Oceanographic Center 1984-1985 Bulletin

Nova University

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Policies and programs set forth herein are effective through June 30, 1985. The regulations and requirements herein, including fees, are necessarily subject to change without notice at any time at the discretion of the Nova University administration.

Nova University is chartered by the State of Florida and is accredited by the Southern Association of Colleges and Schools.

Nova University admits students of any race, color, and national or ethnic origin.
Having entered its second decade, Nova University is beginning to see the impact that its graduates are having upon the institutions within our society. Many of the University's programs are mission-oriented, designed to improve the performance of professionals, and evidence is being collected which indicates that Nova alumni are having a strong, positive effect on the institutions in which they are employed.

Independent education must continue to be responsive and adaptable to the varying needs of potential students if it is to represent a true alternative to the tax-supported sector. Nova University is committed to maintaining quality at the same time it is meeting these needs.

Abraham S. Fischler
President

The growth of Nova University as a dynamic, mission-oriented educational institution has been coupled with an intensive search for strategies designed to make each of its courses of study maximally responsive to individual human needs. Hence, Nova University continues to press forward in seeking solutions to major societal problems while offering to its students many opportunities for intellectual challenge, professional preparedness and personal awareness.

Alexander Schure
Chancellor
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General Information
Founded in 1964, Nova University is an independent university which is non-sectarian, nonprofit and racially non-discriminatory.

Unusual among institutions of higher education, Nova is a university for all ages. Undergraduate education is offered through Nova College. Numerous graduate programs in a variety of fields provide master’s, doctoral, and post-doctoral education. Also, non-degree, continuing education programs are offered. The University School, a demonstration school, serves children from pre-school through seniors in high school.

In 1970, Nova University joined in an educational consortium with the New York Institute of Technology, an independent, nonprofit institution with campuses in Manhattan and Old Westbury, Suffolk County, Long Island. This mutually beneficial relationship permits each institution to draw on the personal and physical resources of the other, giving maximal benefit to the students of each and to society in general.

With students studying in Florida and in 21 states, Nova University is a university of national scope.

Accreditation

Nova University is accredited by the Southern Association of Colleges and Schools. The Ph.D. and the Psy.D. programs in clinical psychology are provisionally accredited by the American Psychological Association.

Campus and Off-Campus Locations

The Nova University main campus is located on a 200-acre site west of Fort Lauderdale at 3301 College Avenue in the town of Davie, Florida. It is 10 miles inland from the Atlantic Ocean and is easily accessible from major U.S. and state highways, including I-95 and Florida’s turnpike.

The Center for the Study of Law is located at 3100 S.W. 9th Avenue in Fort Lauderdale.

Nova University at Coral Springs is located at 3501 University Drive. Degree programs, non-credit courses, and cultural events that serve the residents in north Broward County and in Palm Beach County are held in Coral Springs.

The Oceanographic Center is located on the south side of the marine entrance to Port Everglades at 8000 North Ocean Drive, Dania, Florida.

Many Nova University students attend classes on the main campus, at the Oceanographic Center, at the Law Center, or at Coral Springs. Consistent with its educational mission to provide educational opportunities for adult students wherever they may be, Nova offers degree programs and continuing education experiences at off-campus centers locally, throughout Florida, across the United States, and in foreign countries.

With the New York Institute of Technology, Nova University maintains an office in Washington, D.C. It is located at 1511 K St., N.W., Suite 624.
General Information

The Oceanographic Center pursues studies and investigations in experimental and theoretical oceanography. Studies include modeling of large scale ocean circulation, coastal dynamics, ocean-atmosphere coupling, coral growth and coral reef assessment, Pleistocene and Holocene sea-level change, physiology of marine phytoplankton, calcification of invertebrates, cell ultrastructure, fouling effects, marine fisheries, lobster migration, larval recruitment, and nutrient dynamics. Primary regions of interest include Florida’s coastal waters, the continental shelf and slope waters of the southeastern U.S., the waters of the Caribbean and Gulf of Mexico, and the equatorial Atlantic, Pacific and Indian Oceans.

DEGREES OFFERED

The Oceanographic Center offers graduate degrees in ocean science including the Ph.D. and the M.S. specialization in coastal zone management, and the M.S. and the M.A. major in marine biology.

FACILITIES

Laboratory and Office Space

The Oceanographic Center is located on a 10-acre site in Port Everglades near the port entrance. The land was deeded to Nova University in 1967 by the Broward County Commission. Its proximity to the Gulf Stream and the Florida Straits makes it an ideal location for oceanographic research.

