



Item: AS: A-1

Tuesday, May 16, 2017

SUBJECT: APPROVAL OF NEW DEGREE PROGRAM – MASTER OF SCIENCE IN MARINE SCIENCE AND OCEANOGRAPHY (CIP 30.3201)

PROPOSED BOARD ACTION

Approve a new degree program, Master of Science in Marine Science and Oceanography (CIP 30.3201).

BACKGROUND INFORMATION

The Charles E. Schmidt College of Science proposes a new graduate degree program, Master of Science in Marine Science and Oceanography. This is an interdisciplinary program designed to provide students with specialized training in Marine Science and Oceanography jointly administered by the Charles E. Schmidt College of Science and Harbor Branch Oceanographic Institute (HBOI). Participating faculty have appointments at the College of Science and HBOI.

The primary educational objective is to provide graduate students with a broad understanding of coastal, nearshore and oceanographic science, along with the research and inquiry skills necessary to independently conduct research. Students will enter the workforce ready to apply their skills to research, management and administrative questions related to coastal and oceanographic issues in higher education, government, private sector consulting positions and non-profit organizations. Florida is the third ranked state in the number of job postings in this category, behind California and Louisiana.

IMPLEMENTATION PLAN/DATE

If approved, degree will begin in Fall 2017

FISCAL IMPLICATIONS

The final five-year projected program costs will be \$669,765.

Supporting Documentation: New Degree Program Proposal

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Board of Governors, State University System of Florida

Request to Offer a New Degree Program

(Please do not revise this proposal format without prior approval from Board staff)

<u>Florida Atlantic University</u>	<u>Fall 2017</u>
University Submitting Proposal	Proposed Implementation Term
<u>CES College of Science</u>	<u>HBOI/Biological Sciences/Geoscience</u>
Name of College(s) or School(s)	Name of Department(s)/ Division(s)
<u>Academic Specialty or Field</u>	<u>MS in Marine Science and Oceanography</u>
	Complete Name of Degree
<u>30.3201</u>	
Proposed CIP Code	

Program Description and Relationship to System-Level Goals

- A. Briefly describe within a few paragraphs the degree program under consideration, including (a) level; (b) emphases, including majors, concentrations, tracks, or specializations; (c) total number of credit hours; and (d) overall purpose, including examples of employment or education opportunities that may be available to program graduates.

The proposed degree is a Master of Science in Marine Science and Oceanography. The primary educational objective is to provide graduate students with a broad understanding of coastal, nearshore and oceanographic science, along with the research and inquiry skills necessary to independently conduct research and answer questions within their area of specialization. They should be well situated to enter the workforce ready to apply their skills to research, management and administrative questions related to coastal and oceanographic issues in higher education, government, private sector consulting positions and non-profit organizations. Florida is the third ranked state in the number of job postings in this category, behind California and Louisiana. Last year, the number of job postings matching this degree in the nation was 448.

This is an interdisciplinary program designed to provide students with specialized training in Marine Science and Oceanography jointly administered by the Charles E. Schmidt College of Science and Harbor Branch Oceanographic Institute. Participating faculty have appointments at HBOI and the College of Science. Students are required to take 37 total credits: 3 core courses (7 cr.) and electives totaling 24 credits with at least one course from each of four different concentrations. Areas of concentration include Marine Biology, Coastal and Geological Science, Conservation and Ecology, Remote Sensing and

GIS, Chemistry, and Statistics and Communication. The Thesis option will include 3-6 credits of thesis research. The exact courses taken are to be determined by students and their advisory committees.

Fiscal Implications:

Provide headcount (HC) and full-time equivalent (FTE) student estimates of majors for Years 1 through 5. HC and FTE estimates should be identical to those in Table 1 in Appendix A. Indicate the program costs for the first and the fifth years of implementation as shown in the appropriate columns in Table 2 in Appendix A. Calculate an Educational and General (E&G) cost per FTE for Years 1 and 5 (Total E&G divided by FTE).

Implementation Timeframe	Projected Enrollment (From Table 1)		Projected Program Costs (From Table 2)				
	HC	FTE	E&G Cost per FTE	E&G Funds	Contract & Grants Funds	Auxiliary Funds	Total Cost
Year 1	15	13.0	\$20,706	\$269,175	\$100,000		\$369,175
Year 2	37	32.0					
Year 3	51	44.3					
Year 4	61	53.2					
Year 5	73	64.1	\$5,769	\$369,765	\$300,000		\$669,765

Note: This outline and the questions pertaining to each section must be reproduced within the body of the proposal to ensure that all sections have been satisfactorily addressed. Tables 1 through 4 are to be included as Appendix A and not reproduced within the body of the proposals because this often causes errors in the automatic calculations.

