

UH Hilo Undergraduate Applied Engineering Program

BACKGROUND

In order for the UH System to be better positioned to meet the States S&T related goals, UHH requires essential support to excel in applied and basic STEM (science, technology, engineering and mathematics) research fields that provide the hands-on experiences essential for our graduates to be competitive in the global discovery and innovation enterprise. UH Hilo will make an active and measurable contribution to the State's economy and provide a solid return on its investment through research and training, both through the production of new knowledge and methodologies that help Hawaii's business and citizens, and through the enhanced educational experience of its students. Because participation in faculty-guided research experiences are essential to degree attainment in the STEM fields, UHH STEM initiatives will also help address critical workforce shortages and prepare undergraduate, graduate and professional students to serve in a variety of STEM fields. One example of a new applied STEM research initiative and degree program that UH Hilo will pursue is applied engineering with a focus on robotics, artificial intelligence, data manipulation, sustainable energy and food security. Woven throughout this program will be concepts of indigenous engineering from Native Hawaiian and Broader Pacific Islander cultures.

UH Hilo will create a special advisory committee to the Chancellor for the purpose of establishing a UH Hilo BS degree program in applied engineering. This committee will be composed of, *inter alia*, former and current deans and presidents of esteemed engineering universities (including UH Manoa Dean of Engineering), CEOs of private engineering corporations, representative from DBEDT, and representatives from S&T enterprises in Hawai'i. They will be charged with providing advice to UH Hilo Chancellor for implementing a new paradigm BS applied engineering degree program that will seek to implement many of the recommendations of the recent National Science Board report on Undergraduate Engineering Education. The new degree program will also seek to address state needs for a BS-level workforce with both experience and training in high priority area for S&T economic development in Hawai'i. Initially, it is expected that this new program will have a focus on the topic areas described in the following sections. It is envisioned that UH Hilo will establish the special advisory committee in early FY2010, with an expected final report to the Chancellor by the end of 2009. Estimated costs to support advisory committee activities are \$200,000.

FY2011 funding in the amount of \$300,000 will provide initial seed funding to hire two new engineering faculty (including funds for base salaries, fringe benefits, start-up supplies and curriculum development) at the University of Hawaii at Hilo for the purpose of implementing the new undergraduate degree program. Faculty may have background in systems, mechanical, cyber-engineering and/or electrical engineering. Following this initial year of seed funding, it is anticipated that the University of Hawaii will include sustained support for these UH Hilo engineering faculty as part of the annual base budget for UH Hilo.

FY2010 BUDGET

Casual Hire - \$75K

Supplies – \$10

Services –\$35K

Travel – \$50K
Misc – \$5

FY2011 BUDGET

Personal (2 tenure track full time engineering faculty @ \$75K each) = \$150K
Supplies – \$80K
Travel – \$5K
Misc – \$5
Equipment - \$60K

RELATIONSHIP OF THE REQUEST TO STATE PLAN OR FUNCTIONAL PLAN

This funding request is in accord with Chapter 226 of the Hawaii Revised Statutes, which sets forth guidelines for “the future long-range development of the State”, and specifically identifies the need to promote activities that increase and diversify employment opportunities to achieve full employment, increase income and job opportunities, improve living standards for Hawaii's people, and expand industry development on “neighbor islands” (counties other than Oahu).

In particular, the proposed Undergraduate Applied Engineering Program will help advance each of the following legislatively mandated goals in Sections 10 and 21 of Chapter 226:

- (1) Increase effective communication between the educational community and the private sector to develop relevant curricula and training programs to meet future employment needs in general, and requirements of new, potential growth industries in particular.
- (2) Develop, promote, and support research and educational and training programs that will enhance Hawaii's ability to attract and develop economic activities of benefit to Hawaii.
- (3) Foster a broader public recognition and understanding of the potential benefits of new, growth-oriented industry in Hawaii.
- (4) Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.
- (5) Provide higher educational opportunities that enable Hawaii's people to adapt to changing employment demands.
- (6) Emphasize quality educational programs in Hawaii's institutions to promote academic excellence.
- (7) Support research programs and activities that enhance the education programs of the State.

Section VII - IMPACT ON OTHER STATE PROGRAMS/AGENCIES

Engineering-related education and training programs a high priority for the State's Innovation Initiative. UHH is proposing to establish a “new paradigm” undergraduate degree program in Applied Engineering that will directly support this priority, providing both in-classroom education and “real world” training opportunities that will enable UHH graduates to qualify for

high-paying employment in STEM-related fields and expand our State's technologically proficient workforce

UHH seeks to broaden its engineering faculty while concurrently enhancing the capacity of its education and applied research capabilities in other science based departments. New faculty hires will be charged with creating an extramurally funded initiative for developing local state capabilities for research, education, workforce training and business development opportunities for production of next generation self diagnostics machines that interface human and machine cognition to improve quality of life, promote space and undersea exploration, increase manufacturing efficiencies in multiple sectors and broadly support statewide S&T innovation enterprises. Initial foci will include robotics, artificial intelligence, data manipulation, sustainable energy, food security and cyber-engineering. It is envisioned that this initiative will also have linkages to current and next generation observatories on Mauna Kea, as well as the ongoing UHH Pacific International Space Center for Exploration Systems (PISCES), the only comprehensive, international research and education center in the world dedicated to developing technologies to sustain life on another planet. The rich history of Native Hawaiian engineering accomplishments from construction of ocean-going vessels, to astronomically aligned heaus in both marine and terrestrial locations, to complex fish-pond aquaculture construction extending from land into the ocean, will all serve as significant components of the envisioned degree program and help to link the utility of engineering in today's society to the cultural foundations of the diverse population of Hawaii.