Located in a 20,000 sq. ft. warehouse building on the property are a machine shop, carpentry shop, darkroom, electron microscope laboratory, biological laboratory, computing center, offices, the William Springer Richardson Library, and a classroom for the Masters Program. Additional offices and seminar rooms are located on a two-story houseboat moored in the Center’s boat basin. Another building on the laboratory site provides a sea turtle incubation area, a coral workshop, and a biology laboratory. Additional facilities include a clean lab for electron microscopy preparation, chemostats, an X-ray machine, and a rock saw. A mobile classroom is used for Sea Survival classes.
Library Resources

The Center's William Springer Richardson Library contains 3,350 bound volumes (1,900 monographs and 1,450 scientific journals). The library has 102 periodicals on subscription and 26 gift periodicals. Audiovisual equipment and computer-assisted data searches are available.

Nova University maintains two other libraries: the Behavioral Sciences Library (Einstein Library) on the main campus in Davie and the Law Library at the Center for the Study of Law, at 3100 S.W. 9th Avenue, Fort Lauderdale. These libraries offer computer-assisted data searches and microfiche systems, along with an inter-library loan service that makes available copies of articles from other libraries around the country.

Computer Services

The computing facility at the Oceanographic Center consists of a Data General Nova computer with associated peripherals, including a magnetic tape unit, two disk drives, and a Calcomp drum plotter. This system functions both as a stand-alone computer with FORTRAN IV capability and as a remote batch terminal to large off-site computers. In addition, a keyboard terminal is available for telephone access to the University's VAX 11/780 computer, located on the main campus. There is a variety of microcomputers in use at the center, including Osborne, Apple, and IBM-PC.
Current Research in Oceanography

PHYSICAL OCEANOGRAPHY

Physical oceanography is the study of the physics of the ocean. Areas of the subject that are currently being investigated at the Oceanographic Center are the following:

Surface Layer Dynamics

An important driving force for the ocean currents is the surface wind stress. A question of critical importance is exactly how this stress enters the ocean. Observations show that when the wind blows on the ocean surface, the surface waters mix to form a layer of nearly constant temperature. The development of the mixed layer is being studied analytically and with the aid of a computer model.

Equatorial Dynamics

The Equatorial Undercurrent is one of the most remarkable of ocean currents. This very swift current is about 100 miles wide, 100 meters thick, and is located about 100 meters below the ocean surface. Surprisingly, it flows in a direction opposite to that of the prevailing winds. A theoretical model has been developed that is able to explain these properties of the current.

Coastal Dynamics

Continental boundaries can have important effects on ocean currents. For example, along the western coasts of continents (like California), equatorward winds cause a slow movement of cold deeper water to the ocean surface. (This coastal upwelling is of great biological importance because it replenishes the surface waters with nutrients.) A recent theoretical model has shown that this upwelling occurs in conjunction with a poleward undercurrent. The physics of the Coastal Undercurrent is very similar to that of the Equatorial Undercurrent.

Ocean-Atmosphere Coupling; Climate

In the past fifteen years, a great deal of evidence has been accumulated suggesting that the tropical oceans may play a strong role in affecting global climate. During the next decade there will be a considerable national effort directed toward understanding the dynamics of the coupling between the atmosphere and the ocean. Several computer models of a simplified coupled ocean-atmosphere system have been developed; research is ongoing.
Current Meanders and Mesoscale Eddies

The dynamics of areas such as the Gulf Stream, Kuroshio, Antarctic Circumpolar Current and the California Current System are studied using numerical models. Satellite infrared images also are analyzed.

Physical Effects on Plankton and Fish

The distribution and evolution of phytoplankton and zooplankton in an upwelling region are being studied. Vertical and horizontal water motions are considered as important indicators of plankton evolution as it relates to fishery and pollution activities.
BIOLOGICAL OCEANOGRAPHY AND PALEOCLIMATOLOGY

Studies include work with Gulf Stream warm core rings and marine phytoplankton and aspects of their physiology. Effects of environmental factors such as temperature, photoperiod, and nutrients are being examined in the coccolithophores in collaboration with investigators at the Woods Hole Oceanographic Institution. Mechanisms of calcification in invertebrates are being examined with particular emphasis on $^{18O}/^{16O}$ fractionation in cultured coccolithophores. The ultrastructure of algae cells grown under different environmental conditions is being examined on the electron microscopic level. A consulting study is underway to determine sequences in community structure during fouling. Studies on the dynamics of dissolved carbohydrates in the sea and their relationship with the microbial plankton in local waters and the open ocean are also in progress.

