



The University of Georgia

University Council
Athens, Georgia 30602

August 21, 2015

UNIVERSITY CURRICULUM COMMITTEE – 2015-2016

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Dear Colleagues:

The attached proposal for a new Area of Emphasis in Marine Biology under the major in Biology (B.S.) will be an agenda item for the August 28, 2015, Full University Curriculum Committee meeting.

Sincerely,

William K. Vencill, Chair
University Curriculum Committee

cc: Provost Pamela S. Whitten
Dr. Rahul Shrivastav



Franklin College of Arts & Sciences
Division of Biological Sciences

November 21, 2014

Dr. Hugh Ruppensburg
Senior Assoc. Dean
Franklin College

Dear Dr. Ruppensburg,

In coordination with the department of Marine Sciences, the Division of Biological Sciences would like to propose a new area of emphasis in Marine Biology under the major in Biology (B.S.).

Marine Biology is an interdisciplinary field that encompasses the physiology, natural history, and phylogeny of marine organisms from microbes to whales, as well as the nature, function, and dynamics of the ecosystems that these organisms comprise. About half of the world's population lives within 150 kilometers of the sea. Marine ecosystems support rich fisheries that provide food and natural products to society. They exert a strong influence on, and are vulnerable to, climate change and other anthropogenic drivers, and interact in complex ways with global cycles. The proposed Marine Biology area of emphasis will provide students with a strong background in basic biology, core knowledge in marine biology, and more specialized training to suit students' particular interests within this broad field. Students completing this area of emphasis will be prepared for graduate study and careers in the field of Marine Biology and related disciplines.

Understanding the marine environment and the organisms that inhabit it is becoming increasingly important as more demands are placed on the ocean for food, mineral resources, and recreation. Furthermore, the large influence of the oceans on global climate will focus much attention on these systems in the coming decades. Undergraduate training in Marine Sciences and/or Marine Biology is increasingly being offered by colleges and universities nation-wide. Baccalaureate programs in Marine Sciences are offered by a large number of Universities, both public and private (Peterson's Guide lists more than 100 such programs in Marine Sciences and related fields nation-wide). These programs have been developed in response both to tremendous student demand and to acknowledged societal need to address marine problems at all levels of complexity.

In the absence of Bachelor of Science degree (B.S.) in Marine Sciences at UGA, students who wish to study this field can only do so through the Franklin College Interdisciplinary Studies program. To date 39 students have completed a degree in this interdisciplinary program. The vast majority of these IDS/MARS students concentrated in marine biology. Although this number in and of itself may seem small, given the extra demands placed on IDS students (e.g. maintenance of a 3.0 GPA, senior thesis), and the modest visibility of the program, we believe that this enrollment reflects a high degree of interest in the field among biology undergraduates.



Franklin College of Arts & Sciences
Division of Biological Sciences

Further evidence of demand comes from oversubscription to MARS 3450 Marine Biology, where typically only seniors are able to get in, and high enrollment in related courses (e.g. ECOL3200 Biology and Conservation of Marine Mammals, ECOL/MARS 4330 Tropical Marine Invertebrates, MARS/MIBO 4620 Microbial Ecology). The Marine Sciences department regularly receives inquiries about majoring in Marine Biology from prospective and current students, and recently a group of UGA undergraduates started the Marine Science Club (<http://www.facebook.com/groups/ugamars/>). Finally, we regularly poll students in MARS 3450 about their interest in a Marine Sciences Major; typically 35-50% of the students in this course express strong interest. Based on 160 students taking the course over two academic years, this translates to a pool of 56-80 potential students for the Marine Biology area of emphasis.

Program Description: The Biology major with Marine Biology area of emphasis has been structured to ensure that students obtain a foundational understanding of marine systems, through MARS 4100 Physical Processes of the Ocean (Area VI, recommended) and MARS4200 Chemical and Biological Oceanography (required), but then allows them to plan a flexible program to focus on aspects Marine Biology that interest them most. So for example, those interested in larger organisms, such as fish and marine mammals, might take e.g. ECOL 3220 Biology and Conservation of Marine Mammals, ECOL 4050 Ichthyology, and BIOL 3700 Animal Behavior, whereas those interested in the microbial communities that dominate the open-ocean have other options available, e.g. C BIO 4600 Biology of Protists, MARS 4620 Microbial Ecology, and MARS 4810 Global Biogeochemical Cycles. There are a sufficient number of options for all BIOL requirements so that students should be able to meet the requirements of the area of emphasis without undue stress on their schedules or lengthening of their time to degree completion.