Need and Demand

- A. **Need:** Describe national, state, and/or local data that support the need for more people to be prepared in this program at this level. Reference national, state, and/or local plans or reports that support the need for this program and requests for the proposed program which have emanated from a perceived need by agencies or industries in your service area. Cite any specific need for research and service that the program would fulfill.

The survey conducted by Market Research Associates of Graduates in coastal and marine sciences within the State of Florida (completed in September 2014) showed that they are generally employed in Higher Education (59%) and Government (39%; Federal, State, and Local) positions. Smaller numbers find employment with non-profit organizations and in consulting positions. In 2014 the nationwide numbers of job postings requiring a graduate degree in the field of marine science has increased by 4.2% from 430 to 448.

Research universities drive employer demand for marine and coastal science graduate degree-holders in Florida; all of the 11 metropolitan areas with the most job postings for marine and coastal science graduate degree-holders host at least one large research university.

While other marine and coastal science programs establish partnerships with local marine laboratories and agencies, FAU has its own internal but independent research institute, Harbor Branch, which makes the program unique. Students will be taking core curriculum with HBOI research faculty, and will have many opportunities to take additional courses and work in many lab environments with researchers that have external funding and existing partnerships outside of FAU, on both basic and applied research projects. This is in addition to the College of Science research faculty who have established and funded research programs in Biology and Geoscience. FAU has also established partnerships with such institutions as the Smithsonian Marine Station at Ft. Pierce and the USGS on the Davie campus, which offer additional training and research opportunities.

- B. Demand: Describe data that support the assumption that students will enroll in the proposed program. Include descriptions of surveys or other communications with prospective students.**

Demand for Graduates in Marine Science and Oceanography

A Google survey was conducted of the students in the IFP class Environment and Society in the Fall of 2015. There were 228 respondents. Of these, 59% indicated that they had an interest in pursuing a graduate degree in coastal and marine science, 57% said that they would apply to one if there was one at FAU, and 45% said they were looking elsewhere for such a degree. While we currently offer students MS degrees in Biology, Environmental Science and Geoscience that allow them to focus somewhat on coastal and marine science issues, we are losing students because they want degrees that allow them to concentrate on these topics and credential their expertise in these areas. Adding more than a dozen new Harbor Branch graduate courses taught by faculty who are primarily researchers with established research labs will greatly strengthen the exposure of our graduate students to marine research.

In the comments section of the Google survey, several indicated excitement at the concept of a joint FAU College of Science and FAU Harbor Branch degree, and several suggested that the strength would be the diversity of potential coastal and marine classes at FAU versus the limited focus on Marine Biology in other SUS graduate programs. A biology undergraduate advisor, Glenn Malone has stated that we will fill the program quickly as many biology majors are seeking a Marine Science Master's degree after their major at FAU in which they develop an interest in marine science but find the existing MS programs in Environmental Science, Biological Science and Geoscience are not sufficiently focused on marine and coastal issues. A degree that adds the research courses, faculty and labs at HBOI along with courses across the marine and coastal disciplines at FAU would suit these students well.

Budget

All except one of the faculty participating in the degree program are current faculty holding full time positions at FAU; the other faculty member participating is an OPS

employee. The majority of the faculty at Boca Raton and at Davie campuses are already teaching courses that will be part of the new degree program. The impact on these FAU faculty will be minimal, with 15 students in the first year, and over 30 courses offered across the campuses, it is expected that the additional load for all FAU faculty combined will be the equivalent of 0.26 PY (\$18,409 based on current salaries and benefits for the Faculty listed in Table 4, with one student from the new degree program participating in a class of seven or two in a class of 14). These salary and benefit costs were calculated from the actual salary and benefit costs for CES College of Science tenure and tenure track faculty teaching an existing 3 credit course which is offered as an elective in the new program. The cost is calculated as 0.035 effort (1 student in a class of 7). These faculty salary costs (\$18,409) will be reallocated from existing E&G expenses; the base before reallocation (\$128,860) is calculated as the E&G cost to provide the full teaching load for the 3 credit courses offered as electives in Year 1 of the program. College of Science faculty offering courses that are included as part of this degree program will not necessarily teach the courses every year, therefore, Table 4 shows effort in years 1 and 5 for some of the faculty and other faculty would have effort in years 2 and 4. The Biology and Geoscience graduate programs will benefit from the new degree program by increasing the number of students in small graduate classes. This increased enrollment may avoid courses with low enrollment being cancelled.

In addition, the Administrator salaries (P. McCarthy (0.3 FTE, \$51,062, including fringe benefits) and S. Milton (0.25 FTE, \$32,759, including fringe benefits)) will be reallocated from the Harbor Branch and CoS budgets, respectively. The administrative budget to cover three months of S. Milton's salary will be discussed with the Chair of Biological Sciences and the new Dean of CES College of Science. Administrative support (0.5 FTE A&P, \$46,242 and 0.1 FTE USPS, \$5,845) will be provided as a redistribution of duties from existing members of the Harbor Branch administrative staff in Year 1, however, over the course of the 5 years as this program expands this will need to be considered as a program expense.

