North Carolina A&T State University
Request to Plan a Doctoral Program in Energy and Environmental Studies

Introduction

North Carolina A&T State University requests approval to plan a doctoral program in Energy and Environmental Studies (CIP: 30.9999).

Program Description

The institution provided the following description of the program:

> The proposed degree program for which planning authorization is sought by North Carolina Agricultural and Technical State University (NCA&T) is an "Interdisciplinary Doctor of Philosophy (Ph.D.) degree program in Energy and Environmental Studies." The Ph.D. program in Energy and Environmental Studies will have the following tracks that emphasize energy and environmental issues.
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> *Energy and Environmental Engineering*
> This track will be designed to produce engineers who have training in basic management skills along with interdisciplinary technical expertise in topics related to energy and complex environmental systems. The goal of this track will be to produce engineering innovators in the application of renewable and non-renewable energy sources, the advancement of environmental security, and the design of sustainable processes. Topics include, but are not limited, to research and theory applied to energy design and control, modeling, simulation, distribution, control systems, analysis, economics, management, planning, generation, and fuel cell technology.
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> *Pollution Prevention*
> This track will be designed to produce scientists who have training in basic management skills along with interdisciplinary technical expertise in topics related to energy and complex environmental systems. The goal of this track will be to produce scientists who are innovators in the application of renewable and non-renewable energy sources, the advancement of environmental security, and the design of sustainable processes. Topics include but are not limited to research and theory applied to supercritical carbon dioxide, separation processes, fate and transport, bioremediation, bioprocessing, quantitative risk assessments, risk management and economics.
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> *Environmental Education and Security*
> This track will be designed to produce professionals who have a broad education in social and physical sciences with interdisciplinary expertise in topics related to energy and the environment. The goal of this track is to produce professionals who are innovators in enhancing effective communication about complex environmental security issues among the scientific community, managers, policy makers, and the public. Topics include but are not limited to assessment and evaluation of environmental education and environmental security issues to enhance public understanding of complex environmental information and decisions.

The Ph.D. program will have a unique interdisciplinary focus that will encourage students to pursue their interests from a wide range of perspectives and approaches, while forming a learner-centered community of interacting scholars. The new program will proceed through the program plan, comprehensive examination, and dissertation stages. Options available to candidates will vary to meet program requirements. Students who will be admitted into the Interdisciplinary Ph.D. program will come primarily from applied sciences and engineering. Students with a background in social sciences and humanities who fail to meet admission requirements for the doctoral program will be expected to satisfy the requirements by enrolling in prerequisite courses before beginning doctoral work in Energy and Environmental Studies.

Doctoral students will have unique opportunities to form and reform collegial working relationships within the interdisciplinary faculty. The Ph.D. plan of work will be guided by an Interdisciplinary Steering Committee. Academic advisors will work closely with the Steering Committee.

Graduates from the proposed program will work in all sectors of the local, national, and international economy. The Environmental Protection Agency (EPA) and other agencies have begun to recognize the need to consider an interdisciplinary skill mix as well as the way work is accomplished to meet the challenges of this new century. In addition, graduates, especially African Americans, and other underrepresented groups, will be trained for teaching and research positions in colleges/universities. The aim of the program is to produce graduates who are at the cutting-edge of energy, pollution prevention, environmental education and security, and to build on faculty strengths in research and teaching. The Energy and Environmental Engineering, Pollution Prevention, and Environmental Education and Environmental Security tracks are crucial to "Homeland Security" such as protecting energy supplies, water resources, and air quality which will be necessary for assessing terrorist threats and responding to terrorist attacks according to testimony presented to Congress by the National Council for Science and the Environment. In his State of the Union Speech on January 27, 2003, President George W. Bush recommended an energy plan designed to reduce our reliance on foreign oil. He also proposed a new initiative of $1.2 billion in research funding "so that America can lead the world in developing clean, hydrogen-powered automobiles." According to a recent National Science Foundation report, Environmental Research and Education are central elements of local, national, and global security, health, and prosperity.

Program Review

The review process for requests to plan is designed to determine if the proposal is developed to the stage appropriate for taking to the Graduate Council and if so what are the issues that may need further attention. Proposals to plan doctoral programs are reviewed internally. The concerns from the reviewers were summarized in a letter to the Chancellor prior to the presentation to the Graduate Council. That summary follows:

While the reviewers identified some strong points in the proposal, there were a number of issues that surfaced which I will summarize. One reviewer thought there should be more

attention to how the graduate faculty for this program would grow their research programs and increase outside funding. Programs are expensive and to recruit good graduate students there will need to be significant funding for the numbers planned and a sizable portion of that will have to come from external grants. There was a question of whether there would be a teaching requirement for doctoral students in this program.

Another reviewer thought educational objectives for the program were not as explicit and unified as they might be. He commented that educational and non-educational objectives were mixed together in some sections and that the objectives were spread through the proposal. His advice would be to consolidate and unify the statement of the educational objectives.

Another request was for more attention to the opportunities for the graduates of the program and a more detailed analysis of the demand for graduates of this type of program.

Graduate Council
The Graduate Council had, as a basis for its consideration, the proposal to plan the program, the summary letter to the Chancellor, and a presentation to the Council by representatives of the program.

Response
Representatives of NCA&T identified the educational objectives to be a.discovery, development and application of renewable and non-renewable energy sources, b.advancement of environmental safety and security, and c.design of sustainable processes. Research funding has been growing at NCA&T and now exceeds $40 million annually. This interdisciplinary program will bring the right faculty together to be competitive for new research funding in the areas of energy and environment, most of which will require interdisciplinary teams. There will be plenty of opportunity for graduates since employment of environmental engineers and scientists is projected by the Bureau of Labor Statistics to grow faster than average.

Recommendation by the Graduate Council
After consideration of the issues raised by previous reviewers and Council members, the Graduate Council voted, without dissent, to recommend approval for North Carolina A&T State University to plan a doctoral program in Energy and Environmental Studies.

Recommendation
The Office of the President recommends that the Board of Governors approve the request from North Carolina A&T State University to plan a doctoral program in Energy and Environmental Studies.