Faculty: The University of Georgia has a strong group of faculty working on Marine Biology and Marine Sciences. In the Marine Sciences Department, including faculty newly incorporated from the Skidaway Institute of Oceanography, there are 25 faculty members of which the majority have a primary or secondary focus on Marine Biology. There are also a significant number of faculty in other departments and colleges across UGA working on some aspect of Marine Biology. These include Microbiology, Genetics and Cell Biology in Franklin College, the Odum School of Ecology, and the College of Agricultural and Environmental Sciences. The breadth of this expertise will provide a true interdisciplinary education for undergraduates completing the Marine Biology area of emphasis. Research in marine sciences (including marine biology) is well funded and vigorous at UGA with extramural funding currently exceeding \$7 million per year for Marine Sciences faculty on the Athens campus alone. This portfolio of active research translates into a large number and variety of undergraduate research opportunities.



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Facilities: There are excellent facilities at the University of Georgia available to support a Marine Biology area of emphasis, most notably the facilities available in the Marine Sciences Department, Skidaway Institute of Oceanography, and the Marine Institute on Sapelo Island. Locally, the Marine Sciences Department has a teaching lab for undergraduate education and many research labs that facilitate undergraduate research. On the coast, the Skidaway Institute of Oceanography has extensive marine research facilities including an oceanographic research vessel (the R/V Savannah), several small boats, housing, and access to local estuaries and the coastal ocean. On Sapelo Island, the UGA Marine Institute has extensive marine research and educational facilities including lab and classroom space, housing, several small boats, and access to pristine salt marshes and other coastal ecosystems.

Advising: The Biological Sciences advising staff will handle undergraduate advising for students pursuing a Biology major with an area of emphasis in Marine Biology. It is expected that students in the area of emphasis will work with these fulltime professional advisors to ensure that they are satisfying the major requirements. Students will also be assigned a faculty mentor (likely from Marine Sciences) who can help advise them on appropriate subject areas, aspects of Marine Biology, career options, etc. Since the majority of students expected to enroll in the Marine Biology area of emphasis are currently Biology majors, we do not expect the new area of emphasis to increase the Biological Sciences advising load and no additional staff resources are requested.

Administrative Staff: The Division of Biological Sciences currently has sufficient clerical and secretarial staff to manage the Biology major with Marine Biology area of emphasis program.

In summary, UGA currently has sufficient faculty, course offerings, and facilities to establish a nationally recognized program in Marine Biology. With the current demand for marine biology courses and lack of alternative degree programs, we expect that the Marine Biology area of emphasis will be in high demand.

Sincerely,

Mark Farmer
Chair - Biological Sciences

Brian Binder
Head – Marine Sciences

PROPOSAL FOR AREA OF EMPHASIS

1. School/College: Franklin College of Arts and Sciences
2. Department/Division: Division of Biological Sciences
3. Major: Biology (B.S.)

If major has more than one area of emphasis, submit all areas of emphasis under one major together. A course may appear in more than one area of emphasis, but each area of emphasis should have a distinct focus.

4. Major Requirements: Attach a list of requirements for the major. Undergraduate programs may attach a copy of the major requirements from the online bulletin. Graduate programs may provide a list of general requirements for the major.

See attached

5. Area of Emphasis Title (as it will appear in the *Bulletin*): Marine Biology
6. Proposed starting date: Spring 2016

7. Area of Emphasis Description:

Include prefixes, numbers and titles of required courses, number of credit hours required; residency requirements (if any); and grade requirements (if any). Graduate Areas of Emphasis may refer to groups of courses if necessary.