RESEARCH IN MARINE BIOLOGY

Current projects include biochemical population genetics as applied to fisheries-related problems, as well as speciation and evaluation. One project involves the study of larval dispersal patterns in lobsters as mechanisms for recruitment and gene flow. Other research areas encompass metabolic responses of marine organisms to a variety of pollutants, including hydrocarbons, the build-up and movement of carcinogens in the food chain, and mariculture.

MARINE GEOLOGY

Investigations of coral growth and coral reef assessment are an interest of the current Oceanography faculty. Coral growth as measured by X-ray techniques (band analysis) is being investigated. A storage area, work space, X-ray machine, and darkroom are available for this type of study. Coral reef assessment is progressing with study in U.S. and Caribbean waters, as well as at Bermuda.

Investigations into sea-level history and paleoclimatology and paleoenvironmental reconstruction are also conducted, with primary emphasis on fossil and recent coral reefs and hermatypic (reef-building) corals.
Courses of Study

THE PH.D. DEGREE IN OCEAN SCIENCE

The academic program in Oceanography is tailored to address the specific needs and intellectual development of the individual student. Instruction is primarily in the tutorial mode; no structured courses exist at this time. Each student is required to complete a self-paced course of study. Frequent meetings with the faculty will be held to provide assistance in problem areas. Examinations, both oral and written, are scheduled by the student.

The student is assigned a Faculty Advisory Committee that considers the student’s competencies and prescribes a course of study for the Ph.D. degree. A minimum of one and one-half years of study, in residence at the University, must be completed prior to taking the Candidates Examination. Additional course work at a nearby university may be required in some cases, depending upon individual competencies.

Criteria For Assessment of Progress

A student is required to demonstrate competence in the ocean sciences by successfully completing the directed research program set up by the Faculty Advisory Committee. Each candidate is required to participate in one or more research projects to gain a practical background in the ocean sciences. Progress will be monitored by the Faculty Advisory Committee. Each student is expected to prepare several reports on topics of his own choosing. The reports are presented as seminars before the faculty and other interested scientists.

The Ph.D. student is expected to complete work toward the degree within five years. Upon passing the Candidates Examination, the student will submit a dissertation proposal to his Dissertation Committee. The Committee shall comprise at least four faculty members, one of whom must be on the faculty of another center at Nova University or of another university. If the proposal is approved, the student may then proceed with the research under the Committee’s guidance.

MASTER’S DEGREE PROGRAMS IN OCEAN SCIENCE

The Oceanographic Center offers evening programs leading to the M.A. and M.S. degrees specializing in marine biology and to the M.S. degree specializing in coastal zone management. Both programs employ a common core to provide an overview and foundation in the ocean sciences.
Marine Biology Specialty

This new course of study is designed to equip students with a substantial understanding of the nature and ecology of marine life. It is also designed to equip them with a grounding in the other overlapping areas of marine science to prepare them as graduates for further study toward the Ph.D. degree as well as for technical employment in research, government agencies or environmental consulting firms. The program can be of significant value for enhancement of careers in secondary education. Master of science and master of arts options are offered. The M.S. degree requires 27 formal class credits and a 9-credit thesis based on original laboratory, field, or theoretical research. It is primarily intended for students interested in a research career. The M.A. option requires 30 credits of formal course work and a 6-credit thesis consisting of an extensive literature review of an approved topic. Applicants should hold a bachelor's degree in one of the natural sciences, preferably biology (or one of its subdisciplines), oceanography, or a closely related field including science education.

Coastal Zone Management Specialty

This program leads to a multidisciplinary professional M.S. degree, intended for employees of government and industry seeking career enhancement as well as for recent college graduates seeking careers in planning and management with government agencies, industries, and other activities depending on or affecting the coastal zone or its resources. The program can also be of value for enhancement of careers in education. It focuses on contemporary problems and conflicts arising from increased use of coastal areas and emphasizes the development and evaluation of...
alternative policy management solutions. CZM combines elements of ecology, geology, physics, engineering, economics, law, the social sciences, and management. Because of this diversity, applicants with any undergraduate major will be considered for admission. The program requires 30 classroom credits and completion of a 6-credit thesis.

