Adopted: March 2 2010

ACADEMIC SENATE
of
CALIFORNIA POLYTECHNIC STATE UNIVERSITY
San Luis Obispo, CA

AS-704-10

RESOLUTION ON PROPOSED NEW PILOT DEGREE PROGRAM: MASTERS OF SCIENCE IN FIRE PROTECTION ENGINEERING

WHEREAS, There are no Fire Protection Engineering Masters programs in the Western United States; and

WHEREAS, There is significant industry demand and support for such a program at Cal Poly; therefore be it

RESOLVED: That the Academic Senate at Cal Poly endorse the implementation of the attached proposal for a Masters Degree in Fire Protection Engineering as a five-year pilot program commencing in fall quarter 2010.

Proposed by: Academic Senate Curriculum Committee
Date: December 4 2009

Cal Poly, San Luis Obispo

Summary Statement of Proposed New Degree Program for
CSU Academic Master Plan Projection

1. Title of proposed program:

Master of Science in Fire Protection Engineering

2. Reason for proposing the program:

The need for fire protection engineers, especially in California and the Western States, is growing critical. The projected large numbers of retirements in the field of fire protection engineering, increasing challenges due to California's wildland/urban interface environment, new state structural regulations related to fire protection, and the lack of any higher education providers is creating a situation that needs to be addressed immediately. The challenge of fire in the wildland/urban interface, which can be defined as those areas where structures and wildland vegetation coincide, is of particular concern in California due to climate and growth factors. The program is primarily targeted toward people with undergraduate degrees in engineering who want to earn a master's degree and obtain their professional license in fire protection engineering. Fire protection engineering firms have asked California Polytechnic State University to develop this program in response to this critical shortage of fire protection engineers in California and the western states. Currently, there are only two universities on the East Coast that offer a master's degree in fire protection engineering, Worcester Polytechnic Institute and the University of Maryland.

3. Expected student learning outcomes and methods for assessing outcomes:

Upon completion of this program, the students will possess the necessary knowledge and skills to pursue professional certification and licensure in the fire protection engineering discipline. Furthermore, the program will address unique fire challenges faced by California and other western states, including wildland-urban interface fires and post-earthquake fires.

The educational objective of the Fire Protection Engineering program is to provide students with the knowledge, skills and tools needed to solve fire protection engineering problems and develop fire safety design solutions in a variety of professional settings. Upon completing the requirements for a Master of Science degree in Fire Protection Engineering, students should be able to:

a) Identify relevant fire safety codes, standards and regulations, comprehend the fire safety performance objectives and criteria associated with these documents, and apply these fire safety objectives and criteria to a broad range of applications.

b) Analyze the flammability characteristics of different materials, interpret the results of standard and non-standard fire test methods and evaluate the fire hazards associated with different materials in a range of anticipated settings.
c) Analyze the dynamics of fires in and around buildings and other structures through the application of fundamental principles and the use of state-of-the-art computer-based fire simulation models.
d) Understand how people interact with fire conditions in buildings and calculate evacuation times through the application of fundamental principles of people movement and the use of state-of-the-art computer-based evacuation models.
e) Design fire detection and alarm systems, fire suppression systems, smoke management systems, egress systems and structural fire protection to achieve specified performance objectives.
f) Perform comprehensive fire and life safety evaluations of buildings and other structures through application of the knowledge, skills and tools acquired in this program and effectively communicate the results and findings of such evaluations.

Assessment of student learning will take several forms including direct examination of student work; feedback from students via (for example) course evaluations, surveys, and focus groups; and alumni and employer surveys. With advice and counsel from an industry-based advisory board, the program's faculty program committee will draw on the assessment results in pursuing continuous improvements in curriculum and other aspects of program design/implementation.

4. Anticipated student demand:

	Number of Students		
	at initiation	3 years after initiation	5 years after initiation
Number of Majors	20	40	40
Number of Graduates	0	20-30	40-50

Indicate briefly what these projections are based upon:

Twenty students are expected in the first class, with enrollment increasing to forty students by the fifth year of operations. It is estimated it will take students 5-6 quarters to complete the program. Since the program is designed for working professionals as well as students continuing directly from undergraduate degrees, some will only attend part-time.

The anticipated student demand for the proposed FPE program is based on a survey distributed to the California and Nevada chapters of the Society of Fire Protection Engineers (SFPE) and to the California Fire Prevention Officers (CFPO) organizations in northern and southern California. The CFPO organizations represent the fire code enforcement authorities in small, medium and large jurisdictions throughout California. The SFPE and the CFPO distributed the survey to their member organizations.

5. **If additional resources (faculty, student allocations, support staff, facilities, equipment, etc.) will be required, please identify the resources, indicate the extent of the college's commitment to allocate them, and evidence that college decision-making committees were aware of the sources of resource support when they endorsed the proposal. If the college expects the university to provide additional resources, please identify the resources and anticipated cost.**

A coordinator will be required to develop and maintain this program. This coordinator will be supported by income generated by the program. Support has been received from the California State University Commission on the Extended University and the Society of Fire Protection Engineers' Education and Scientific Foundation. Additional funding is being sought from private industry to help support this program. The program will operate through special session so no state general funds will be required to start or maintain the program. The program will be financially self-supporting.