Area of Emphasis in Marine Biology

Required:

BIOL 1108 (3 hrs) and BIOL 1108L (1 hr) or BIOL 2108H (3 hrs) and BIOL 2108L (1 hr)
BCMB 3100 (4 hrs) or BCMB 4020/6020 (3 hr)
GENE 3200-3200D (4 hrs)
CBIO 3600* or CBIO 3400* (4 hrs) or PBIO 3600 (4 hrs) (*CBIO 3600 or CBIO 3400 preferred)
ECOL 3500-3500L or ECOL 3505H-3505L or GENE 3000-3000D (4 hrs)

Organismal Course (3-4 hours)

Choose one of the following courses:

BIOL(WILD) 3700 – (3 hrs) – Animal Behavior
CBIO(PBIO) 4600/6600 – (3 hrs) – Biology of Protists
ECOL 3220 – (3 hrs) – Biology and Conservation Marine Mammals
ECOL 4050/6050-4050L/6050L – (4 hrs) - Ichthyology
ECOL 4070/6070-4070L/6070L – (4 hrs) – Invertebrate Biology and Ecology
ECOL(BIOL)(MARS) 4330/6330-4330L/6330L - (4 hrs) - Tropical Marine Invertebrates
MARS 3450 – (3 hrs) – Marine Biology

Laboratory Course (3-5 hours)

Choose one of the following courses:

BIOL 3110L – (4 hrs) - Basic Skills in the Laboratory
BIOL 4960 or BIOL 4960H – (4 hrs) – Undergraduate Research in Biology
ECOL(BIOL)(MARS) 4330/6330-4330L/6330L - (4 hrs) - Tropical Marine Invertebrates
ECOL 4070/6070-4070L/6070L – (4 hrs) – Invertebrate Biology and Ecology

MARS 4500/6500 – (3-5 hrs) – Field Study Oceanography and Marine Methods

Major-Related Electives (9 hours)

MARS 4200/6200 – (3 hrs) - Chemical and Biological Oceanography (Required)

Choose two of the following from Category A or one from Category A and one from Category B:

Category A

ECOL 3220 – (4 hrs) - Biology and Conservation of Marine Mammals

ECOL(BIOL)(MARS) 4330/6330-4330L/6330L – (4 hrs) - Tropical Marine Invertebrates

FISH(ECOL)(MARS)(WILD) 4300/6300 and FISH(ECOL)(MARS)(WILD) 4300/6300 – (4 hrs) -

Environmental Biology of Fishes and Environmental Biology of Fishes Laboratory

MARS 3450 – (3 hrs) - Marine Biology and Marine Biology Laboratory

MARS 3550 – (3 hrs) - Life in Fluids

MARS 4500/6500 – (5 hrs) - Field Study in Oceanography and Marine Methods

MARS(MIBO) 4620/6620-4620L/6620L – (3 hrs) - Microbial Ecology

MARS 4810/6810 – (3 hrs) – Global Biogeochemical Cycles

Category B

BIOL 3110L – (4 hrs) - Basic Skills in the Laboratory

BIOL(WILD) 3700 – (3 hrs) - Animal Behavior

BIOL 3710L – (3 hrs) - Animal Behavior Laboratory

BIOL 3720L – (3 hrs) - Field Animal Behavior

BIOL 4960 – (4 hrs) - Undergraduate Research in Biology

BIOL 4960H – (4 hrs) - Undergraduate Research in Biology (Honors)

CBIO(PBIO) 4600/6600 – (3 hrs) – Biology of Protists

ECOL 3500-3500L – (4 hrs) - Ecology

ECOL 3505H-3505L – (4 hrs) - Ecology (Honors)

ECOL 4050/6050-4050L/6050L – (4 hrs) – Ichthyology

ECOL 4070/6070-4070L/6070L – (4 hrs) – Invertebrate Biology and Ecology

GENE 3000-3000D - (4 hrs) - Evolutionary Biology

PBIO(GENE)(PATH) 4510/6510 - (3 hrs) - Genome Evolution Across the Tree of Life

Biology (B.S.)

DRAFT

TOTAL DEGREE HOURS **120 hours**

MAJOR REQUIREMENTS

A baccalaureate degree program must require at least 21 semester hours of upper division courses in the major field and at least 39 semester hours of upper division work overall.
Students in the Franklin College must earn a grade of "C" (2.0) or better in major required courses.

