TOPIC: **PROPOSAL TO OFFER A DOCTOR OF PHILOSOPHY DEGREE IN ENGINEERING AND APPLIED SCIENCE (EASPhD) AT THE UNIVERSITY OF COLORADO DENVER**

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I. SUMMARY

This consent item recommends approval of the University of Colorado Denver, College of Engineering and Applied Science's proposal to offer a Ph.D. in Engineering and Applied Science (EASPhD).

II. BACKGROUND

The following is summarized from the University of Colorado's proposal:

> The program will position the College for increased overall quality of research and for significant growth in research funding. Further, the program will attract working professionals from within the Denver metro area as well as traditional students from the nation and around the world. The proposed program is designed to be multidisciplinary and allow students to span their interests and collaborate across all campuses. This is a major point in the research component of the program and will encourage continual collaboration especially between the Denver Campus and the Anschutz Medical Campus.

ROLE AND MISSION SUPPORT

The Ph.D. in Engineering and Applied Science supports the role and mission of the University of Colorado Denver. The statutory mission states:

> *The Denver campus of the university of Colorado shall be an urban comprehensive undergraduate and graduate research university with selective admissions standards. The Denver campus shall offer baccalaureate, master's, and a limited number of doctoral degree programs, emphasizing those that serve the needs of the Denver metropolitan area. The Denver campus has statewide authority to offer graduate programs in public administration and exclusive authority in architecture and planning. C.R.S. 23-20-101(1)(b)*

EVIDENCE OF STUDENT DEMAND

> Enrollment projections are based on how the proposed EASPhD program will improve the research interaction between the various engineering disciplines. As a consequence, a number of well qualified Ph.D. candidates will be recruited, trained and ultimately enter the workforce. A survey conducted in early 2010 indicated that out of 57 enrolled

engineering master's students, 42 had interest in enrolling in the proposed program. Moreover, a review of several leading graduate engineering programs in the United States indicated that there is an unmet demand for programs such as the one proposed by UCD.

The proposed EASPhD program will enhance the enrollment and support of graduate students by facilitating research funding in joint endeavors between the College of Engineering and Applied Sciences (CEAS) and the Anschutz Medical Campus. Associated activities in the college will improve research in technologies related to energy systems, biomedical engineering, health systems, and health information technology to name a few.

EVIDENCE OF NEED

There are many reasons a program like the EASPhD is in high demand. For example, the Colorado Department of Labor and Employment projects an employment increase of 421 engineers in Colorado from 2009 to 2019, led mainly by civil and environmental engineers. They estimate an annual average 175 job openings due to industry and employment growth and another 904 job openings per year due to replacing an aging workforce. This is an estimated need of over 1,000 engineering jobs per year in Colorado. Demand, funding, and advancements in engineering, with particular focus on health systems and renewable energy have been on the rise for some time. Colorado has the intellectual base and educational resources to become a leader in these fields. The proposed EASPhD will also fill some of the urgent state needs for highly qualified engineers in the field of renewable energy. Renewable energy employment in Colorado is expected to grow dramatically in the coming years.

DUPLICATION/SIMILAR PROGRAMS IN THE STATE

There are other multidisciplinary Ph.D. degrees in Colorado but the EASPhD does not duplicate these independent programs. Specifically, the College of Engineering and Applied Science at the University of Colorado, Colorado Springs has a Ph.D. in Engineering with emphasis areas in computer science, electrical, mechanical, and aerospace engineering and security. However, this program does not offer the spectrum of interdisciplinary engineering activities that is available with the proposed EASPhD. The Colorado Springs program also does not serve the Denver metro area. The University of Denver has a Ph.D. in Engineering but its interdisciplinary nature is limited to fields such as business or natural sciences and doesn't offer the range of interdisciplinary options available in the EASPhD program. Other Ph.D. programs that are more limited in scope include the Colorado School of Mines, which offers a Ph.D. in Engineering with Specialty in Engineering Systems and Colorado State University, which offers a Ph.D. in Biomedical Engineering, which includes interdisciplinary research opportunities. It also involves the design and regulatory approval of advanced medical technologies. The core courses are in mathematics, statistics, bioengineering, and biomolecular technology with

the electives being in engineering. The proposed EASPhD would have the main concentration in an engineering field, such as electrical engineering, computer

engineering, civil engineering, or mechanical engineering with a secondary emphasis on mathematics, statistics, and biotechnology.

III. STAFF ANALYSIS

Pursuant to Colorado Revised Statutes 23-5-129 (6)(b), Department staff finds that Doctor of Philosophy Degree in Engineering and Applied Science is consistent with the University of Colorado Denver's campus role and mission.

IV. STAFF RECOMMENDATION

Staff recommends that the Commission approve the University of Colorado Denver's proposal to offer a Doctor of Philosophy Degree in Engineering and Applied Science.

V. SUPPLEMENTAL INFORMATION

Copies of all relevant materials are on file in the Academic Affairs office and are available upon request.

STATUTORY AUTHORITY

C.R.S. §23-5-129