6. ***If the program is occupational or professional,* summarize evidence of need for graduates with this specific education background:**

The shortage of fire protection engineers in California is critical. Despite the demonstrated need for individuals trained in this field, there are no graduate degree programs in fire protection engineering west of the Mississippi. The only two existing programs in fire protection engineering are in Maryland and Massachusetts. In addition to the traditional fire protection engineering field, California has a unique Wildland Urban Interface (WUI) fire problem that fire protection engineers can help address. As our WUI areas continue to expand along with the overall population, California can expect to realize even greater human and property loss from fires.

The lack of degree opportunities has created significant demand for individuals with fire protection engineering expertise in California. More positions open each year than there are qualified individuals to fill them. This demand is expected to expand in California and other western states, which continues to be one of the fastest growing regions in the country.

In its 2009 recruitment survey, the SFPE reported that of 56 respondents, 33 (59%) attempted to hire a FPE despite the economic downturn. Of these 33, 21 (64%) experienced difficulties with the hiring process, with the primary issue being a lack of applicants in the geographic location. Of the 56 respondents, 49 (88%) anticipated hiring additional FPEs within the next 5 years. Of these 49, 36 (73%) felt it would be difficult to find qualified applicants.

7. ***If the new program is currently a concentration or specialization,* include a brief rationale for conversion:**

N/A

8. ***If the new program is not commonly offered as a bachelor's or master's degree,* provide compelling rationale explaining how the proposed subject area constitutes a coherent, integrated degree major which has potential value for students. If the new program does not appear to conform to the CSU Trustee policy calling for "broadly based programs," provide rationale:**

The discipline of fire protection engineering is not new; however, programs designed to educate individuals to be fire protection engineers have not been offered by the California State University. There is only one undergraduate program in the country at the University of Maryland. There are only two graduate programs, University of Maryland and Worcester Polytechnic Institute.

Fire protection engineering is recognized as a distinct engineering discipline in the State of California as well as in most other states. Engineers practicing in this discipline must be licensed as professional engineers. Students in this program will be prepared to sit for the professional engineering examination in this discipline.

9. **Briefly describe how the new program fits with the mission and/or strategic plan for the department, college and/or university:**

The addition of this program will not impede the successful operation and growth of existing programs on campus. As a special session program offered under Executive Order 802, the program will be administratively and academically completely self-supporting. No general fund resources from either the College of Engineering or any other academic units will be used to support this program. The program's interdisciplinary structure, application of theory to practice, and outreach and engagement features support and advance the missions of Cal Poly, the College of Engineering, and Continuing Education and University Outreach.

Cal Poly Mission Statement

Cal Poly fosters teaching, scholarship, and service in a learn-by-doing environment where students and faculty are partners in discovery. As a polytechnic university, Cal Poly promotes the application of theory to practice. As a comprehensive institution, Cal Poly provides a balanced education in the arts, sciences, and technology, while encouraging cross-disciplinary and co-curricular experiences. As an academic community, Cal Poly values free inquiry, cultural and intellectual diversity, mutual respect, civic engagement, and social and environmental responsibility.

This program enhances the strong polytechnic mission of Cal Poly by applying engineering and architectural theories to fire protection. The program expands our civic engagement initiatives by producing graduates who will reduce the loss of lives and property in California due to fire.

10. Attach a display of curriculum requirements.

Required Courses	Units	Prerequisite
FPE 501 Fundamental Thermal Sciences	4	Grad Standing or consent
FPE 502 Fire Dynamics	4	FPE 501 or consent
FPE 503 Flammability Assessment Methods	4	FPE 502
FPE 504 Fire Modeling	4	FPE 502, FPE 503
FPE 521 Egress Analysis and Design	4	Grad Standing or consent
FPE 522 Fire Detection, Alarm and Communication Systems	4	Grad Standing or consent
FPE 523 Water-based Fire Suppression	4	FPE 501 or consent
FPE 524 Structural Fire Protection	4	Grad Standing or consent
FPE 596 Capstone Experience in Fire Protection Engineering	5	FPE 504, advanced graduate standing, completion of, or concurrent enrollment in, engineering courses in program, & consent
TOTAL	37	

Elective Courses	Units	Prerequisite
FPE 551 Fire Safety Regulation and Management	4	Grad Standing or consent
FPE 552 Smoke Management and Special Hazards	4	FPE 502, FPE 504
FNR 455 Wildland-Urban Interface Fire Protection	3	Consent
ME 541 Advanced Thermodynamics	4	ME 303,ME 343, ME 347, MATH 244, Grad Standing
ME 554 Computational Heat Transfer	4	ME 343, ME347, Math 418, Grad Standing
Choose a total of 8 units from elective courses	8	
TOTAL NUMBER NEEDED FOR DEGREE	45	

State of California
Memorandum

CAL POLY
SAN LUIS OBISPO
CA 93407

To: Rachel Fernflores
Chair, Academic Senate

Date: March 22, 2010

From: Warren J. Baker
President

Copies: R. Koob, M. Noori, D. Parks, S. Opava, E. Smith, C. Sunata, S. Olivas, M. Whiteford

Subject: Response to Academic Senate Resolution AS-704-10
Resolution on Proposed New Pilot Degree Program: Masters of Science in Fire Protection Engineering

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I am pleased to approve the above-entitled Academic Senate Resolution. The proposal will now be sent to the Chancellor's office for approval.

Please convey my appreciation to the Academic Senate members for their attention to this important curricular matter.