Division of Biological Sciences

Graduate programs in biological sciences are the responsibility of the Biology Laboratory of the Nova University Oceanographic Center. Curricula leading to the doctorate with major emphasis on Biological Oceanography/Marine Biology are shared with the Oceanographic Center. Curricula leading to the doctorate with major emphasis on the biology of disease processes are shared with the Goodwin Institute for Cancer Research.
FACILITIES AND CURRENT PROGRAMS

In addition to the facilities described for the Oceanographic Center, the Biology Laboratory has available instrumentation and facilities to support a variety of project areas. Current interests include: biochemical systematics and evolutionary genetics; the application of these and classical approaches to fisheries-related problems; and the metabolism of organic pollutants by marine organisms, particularly algae. In addition to laboratory facilities for physiological and biochemical studies, the lab has two research boats and dive equipment to support field studies ongoing in the Port Everglades/Fort Lauderdale area and in the Florida Keys in the vicinity of Elliott Key in Biscayne National Park. Collaborative studies are also ongoing with Everglades National Park personnel.

GOODWIN INSTITUTE FOR CANCER RESEARCH

The Goodwin Institute for Cancer Research is located in nearby Plantation, Florida. The Goodwin Institute is a 26,000 sq. ft. cancer research complex, with its own animal production unit housed within the research building. Immunology, virology, histopathology, microbiology, cell culture, electron microscopy and photography, and instrument design laboratories are included in the Institute’s physical facilities. The Primary Genetic Center, one of five in the nation operated for the National Cancer Institute, raises and annually distributes over 200,000 barrier-maintained rodents to scientists in the National Cancer Program. The Institute is a member of the American Association of Cancer Institutes.
Policies and Procedures

REQUIREMENTS FOR ADMISSION

Applicants for admission to degree programs leading to the Ph.D., M.S., or M.A. degree in ocean science must meet the following requirements:

1. Hold a baccalaureate degree from a regionally accredited institution. For Ph.D. applicants the degree should be in mathematics or any of the natural sciences. A master's degree in a related science or oceanography is preferred. Applicants to the master's degree program in marine biology should have majored in one of the natural sciences (usually biology or one of its subdisciplines), oceanography, or science education. The undergraduate degree may be in any major for application to the coastal zone management program.

2. An academic record indicating an ability to pursue advanced study and research. Official transcripts from all post secondary institutions attended.

3. Three letters of recommendation from professional associates indicating a potential for research in oceanography.

4. Advanced aptitude test scores from the Graduate Record Examination (administered by the Educational Testing Service, P.O. Box 995, Princeton, N.J. 07540).

5. Foreign students must submit results of the TOEFL (Test of English as a Foreign Language) examination of 550 or higher and obtain certification from the Nova Intensive English program.

ENROLLMENT PROCEDURES

Application forms for admission may be requested from the Office of Admissions, Nova University, 3301 College Avenue, Fort Lauderdale, Florida 33314. Alternatively, applicants may write directly to the center or call: Nova University Oceanographic Center, 8000 N. Ocean Dr., Dania, FL 33004, 305-475-7488. Applications must be completed and returned to the Oceanographic Center along with a $25 nonrefundable application fee. Prospective students may apply at any time during the year. All correspondence pertaining to admission should be addressed to the Oceanographic Center. It is the responsibility of the applicant to obtain the supporting documents requested and necessary for application.

Because GRE scores are weighted factors in the admissions formula used to evaluate an applicant's potential to do quality graduate work, no specific score is set. As a general rule, GRE scores of 1000 or higher are acceptable. Applicants scoring lower than this threshold level may be required by the admissions committee to retake the GRE.
Prerequisite Satisfaction

Those who have not completed a few course prerequisites may still enter the program; however, they may not enroll for any graduate course for which they lack a specific prerequisite. All prerequisites must be satisfied within six months of the beginning of coursework in the program.

Students have three options for satisfying a prerequisite: (1) taking the required prerequisite course at Nova University or at another accredited college, including Nova College, the undergraduate division of Nova University; (2) successfully completing a proficiency examination administered by a testing organization that has national recognition—organizations such as CLEP, LOMA, or USAFI; or (3) taking a proficiency examination administered directly by the program.
Acceptance Procedures

Students are admitted under one of three classifications. First is full acceptance. This status is given upon satisfaction of all requirements for admission as stated elsewhere in this bulletin. Second is provisional (conditional) acceptance. This status is given to students who have not satisfied all of the admission requirements but have given evidence that all criteria can be met. Third is special student acceptance. This status is reserved for non-degree seeking students. While this may be a preliminary status to full acceptance, enrollment in and satisfactory completion of courses do not guarantee admission to any program.