Required Courses (25-30 hours)

(Minimum grade of "C" (2.0) is required in all upper division BIOL courses.)

BIOL 1108, BIOL 1108L or BIOL 2108H, BIOL 2108L

BCMB(BIOL)(CHEM) 3100 or BCMB 4020/6020

CBIO 3600 or CBIO 3400 or PBIO 3600

ECOL 3500-3500L or ECOL 3505H-3505L or GENE 3000-3000D

GENE 3200-3200D

Organismal Biology

Choose one course from the following: (3-5 hours)

BIOL(WILD) 3700

CBIO 3000-3000L

CBIO(PBIO) 4600/6600

ECOL 3220

ECOL 4050/6050-4050L/6050L

ECOL 4070/6070-4070L/6070L

ECOL(BIOL)(MARS) 4330/6330-4330L/6330L

ENTO 3140-3140L

ENTO 3650-3650L

ENTO 4000/6000-4000L/6000L

MARS 3450

MIBO 3500

MIBO 3510L

PATH(PBIO) 4200/6200-4200L/6200L

PBIO 4650/6650-4650L/6650L

PSYC 5750/7750

WILD(ECOL) 3580, WILD(ECOL) 3580L

WILD(ECOL) 4040/6040-4040L/6040L

WILD(BIOL) 4050/6050

WILD(ECOL) 4060/6060-4060L/6060L

WILD(ECOL) 4575/6575-4575L/6575L

Laboratory

Choose one course from the following: 3-5 hours

BCMB 4030L/6030L

BIOL 3110L

BIOL 3710L

BIOL 3720L

BIOL 4960 or BIOL 4960H

BIOL(CBIO) 5050L/7050L

BTEC(BCMB)(PBIO) 4000L

CBIO 3410L

ECOL(BIOL) 3510

ECOL(MARS) 4225-4225L

GENE 3210L

GENE 4210L

GENE 4220L

GENE 4230L

MARS 4500/6500

MIBO 3510L
MIBO 4600L/6600L
MIBO 4710L/6710L
PBIO 3660L

Major Electives (9 hours)

For a total of nine hours, choose three or more courses from the list below. At least two of the courses must be 3 or more credit hours and from two different departments.

ANTH(ECOL) 4210L/6210L

ANTH(BIOL)(ECOL)(ENTO)(PBIO) 4260/6260-4260L/6260L

ANTH(BIOL)(ECOL)(EETH)(ENTO)(FANR)(GEOL)(PATH)(PBIO) 4261

ANTH(ECOL) 4290/6290

ANTH 4790/6790

BCMB(BIOL)(CHEM) 3100

BCMB(GENE) 3433

BCMB 3600

BCMB 4010/6010

BCMB 4020/6020

BCMB 4030L/6030L

BCMB(CHEM) 4110/6110

BCMB 4120/6120

BCMB 4130

BCMB 4130H

BCMB(ENTO)(BTEC) 4200/6200

BIOL 3110L

BIOL(WILD) 3700

BIOL 3710L

BIOL 3720L

BIOL 4910

BIOL 4960

BIOL 4960H

BIOL(CBIO)(VPAT) 5040/7040

BIOL(CBIO) 5050L/7050L

BTEC(BCMB)(PBIO) 4000L

CBIO 3000-3000L

CBIO 3200L

CBIO 3600

CBIO 3400

CBIO 3410L

CBIO 3710

CBIO 3800

CBIO 3800L

CBIO(MIBO)(IDIS) 4100/6100

CBIO 4200

ENTO 4000/6000-4000L/6000L

FDST(MIBO) 4120/6120-4120L/6120L

FISH(ECOL)(MARS)(WILD)

4300/6300, FISH(ECOL)(MARS)(WILD)

4300L/6300L

FISH(ECOL) 4360/6360

FISH 4500/6500

FISH(ECOL)(MARS)(WILD)

