

New Program Planning Summary

CLEMSON UNIVERSITY

REQUESTING TO OFFER A NEW PROGRAM

MASTER OF SCIENCE


IN

NUCLEAR ENGINEERING

Submitted to the South Carolina Commission on Higher Education

College of Engineering and Science
Clemson University and the Catholic University of Louvain (UCL)
in Belgium

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Program Planning Summary

New Program Proposal:

New graduate program proposal for a Master of Science in Nuclear Engineering consisting of 30 semester credit hours.

This program will lead to a joint MS degree in Nuclear Engineering from Clemson University and the Catholic University of Louvain (UCL) in Belgium with students receiving diplomas from each of the two universities. Clemson University has a cooperative agreement with UCL as part of the Clemson University Brussels Center (CUBC). UCL is a member of the BNEN (Belgian Nuclear Higher Education Network) which administers an MS degree program in Nuclear Engineering at the Nuclear Research Center (SCK•CEN) in Mol, Belgium. BNEN was created in 2001 by five Belgian universities and the Belgian nuclear research centre (SCK•CEN) as a joint effort to maintain and further develop a high quality program in nuclear engineering in Belgium, with students benefiting from the human resources and infrastructure of Belgian Nuclear Research Centre (SCK•CEN). The Clemson/UCL cooperative agreement allows Clemson students to be co-enrolled to UCL, thus allowing access to BNEN and the extensive reactor facilities and researchers of SCK•CEN. SCK•CEN refers to the Dutch-French double name *Studiecentrum voor Kernenergie - Centre d'étude de l'Energie Nucléaire* both parts basically meaning "Center for the Study of Nuclear Energy".

It is anticipated that at least thirty credit hours will be required for the MS degree. This overall program would be divided into three separate blocks. In the first block, the students complete approximately six credit hours at Clemson in preparation for classes with BNEN. The students then complete approximately twenty credit hours in courses administered by the BNEN faculty in Belgium. Students then return to Clemson to complete their MS project work. It is anticipated that the work on the project will be initiated during the period that the students are in Belgium, taking courses at BNEN. The majority of the project will be completed on the students' return to Clemson. At the completion of this program, the students will receive a joint MS in Nuclear Engineering from UCL in Belgium and from Clemson University, with each university issuing a diploma to the students.

Proposed Date of Implementation:

The program is proposed for implementation in May 2009.

Justification of Need:

The nuclear energy operators and construction companies in the Southeast have seen a major growth in the demand for skilled engineers with nuclear engineering backgrounds [1]. Within South Carolina, energy companies operating nuclear plants are considering expanding/constructing new nuclear power plants. Large construction companies have created new divisions within South Carolina devoted toward new nuclear power plant

construction. Companies constructing a nuclear power plant may be US companies but they may be integrating a European designed and built reactor, thus, emphasizing the need for nuclear engineers with international experience and credentials. With the growing global energy challenges, these numbers are expected to grow. The creation of the proposed program will be unique in that it will result in engineers who not only have a degree from Clemson University but also a degree from a world-class European University. The program is packaged with BNEN such that the students can realistically complete the overall program within one year (compared to the almost 18-24 months for other MS programs), thus decreasing the time frame required for the students to secure employment in the industry. The creation of such a program will provide the nuclear energy industries in South Carolina unparalleled access to highly educated engineering talent (who has international experience and credentials), thereby increasing their competitiveness in world markets. Other outcomes will be significant collaboration (both with students and in research) between Clemson University faculty working in the nuclear energy field with the world-class faculty and facilities of BNEN.

Anticipated Program Demand and Productivity:

It is anticipated that the program initially will have about three full-time students enrolled. The initial number is only for initiation purposes and initial logistics. The number is anticipated to grow with an enrollment cap of approximately eight students per year. No foreign language skills are required as the BNEN courses are offered in English. The Clemson University program will consist of four existing College of Engineering and Sciences faculty from the Department of Mechanical Engineering and the Department of Environmental Sciences and Engineering. These faculties all have significant expertise in Nuclear Engineering. Numbers beyond eight MS students per year may be possible but would require coordination/expansion of laboratory facilities at BNEN.

Program Duplication:

The program does not duplicate any existing program in the state or elsewhere. The MS program offered at the University of South Carolina is a traditional MS in Nuclear Engineering program found at other US universities offering nuclear engineering. There are no known programs that offer MS degrees in Nuclear Engineering that can be completed in one year and have international experience. The international experience gained through working with students from Europe and Asia, coupled with working on actual reactor equipment, and interacting with some of the top researchers in the world in nuclear energy make this program unique. As a consequence, the graduates of this program will have professional contacts worldwide.

Relationship to Existing Programs:

The program will be part of the College of Engineering and Science at Clemson University. The current degree programs in Mechanical Engineering, Chemical Engineering, or in Environmental Sciences and Engineering do not offer the same

expertise as the proposed program. However, faculty members teaching in the proposed program will be members from Mechanical Engineering and Environmental Sciences and Engineering Departments and will be subject to the rules and regulations as they pertain to faculty activities and performance set forth by Clemson University.

Relationship to Other Institutions:

There is no other formal relationship proposed with other institutions in the state or nationally. A formal relationship exists with UCL in Belgium, which will be the partner institution for the dual degree offerings.

Total New Costs Associated with Program:

The annual base line operational budget is estimated to be about \$42-48,000 with the majority of the operating costs coming from salaries of existing faculty, staff, and administrators. Some costs of faculty travel, supplies, and library resources will be required but are estimated to be approximately \$10,000. Students in the program will be required to enroll at Clemson University and will pay full tuition. Tuition paid to Clemson University is estimated to cover all costs associated with this program. No tuition (only fees on the order of \$300 per year per student) will be paid to UCL. Additionally, it is anticipated that several scholarships will be provided by energy companies for qualified students entering the program.

References:

[1] John Murawski, "Utilities try to nab the best and brightest," Raleigh News and Observer, March 9, 2008.