Students will be notified in writing of the status under which they may enroll in classes. Upon completion of all requirements, which must be achieved within six months, notification of full acceptance will be given in writing.

International Students

The student VISA (I-20) may be issued only upon completion of all admission requirements. Therefore international students are urged to be sensitive to requirements prior to applying to the program. For more information regarding the procedures of obtaining a student visa, please contact the office of the registrar.
Academic Standing

A student may be asked to leave the program if, in the judgment of the program administrator, continuance would be detrimental to the student or the center. The academic progress of all students will be evaluated after each term, including the summer term. Students shall be deemed in good academic standing unless they have a cumulative G.P.A. of less than 3.0 (B). Any student who fails to maintain a 3.0 will be placed on academic probation for two terms. If probation is not removed at the end of the two terms, the student may be suspended from the program. A student may petition for reinstatement after six months, explaining the reasons why academic potential has changed and readmission should be considered. Students who have reason to believe that there has been an error in assigning a grade may formally protest.
COSTS

Ph.D. Degree

Application Fee (nonrefundable) ........................................ $ 25
Tuition (per year) .................................................. 5,500
Registration Fee (per semester) ..................................... 15
Late Registration Fee .................................................. 15
Graduation Fee .......................................................... 15

Books and supplies may cost an additional $500 per year, depending on individual circumstances. An average matriculation period is approximately four years beyond the master's degree.

Master’s Degree

Application fee (non-refundable) ........................................ $ 25
Continuation fee (annual) ............................................ 150
Graduation fee .......................................................... 15
Incomplete fee ............................................................ 10
Interrupted studies fee .................................................. 15
Late registration fee .................................................... 15
Prerequisite challenge exam .............................................. 50
Tuition (per credit) .................................................... 125
Internship ................................................................. 80
Split Payment fee ........................................................ 10
Withdrawal and Refunds

Students may withdraw at any time before the fifth weekend of classes. A request for tuition refund must be made in writing through the third weekend of classes. Refunds will be made solely at the option of the University and will be based on the legitimacy of the reason for withdrawal. When granted, refunds are adjusted as follows: after the first weekend 75%, after the second weekend 50%, and after the third weekend 0%.

The late registration fee is charged at any time payment is received by the school beyond the closing date for registration. The split payment fee is an additional processing charge which is made when students have provided only partial payment during the registration period. The interrupted studies fee is charged to students who return to study after not having registered for course work for one or more terms and therefore have been removed from the Institute’s active student roll. The continuation fee is an annual charge which begins immediately after the completion of course work and 6 hours of thesis registration.

FINANCIAL AID

Nova University operates several programs of student financial aid in order to assist as many of its students as possible in meeting the direct and indirect educational expenses. Its financial aid programs derive from federal, state, and private sources. Details of the various programs are available from the Office of Financial Aid, Nova University. Students eligible for veterans’ benefits should contact the VA advisor in the financial aid office.
HOUSING

Located on the main campus is the Davie Living Complex. Three buildings of ninety one- and two-bedroom unfurnished apartments are available for graduate and married students. In addition, a five-story building of ninety furnished apartments is available for undergraduate and other students. Apartments are leased on an annual basis. Monthly rental includes utilities and central air conditioning. Rates will be furnished when accommodations are offered. Interested students are invited to obtain further information from:

Housing Office—Unfurnished Apartments
Nova University
3301 College Avenue
Fort Lauderdale, Florida 33314
or
Housing Office—Furnished Apartments
Nova University
3301 College Avenue
Fort Lauderdale, Florida 33314

Housing is limited by program and availability. Applications for housing for the fall term should be submitted prior to May 31.
PLACEMENT SERVICE

Nova University operates a placement office for its graduates. Placement service is available as a lifelong benefit.

GRADUATE ASSISTANTSHIPS

A limited number of graduate assistantships may be available to qualified students to assist with undergraduate biology or chemistry labs or perform other support services.
To qualify for graduation, students must fulfill the following requirements:
1. Completion of all required course work with a minimum grade of B in each class
2. Submission of an approved thesis proposal or outline
3. Successful defense and approval of the masters or Ph.D. thesis by the student's thesis committee
4. Recommendation of the faculty

**Time Limit**

The time limit for the master's program is five years. A continuation fee of $150 per year will be charged beginning immediately after the completion of all course work and 6 thesis credits. Students may petition the program office for an extension of the time limit which will be granted only under extenuating circumstances.
Master's Program Curriculum

CORE COURSES

The following four courses are common to both the marine biology and the coastal zone management programs and provide the necessary overview of the ocean sciences. One additional course (OC 6100, Marine Ecosystems) is also shared by the programs. All courses are three credits.