4550/6550-4550L/6550L

GENE 3000-3000D

GENE 3200-3200D

GENE 3210L

GENE 4050

GENE 4200/6200

GENE 4210L

GENE 4220L

GENE 4230L

GENE 4300/6300

GENE 4500/6500

GEOG(PBIO) 4220/6220

GEOG(PBIO) 4240/6240

IDIS(CBIO) 3100

MARS 3450

MARS 3550

MARS(PBIO) 4160-4160L

MARS 4200/6200

MARS 4500/6500

MARS(MIBO) 4620/6620-

4620L/6620L

MARS 4810/6810

MIBO 3500

MIBO 3510L

MIBO 4090/6090

MIBO(POPH) 4220/6220

MIBO 4300/6300

MIBO 4500/6500

MIBO 4600L/6600L

MIBO 4680/6680

MIBO 4700/6700

CBIO 4200H
CBIO 4340/6340
CBIO 4500/6500
CBIO(PBIO) 4600/6600
CBIO 4730/6730
CHEM(BCMB) 4190/6190
CRSS(HORT)(ECOL) 4590/6590
CRSS(MIBO) 4610/6610-4610L/6610L
ECOL 3000-3000L
ECOL 3100-3100L
ECOL 3220
ECOL 4540/6540

ECOL 3500-3500L

ECOL 3505H-3505L
ECOL(BIOL) 3510
ECOL 3530
ECOL 3880H
ECOL 4000/6000
ECOL 4010/6010
ECOL 4050/6050-4050L/6050L
ECOL 4070/6070-4070L/6070L
ECOL 4110/6110
ECOL 4130L
ECOL(BIOL) 4150/6150-4150L/6150L
ECOL 4160

ECOL(MARS) 4225-4225L

ECOL 4240-4240L
ECOL(FISH)(WASR) 4310/6310-4310L/6310L
ECOL(BIOL)(MARS) 4330/6330-4330L/6330L
ECOL 4500/6500
ECOL(PBIO) 4520/6520
EHSC(FDST)(MIBO) 4310/6310-4310L/6310L
ENTO 3140-3140L
ENTO 3645
ENTO 3650-3650L

MIBO 4710L/6710L
PATH(ANTH)(PBIO) 3010
PATH(PBIO) 4200/6200-4200L/6200L
PBIO 3600
PBIO 3660L
PBIO 3270
PBIO(CRSS) 4500/6500
PBIO(GENE)(PATH) 4510/6510
PBIO(BINF) 4550/6550
PBIO 4640/6640-4640L/6640L
PBIO 4650/6650-4650L/6650L
PBIO(ECOL) 4750/6750
POPH(MIBO)(IDIS) 4450/6450-4450L/6450L
POPH(MIBO)(IDIS) 4650/6650
POPH(MIBO) 4651
POUL(BIOL) 4060/6060
PSYC 4120
PSYC 4130
PSYC 4140
PSYC 4150
PSYC 5750/7750
PSYC 5770/7770
PSYC 5850
VPAT 4000/6000
VPHY 3100
WILD(ECOL) 3580, WILD(ECOL) 3580L
WILD(ECOL) 4040/6040-4040L/6040L
WILD(BIOL) 4050/6050
WILD(ECOL) 4060/6060-4060L/6060L
WILD(ECOL) 4575/6575-4575L/6575L

Note: Only four research hours can count toward the required hours in the major.

Neuroscience Area of Emphasis

Required

BCMB(BIOL)(CHEM) 3100 or BCMB 4020/6020

CBIO 3600* or CBIO 3400* or PBIO 3600

ECOL 3500-3500L or ECOL 3505H-3505L or GENE 3000-3000D

GENE 3200-3200D

*CBIO 3600 or CBIO 3400 are preferred.

Organismal Course (3-4 hours)

BIOL(WILD) 3700

CBIO 3000-3000L

PSYC 5750/7750

Laboratory Course (3-4 hours)

BIOL 3110L

BIOL 3710L

BIOL 3720L

BIOL 4960 or BIOL 4960H

CBIO 3410L

GENE 3210L

GENE 4210L

Major Related Electives (10 hours)

CBIO 3800 (Required)

Select one course from the following:

PSYC 4120

PSYC 4130

PSYC 4140

PSYC 4150

PSYC 5750/7750

PSYC 5770/7770

PSYC 5850

Select one course from the following:

