPROVAL SIGNATURES - Please print name, sign, and date

1. Department Committee Chair
   
2. Department Chair
   
3. College/School PCC Chair
   
4. Dean
   
5. Dean of the Graduate School (if required)
   
6. Chair, Senate PCC
   
7. Chair of Senate
   
8. Vice President for Academic Affairs & Provost

VPAAP 8-05
PROPOSAL FOR A MINOR IN NUCLEAR ENGINEERING
Department Of Mechanical Engineering
A. James Clark School of Engineering

Introduction

Nuclear power currently accounts for approximately 20% of electricity generation in the United States. With 104 operating reactors, the US has more installed nuclear capacity than any nation in the world. Since operation of nuclear plants results in zero emissions of greenhouse gases, which are recognized as significant contributors to global climate change, the requirement for additional nuclear power plants is being recognized as a needed component of the US energy future. At present, the US Nuclear Regulatory Commission anticipates receiving applications for more than 25 new plants within the next two years.

The need for graduate engineers with education in nuclear engineering will grow significantly in the coming years, both due to the new plants as well as the retirement of current nuclear professionals. The proposal for a minor in nuclear engineering will provide engineers graduating from the Clark School with the capabilities needed to enter the field.

Catalog Description

The minor in Nuclear Engineering provides the engineering student with the understanding of nuclear engineering and its application to many different fields, such as power generation, reactor operation, and industrial uses. Students in the minor will learn the fundamentals of nuclear reactor engineering, radiation interactions and measurement, power plant design concepts, and reactor safety. The minor is open to any student in the Clark School of Engineering.

Requirements for Minor

To successfully complete the minor in nuclear engineering, a student must complete a total of 15 credits (5 3-credit courses). All courses must be completed with a grade of 2.0 or higher. A maximum of two of the required five courses can be used to satisfy requirements of the student’s major (with the approval of the major department).

All students pursuing the minor will be required to take the following four courses:

ENME 430 – Fundamentals of Nuclear Reactor Engineering
ENME 431 – Nuclear Reactor Systems and Safety
ENME 432 – Reactor and Radiation Measurements Laboratory
ENME 472 – Capstone Design Project (Nuclear Topic)
The fifth course for the minor will be selected, with the help of the student's minor advisor, based on student interest. Some possible choices include:

ENME 488 – Special Problems in Mechanical Engineering

ENME 489x – Special Topics in Mechanical Engineering
(Students would select an appropriate course from a number of special topics courses taught each semester in the Mechanical Engineering Department)

ENRE 446 – Applied Reliability Engineering

ENRE 447 – System Safety Engineering

ENMA 422 – Radiation Effects on Materials

ENEE 474 – Power Systems

Faculty Oversight and Record Keeping

The faculty advisor for the Nuclear Engineering Minor is Gary Pertmer. He will be assisted by Ali Mosleh, Mohammad Modarres, and Mohamad Al-Sheikly. Record keeping of the minor will be accomplished utilizing the normal academic processes of the Department of Mechanical Engineering.

Resource Requirements and Availability

The four required courses would be open to any student with the necessary prerequisites, which upper level students majoring in any engineering discipline will have completed. As a result, students who are not pursuing the minor will have access to the courses, which can be used to fulfill technical elective options in the student's degree program. The courses would be regularly taught by the four faculty members listed above as part of their normal teaching load.

The availability of the courses would be such that, with advising, a student will be able to complete the minor in a reasonable period of time.

In addition to the regular faculty, adjuncts could be used to provide special problems courses (ENME 488 ENME 489x), depending on student demand. There are many nuclear professionals in the area (US NRC, Department of Energy, Constellation Energy, Bechtel, etc) and these can be drawn upon as desired.
Outcomes and Assessment

The overall outcome for a student pursuing the Nuclear Engineering Minor is that he/she will gain an understanding of the fundamental concepts of nuclear engineering and its applications. Outcome assessment is well established in the Department of Mechanical Engineering as a requirement of its ABET accreditation. Methods include targeted exam questions, student projects, and direct student feedback, depending on the specific outcome being assessed. These methodologies will be implemented in the minor course sequence.

Program Assessment

The Nuclear Engineering Minor program will be assessed three years after inception. Metrics used for the assessment will include: (1) number of students choosing the minor; (2) completion rate of students who enter the program; (3) interviews with students who have completed the minor and those currently in the program; (4) career placement of graduates. Additional metrics may be added once the minor has been established.