

DATE: July 15, 2004

SUBJECT: University of Tennessee Knoxville, Ph.D. in Industrial and Information Engineering (I & IE)

ACTION RECOMMENDED: Approval

BACKGROUND INFORMATION: The University of Tennessee offers a masters degree in industrial engineering and has offered the bachelors degree since 1949. This broad discipline draws students interested in operations research, manufacturing, information engineering, human factors engineering, economy and financial engineering, supply chain engineering and transportation. Students pursuing the Ph.D. in Engineering Science have been able to attain a concentration in industrial engineering through the Department of Mechanical, Aerospace, and Biomedical Engineering, however, concentrations do not appear on the diploma. The approval of the proposed program will benefit the department and students by establishing a stand alone degree. The proposed program is specifically designed to educate highly capable doctoral students to assume leadership roles in research, teaching, and service in industrial and information engineering and applications.

PROPOSED START-UP DATE: Upon approval

Commission staff have reviewed this program proposal according to the academic standards adopted by the Commission on November 14, 2002. Each standard is referenced below.

1.1.20A MISSION: As the state’s primary comprehensive research institution, the proposed program is consistent with the mission of the University of Tennessee and the academic vision of being a top-tier research university.

1.1.20B CURRICULUM: The curriculum for the proposed program is currently offered as a concentration in Industrial and Information Engineering. The concentration includes all courses to complete the curricula; therefore no new courses are required. The curriculum includes three cognate fields (engineer-other than I & IE, mathematics and statistics). The proposed Ph.D. requires a minimum of 72 semester hours beyond the baccalaureate degree.

1.1.20C ACADEMIC STANDARDS: Admission requirements are consistent with the guidelines of the university and similar to programs in the other states. All students are required to take the GRE and for international students, the TOEFL. Consistent with most Ph.D. programs, students must maintain at least a 3.0 GPA, pass a qualifying examination, a comprehensive examination and complete a defense of the dissertation.

Projected Program Productivity

Student Projections	FTE Enrollment	Graduates
Year 1	11	2
Year 2	13	2
Year 3	13	3
Year 4	15	3
Year 5	17	3-4

1.1.20D FACULTY: Three faculty vacancies have occurred within the last calendar year. The department currently has nine filled positions and is conducting a search to fill the vacant positions. The faculty is well qualified with terminal degrees and no additional faculty lines are required to implement the proposed program.

1.1.20E LIBRARY RESOURCES: No additional library resources are required to implement the proposed program.

1.1.20F ADMINISTRATION/ORGANIZATION: The program will be housed and administered in the Department of Industrial and Information Engineering in the College of Engineering.

1.1.20G SUPPORT RESOURCES: The Department of Industrial and Information Engineering is in discussion with the Oak Ridge National Laboratory regarding collaborative projects.

1.1.20H FACILITIES/INSTRUCTIONAL EQUIPMENT: No additional instructional equipment is needed to implement the proposed program. Five laboratories currently support the I&IE programs in the department. The funding of these labs comes primarily from institutional and industrial support. Further development of lab facilities will be pursued from these and other sources. There are also plans to renovate space to house the department on a permanent basis.

1.1.20I STUDENT/EMPLOYER DEMANDS: The demand for the proposed program is supported by the number of students that have received the Ph.D. in Engineering Sciences with the concentration in Industrial and Information Engineering. As a concentration, it has been popular and recognized as a choice area of study. Establishing a stand alone doctorate help attract more qualified faculty and students at all degree levels and increase the national and international stature and visibility of the College of Engineering and the University of Tennessee. Upon approval, having full identity as a Ph.D. degree, the enrollment and production rate of graduates is expected to grow. A survey of current graduate students in the department expressed a preference for the Ph.D., as opposed to just the concentration currently offered. Students interviewed during the external consultant's visit indicated they would be willing to delay their graduation in order to graduate in Industrial and Information Engineering. Graduates of the proposed program will have a competitive edge to graduates of general engineering science programs and will have advanced educational and research skills to support the new industry in this information-based economy. Employment data derived from surveys by the Institute of Industrial Engineers and

the National Science Foundation attest to strong employment opportunities for students receiving doctorates in Industrial and Information Engineering.

1.1.20J NO UNNECESSARY DUPLICATION: There are no Ph.D. programs in Industrial and Information Engineering or Industrial Engineering in Tennessee.

1.1.20K COOPERATIVE INSTITUTIONS: N/A

1.1.20L DESEGREGATION: The program will not impede the state's effort to achieve racial diversity.

1.1.20M ASSESSMENT/EVALUATION AND ACCREDITATION: The proposed program will follow a review plan and cycle similar to those of graduate programs at all public universities. External reviewers from similar programs nationally and other programs within the university also will be used as evaluators.

1.1.20N ARTICULATION: N/A

1.1.20O EXTERNAL JUDGMENT (Graduate Programs): On March 17-19, 2004, an external review was conducted by Dr. Pius J. Egbelu, Dean of Engineering and Distinguished Professor at Louisiana State University. Dr. Egbelu expressed high regard for the potential of the College of Engineering and the Department of Industrial and Information Engineering to implement a quality program. He indicated that the engineering community considers the lack of a Ph.D. program to be evidence of a weak department overall. The availability of the Ph.D. will enrich faculty and student recruitment and enhance the ability to secure external research funding.

1.1.20P COST/BENEFIT/SOURCE: Given that no additional costs are required to implement the proposed program, the student benefit of the program far outweighs any drawbacks that may be encountered. Justification for the new program is evident and would open new opportunities currently out of range for the department. The proposed program will be a source of motivation and leverage for the faculty to aspire to higher levels of accomplishments and competitiveness at the national level.

1.1.30 POST APPROVAL MONITORING: An annual performance review of the proposed program will be conducted for the first five years following approval. The review will be based on goals established in the approved program proposal. At the end of this period, the Commission will conduct a summative evaluation based on, but not be limited to, enrollment and graduation numbers, program cost, progress toward accreditation, library acquisitions, student performance, and other goals set by the institution and agreed to by governing board and Commission staff. As a result of deficiencies noted from the evaluation, the Commission may recommend to the governing board that the program be terminated. The Commission may also choose to extend this period if additional time is needed/or requested by the governing board.