ANTH 4790/6790

BCMB 4120/6120

BCMB 4130 or BCMB 4130H

CBIO 3600

CBIO 4200 or CBIO 4200H

CBIO 4340/6340

CBIO 4730/6730

GENE 4050

GENE 4500/6500

VPAT 4000/6000

VPHY 3100

Marine Biology Area of Emphasis

Required:

BIOL 1108 (3), BIOL 1108L (1) or BIOL 2108H (3), BIOL 2108L (1)
BCMB(BIOL)(CHEM) 3100 (4) or BCMB 4020/6020 (3)
GENE-3200-3200D (4)

CBIO 3600* (4) or CBIO 3400* (4) or P BIO 3600 (4) (*CBIO 3600 or CBIO 3400 preferred)
ECOL 3500-3500L (4) or ECOL 3505H-3505L (4) or GENE 3000-3000D (4)

Organismal Course (3-4 hours)

Choose one of the following courses:

BIOL(WILD)3700 (3)
CBIO(PBIO) 4600/6600 (3)
ECOL 3220 (3)
ECOL 4050/6050-4050L/6050L (4)
ECOL 4070/6070-4070L/6070L (4)
ECOL(BIOL)(MARS) 4330/6330-4330L/6330L (4)
MARS 3450 (3)

Laboratory Course (3-5 hours)

Choose one of the following courses:

BIOL 3110L (4)
BIOL 4960 or BIOL 4960H (4)
ECOL(BIOL)MARS 4330/6330-4330L/6330L (4)
ECOL 4070/6070-4070L/6070L (4)
MARS 4500/6500 (3-5)

Major-Related Electives (9 hours)

MARS 4200/6200 (3) **(Required)**

Choose two of the following from Category A or one from Category A and one from Category B:

Category A

ECOL 3220 (3)
ECOL(BIOL)(MARS) 4330/6330-4330L/6330L (4)
FISH(ECOL)(MARS)(WILD) 4300/6300, FISH(ECOL)(MARS)(WILD) 4300L/6300L (4)
MARS 3450 (3)
MARS 3550 (3)
MARS 4500/6500 (5)
MARS(MIBO) 4620/6620-4620L/6620L (3)
MARS 4810/6810 (3)

Category B

BIOL 3110L (4)
BIOL(WILD) 3700 (3)
BIOL 3710L (3)
BIOL 3720L (3)
BIOL 4960 (4)
BIOL 4960H (4)
CBIO(PBIO) 4600/6600 (3)
ECOL(BIOL) 3500-3500L (4)
ECOL 3505H-3505L (4)
ECOL 4050/6050-4050L/6050L (4)
ECOL 4070/6070-4070L/6070L (4)
GENE 3000-3000D (4)
P BIO(GENE)(PATH) 4510/6510 (3)

(This total does not include the 1-hour P.E. requirement)

Rationale: A Marine Biology Area of Emphasis within the Biology major is highly desired by students and will decrease time to degree completion for many Interdisciplinary Marine Science majors and allow students not eligible for the IDS Marine Science program to receive a degree with a Marine Science focus.

NAME _____		ID _____	
Franklin College Requirements		Regents/ University of Georgia Requirements	
Language 1, 2, 3 _____	Biological Science _____	US/Georgia Constitution Requirement _____	EMAIL _____
FA/PHY/REL 1 _____	Physical Science _____	US/Georgia History Requirement _____	EXPECTED GRADUATION DATE _____
FA/PHY/REL 2 _____	Literature _____	Environmental Literacy Requirement _____	
Social Science 1 _____	History _____	Cultural Diversity _____	Residency Requirement (45/60) _____
Social Science 2 _____	Multicultural _____	PEDB _____	

Marine Biology Area of Emphasis in the Biology Major

MAJOR REQUIREMENTS: A baccalaureate degree program must require at least 21 semester hours of upper division courses in the major field and at least 39 semester hours of upper division work overall. Students in the Franklin College must earn a grade of "C" (2.0) or better in major courses.