The majority of the new costs are associated with the Harbor Branch Research Faculty who are currently hired on contracts and grants. The costs for the five new graduate courses offered each semester at Harbor Branch will be \$110,875 in year 1 and increasing to \$114,201 in year 5 due to faculty and staff salary increases (3%). OPS salary support plus fringe (\$3,983) is included for one adjunct faculty member (W. Louda) who is co-teaching one of the Core degree courses each year.

In some cases, students will be supported by Assistantships and Fellowships associated with research grants and contracts. Faculty will seek such funding to support students, which is estimated to be \$50,000 in Year 1 rising to \$150,000 by Year 5. Students will also have the opportunity to apply for scholarships from Philanthropic awards such as those awarded by the Indian River Lagoon Graduate Student Fellowship and the FAU Harbor Branch ForEverglades Scholarship. This support is estimated to be \$50,000 in Year 1 rising to \$150,000 by Year 5. We are requesting that Teaching Assistantships be included for this

program: by Year 5 we will have 73 students enrolled and are requesting 7 Teaching Assistantships at a total cost of \$92,634, calculated at a rate of \$4,818 for Fall and Spring semesters and \$3,212 for Summer semester plus benefits.

It is anticipated that grants and scholarships will cover 40-50% of the student assistantships and also their tuition. Some students will be eligible to apply for tuition waivers and other students will cover their costs to attend graduate school including covering their own tuition. These other sources of revenue will help to ensure that this degree program has a sustainable budget to support its expenses and growth.

We do not anticipate other expenses or capital outlay such as the purchase of new equipment or supplies and material for the program. Students will be working in research labs where the acquisition of new equipment and supplies and materials are from research grants and contracts. Student use of such items will be a component of the overall operation of the degree program.

Projected Benefit of the Program to the University, Local Community, and State

The expanding human population in South Florida is generating a need for more environmental professionals. This provides unique opportunities for the study of coupled natural-human systems, in diverse subtropical ecosystems, including developed and undeveloped coastlines, large estuaries, and coastal waters. These provide opportunities to study aspects of global change, including water quality, hydrology, coastal geology, biogeochemical cycling, both endangered and invasive species, harmful algal blooms, and urbanization. These studies will have economic impacts as FAU marine scientists have expertise in several coastal ecosystems that are important fisheries habitats including coral reefs, estuaries, coastal marshes and mangroves, lagoonal systems, beaches, shallow banks, as well as ecosystems of the open oceans and seas. Primary research areas include Florida, Bahamas, and the Caribbean.

The research of FAU marine scientists also focuses on important economic and ecological animal, plant and microbial groups, including sea turtles, wading birds, manatees, whales, dolphin, sharks, bill fish, pelagic fish, reef fish, estuarine fish, corals, sponges, conch, crabs, and other invertebrates, along with seagrass, macroalgae, phytoplankton, mangroves, and marshes.

FAU marine scientists and engineers have expertise in nutrient cycling and harmful algal blooms related to pollution problems, sediment biogeochemistry, invasive aquatic species, impacts of point and non-point source pollution, pollution remediation, diseases of marine organisms, and human pathogens in the marine environment.

FAU coastal geologists have expertise in Geographic Information Systems, hydrogeology, coastal morphodynamics, and global environmental change.

The program will provide opportunities for students to train in a broad range of disciplines within Marine Science and Oceanography. Enrollment is expected to increase to provide an ongoing headcount of at least 70 students at an E&G cost per Student FTE of \$5,769. The multi-disciplinary nature of the program and the demand for students trained in these fields will attract both in-state students (approx. 63% by year 5) and out-of-state and international students (approx. 36% combined by year 5).

FAU faculty have considerable academic and research experience with interests in diverse components of South Florida ecosystems ranging from the Everglades to estuarine and oceanic environments, as well as the human impacts on these ecosystems. The FAU Departments of Biological Sciences and Geoscience have individual strengths in marine and coastal sciences, with coursework in biology ranging from Marine Invertebrate Zoology to Introduction to Marine Biotechnology, and in Geosciences from GIS to Shore Erosion and Protection to Environmental Geophysics. However, the addition of coursework taught by HBOI faculty, including the core courses of Physical & Geological Oceanography and Biological and Chemical Oceanography, and specialization in such areas as Underwater Optical Imaging and Ocean Monitoring Systems will greatly increase the course offerings in Marine Science and most importantly, promote cross-disciplinary training that will enable students to face the complex challenges of 21st century science. These areas fit directly into the new FAU Strategic Plan with clear links to the pillars of Ocean Science and Engineering/Environmental Science, Sensing and Smart Systems and the platform Community Engagement and Economic Development.