MEMORANDUM

TO: Lee Putnam, Chair
    Board of Regents

VIA: David Lassner
     President

VIA: Donald Straney
     Vice President for Academic Policy and Planning

VIA: David Lassner
     Interim Chancellor

FROM: Michael Bruno
     Interim Vice Chancellor for Academic Affairs
     and Vice Chancellor for Research

SUBJECT: ESTABLISH AS PROVISIONAL THE BACHELOR OF SCIENCE IN ENGINEERING SCIENCE AT THE UNIVERSITY OF HAWAI‘I AT MĀNOA

SPECIFIC ACTION REQUESTED:
It is respectfully requested that the Board of Regents establish as provisional the Bachelor of Science in Engineering Science in the College of Engineering at the University of Hawai‘i at Mānoa.

RECOMMENDED EFFECTIVE DATE:
Effective Fall 2019

ADDITIONAL COST:
The proposed program will leverage recent strategic investments in the hiring of Engineering faculty, and will require additional nominal resources (lecturers) necessitated by an increase in overall enrollment. These investments, which amount to $185,000, are funded through recent allocations from the central administration and reallocations within the College for greater efficiency.

PURPOSE:
The proposed Bachelor of Science in Engineering Science is designed to serve as a program incubator, which will allow the College to strategically develop and deploy ABET-accredited engineering programs in high demand areas. The initial program concentrations will be Biomedical Engineering and Aerospace Engineering, two areas where there is high need and demand in the state and across the country.
BACKGROUND:
Pursuant to Board of Regents Policy 5.201: Instructional Programs, “The board shall approve the establishment of all new instructional programs granting academic credit leading to a degree or credential, upon recommendation by the president.”

The UHM College of Engineering offers ABET-accredited undergraduate degrees in Computer Engineering, Civil Engineering, Electrical Engineering, and Mechanical Engineering. The College also offers the MS and PHD in Civil Engineering, Electrical Engineering, and Mechanical Engineering.

The proposed BS in Engineering Science complements current engineering degrees by leveraging faculty and curricular resources while establishing the infrastructure to incubate new degrees in areas that are responsive to state needs and in areas where UHM is positioned to excel. As an example of this approach, the provisionally approved Bachelor of Science in Computer Engineering was initially established as a “computer track” within the BS in Electrical Engineering. Once demand for the degree grew, the Board of Regents approved the stand-alone BS in Computer Engineering in 2010. The degree is now fully accredited by ABET, with enrollment and outcomes that have exceeded projections. (Established status for the BS in Computer Engineering is requested in a separate action.)

The College plans to have the same success in emerging areas by establishing the Bachelor of Science in Engineering Science as an incubator for new programs. The degree allows for an interdisciplinary approach to engineering, which is highly desirable in engineering education today. The initial tracks within the degree will be Biomedical Engineering and Aerospace Engineering.

Biomedical Engineering is currently the fifth most popular engineering major nationally, yet no ABET-accredited degree exists within the state. Biomedical engineers are equipped to work in medical fields and prepared to pursue graduate degrees in the biomedical sciences and medicine. Per Hawai‘i Industry Sectors, the average salary is $85,000 (and $135K nationally).

Aerospace Engineering, offered in collaboration with the Hawai‘i Space Flight Laboratory (SOEST), will prepare graduates for careers with the many aerospace companies across the country, some with offices here in the State. The average salary for aerospace engineers is $94,000 (and $160K nationally).

In the future, the College anticipates developing tracks in other emerging fields, such as cybersecurity and data science. If approved, the College will seek ABET accreditation for the BS in Engineering Science in 2021 (the earliest date possible). Graduation from an ABET-accredited program is required for professional engineering licensure (after gaining work experience).

Per the Integrated Academic and Facilities Plan (IAFP), “UH Mānoa must also continue to meet the professional workforce needs of Hawai‘i in areas such as education, medicine, nursing, law, business, social work and engineering. Work must continue to integrate
education, innovation and scholarship, across disciplines, and to develop the next generation of Hawai‘i’s leaders.” As an interdisciplinary program, the proposed BS in Engineering Science fits within the mission of the IAF so that we meet the needs of the state and support the development of new industries for Hawai‘i’s next generation.

The proposed BS in Engineering Science is a priority for UHM as the degree creates the infrastructure for the campus to be strategic and agile in the development and deployment of engineering programs in high demand areas. While UHM offers the only ABET-accredited degrees in the state, Hawai‘i students interested in biomedical engineering and aerospace engineering have to attend college on the U.S. continent, which ultimately is a loss for the state as many of these students do not return to Hawai‘i. The UHM needs to be positioned to respond better to changes in industry, workforce needs, and student demand. The proposed program is a step towards that goal within the field of engineering.

Our studies indicate that enrollment will exceed 100 students with an average of 30 graduates/year by the fourth provisional year. The program will utilize recently approved allocations, and reallocated resources from within the College. UHM has invested in the hiring of engineering faculty in high demand areas over the last few years, with two new faculty slated to begin in January and in Fall of 2019. As the program leverages existing courses, we anticipate that new lecturers will be needed to add sections of introductory-level courses to meet demand. The faculty hires were funded through strategic investments from central administration and recent retirements. We will cover the additional lecturers through a reallocation of resources within the College and through the projected increase in tuition dollars as a result of an increase in student semester hours. All engineering students pay a $500 program fee per semester. The fee will also apply to students in the proposed program.

The proposed Bachelor of Science in Engineering Science represents a new approach in being responsive to changes in industry and needs within the state. Through the establishment of tracks, UH Mānoa is positioned to be both agile and responsible in creating new programs in high demand areas where we are positioned to excel. Further, the proposed tracks in Biomedical Engineering and Aerospace Engineering will meet the immediate needs in the state by preparing future leaders to serve in emerging industries.

**ACTION RECOMMENDED:**
It is recommended that the Board of Regents establish as provisional the Bachelor of Science in Engineering Science in the College of Engineering at the University of Hawai‘i at Mānoa.

Attachment
cc: Interim Dean Riggs