Required Courses (31-33 hours) A minimum grade of "C" (2.0) is required
<input type="checkbox"/> BIOL 1108 (3) and BIOL 1108L (1) or BIOL 2108H (3) and BIOL 2108L (1) <input type="checkbox"/> BCMB 3100 - (4 hrs) - Introductory Biochemistry and Molecular Biology or BCMB 4020/6020 - (3 hrs) - Biochemistry and Molecular Biology II <input type="checkbox"/> GENE 3200-3200D - (4 hrs) - Genetics <input type="checkbox"/> CBIO 3600 - (4 hrs) - Developmental Biology or CBIO 3400 - (4 hrs) - Cell Biology or PBIO 3600 - (4 hrs) - Plant Cell and Developmental Biology <input type="checkbox"/> ECOL 3500-3500L - (4 hrs) - Ecology or ECOL 3505H-3505L - (4 hrs) - Ecology (Honors) or GENE 3000-3000D - (4 hrs) - Evolutionary Biology

Organismal Biology A minimum grade of "C" (2.0) is required. Organismal _____
<i>Choose one course from the following: (3-4 hours)</i> BIOL(WILD) 3700 - (3 hrs) - Animal Behavior CBIO(PBIO) 4600/6600 - (3 hrs) - Biology of Protists ECOL 3220 - (3 hrs) - Biology and Conservation of Marine Mammals ECOL 4050/6050-4050L/6050L - (4 hrs) - Ichthyology ECOL 4070/6070-4070L/6070L - (4 hrs) - Invertebrate Biology and Ecology ECOL(BIOL)(MARS) 4330/6330-4330L/6330L - (4 hrs) - Tropical Marine Invertebrates MARS 3450 - (3 hrs) - Marine Biology

Laboratory A minimum grade of "C" (2.0) is required. Laboratory _____
<i>Choose one course from the following: (3-5 hours)</i> BIOL 3110L - (4 hrs) - Basic Skills in the Laboratory BIOL 4960 or BIOL 4960H - (4 hrs) - Undergraduate Research in Biology ECOL(BIOL)(MARS) 4330/6330-4330L/6330L - (4 hrs) - Tropical Marine Invertebrates ECOL 4070/6070-4070L/6070L - (4 hrs) - Invertebrate Biology and Ecology MARS 4500/6500 - (3-5 hrs) - Field Study in Oceanography and Marine Methods

Biology Major Electives (minimum of 9 hours) - A minimum grade of "C" (2.0) is required. <i>Only ONE semester of research can be used in the Biology major; all other research will count as a general elective.</i>
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Required: <input type="checkbox"/> MARS 4200/6200 - (3 hrs) - Chemical and Biological Oceanography
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Choose two of the following from Category A or one from Category A and one from Category B: _____ Category A ECOL 3220 - (3 hrs) - Biology and Conservation of Marine Mammals ECOL(BIOL)(MARS) 4330/6330-4330L/6330L - (4 hrs) - Tropical Marine Invertebrates FISH(ECOL)(MARS)(WILD) 4300/6300 - (3 hrs) - Environmental Biology of Fishes MARS 3450 - (3 hrs) - Marine Biology MARS 3550 - (3 hrs) - Life in Fluids MARS 4500/6500 - (3-5 hrs) - Field Study in Oceanography and Marine Methods MARS(MIBO) 4620/6620-4620L/6620L - (3 hrs) - Microbial Ecology MARS 4810/6810 - (3 hrs) - Global Biogeochemical Cycles
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Category B BIOL 3110L - (4 hrs) - Basic Skills in the Laboratory BIOL(WILD) 3700 - (3 hrs) - Animal Behavior BIOL 3710L - (3 hrs) - Animal Behavior Laboratory BIOL 3720L - (3 hrs) - Field Animal Behavior BIOL 4960 - (4 hrs) - Undergraduate Research in Biology BIOL 4960H - (4 hrs) - Undergraduate Research in Biology (Honors) CBIO(PBIO) 4600/6600 - (3 hrs) - Biology of Protists ECOL 3500-3500L - (4 hrs) - Ecology ECOL 3505H-3505L - (4 hrs) - Ecology (Honors) ECOL 4050/6050-4050L/6050L - (4 hrs) - Ichthyology ECOL 4070/6070-4070L/6070L - (4 hrs) - Invertebrate Biology and Ecology GENE 3000-3000D - (4 hrs) - Evolutionary Biology PBIO(GENE)(PATH) 4510/6510 - (3 hrs) - Genome Evolution Across the Tree of Life
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