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>OC 5601</td>
<td>Descriptive Marine Physics</td>
</tr>
<tr>
<td>OC 5602</td>
<td>Marine Biology</td>
</tr>
<tr>
<td>OC 5603</td>
<td>Marine Chemistry</td>
</tr>
<tr>
<td>OC 5604</td>
<td>Marine Geology</td>
</tr>
</tbody>
</table>

THESIS REQUIREMENT

A thesis advisory committee is set up for each student. The committee consists of a major professor from the Oceanographic Center faculty and at least two additional members, one of whom must be from another center of Nova University or from outside the University. The committee participates in topic selection and preparation of the outline and thesis. Close coordination between the student and the committee, especially the major professor, during this process is strongly advised. Active thesis work and registration for thesis credits (OC 6900-6920 or CZM 681-683) normally begins after successful completion of all formal course work.
<table>
<thead>
<tr>
<th>Terms/Dates</th>
<th>Course/Day-Time</th>
<th>Marine Biology</th>
<th>Course/Day-Time</th>
<th>Coastal Zone Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>WINTER 1984</td>
<td>OC 5603</td>
<td>Marine Chemistry</td>
<td>Tu/6:30-9:30 p.m.</td>
<td>OC 5603</td>
</tr>
<tr>
<td>2 Jan. - 23 March</td>
<td>Registration</td>
<td>OC 6080</td>
<td>Marine Invertebrates</td>
<td>CZM 605</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12-16 Dec. 1983</td>
<td>W/6:30-9:30 p.m.</td>
<td></td>
</tr>
<tr>
<td>SPRING 1984</td>
<td>OC 5604</td>
<td>Marine Geology</td>
<td>Tu/6:30-9:30 p.m.</td>
<td>OC 5604</td>
</tr>
<tr>
<td>2 April - 22 June</td>
<td>Registration</td>
<td>OC 6050</td>
<td>Marine Bacteriology</td>
<td>CZM 610</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19-23 March</td>
<td>W/6:30-9:30 p.m.</td>
<td></td>
</tr>
<tr>
<td>SUMMER 1984</td>
<td>OC 5601</td>
<td>Descriptive Marine Physics</td>
<td>Tu/6:30-9:30 p.m.</td>
<td>OC 5601</td>
</tr>
<tr>
<td>9 July - 14 Sept.</td>
<td>Registration</td>
<td>OC 6060</td>
<td>Marine Phytoplankton</td>
<td>CZM 607</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18-22 June</td>
<td>W/6:30-9:30 p.m.</td>
<td></td>
</tr>
<tr>
<td>FALL 1984</td>
<td>OC 6070</td>
<td>Marine Botany</td>
<td>Tu/6:30-9:30 p.m.</td>
<td>CZM 603</td>
</tr>
<tr>
<td>24 Sept. - 14 Dec.</td>
<td>Registration</td>
<td>OC 6100</td>
<td>Marine Ecosystems</td>
<td>OC 6100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10-14 Sept.</td>
<td>Th/6:30-9:30 p.m.</td>
<td></td>
</tr>
<tr>
<td>WINTER 1985</td>
<td>OC 5602</td>
<td>Marine Biology</td>
<td>Tu/6:30-9:30 p.m.</td>
<td>OC 5602</td>
</tr>
<tr>
<td>7 Jan. - 29 March</td>
<td>Registration</td>
<td>OC 6090</td>
<td>Marine Vertebrates</td>
<td>CZM 609</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10-14 Dec. 1984</td>
<td>W/6:30-9:30 p.m.</td>
<td></td>
</tr>
</tbody>
</table>
Elective Courses
The following courses may be offered on a tutorial basis (directed individual study) or in standard lecture format if six or more students enroll.

CZM625 Coastal Environmental Quality Control
CZM630 Coastal Energy Resources
CZM 640 Barrier Islands and Beaches
CZM 641 Quaternary Coastal Geology
CZM645 Coastal Zone Climatology

CZM660 Marine Archaeology
CZM740 Marine Technology
CZM750 Oceanographic Instrumentation
CZM760 Coastal Fisheries Management
CZM775 Directed Independent Study
CZM780 Ports and Harbors

COURSE DESCRIPTIONS
The permission of the instructor or program administrator is a prerequisite for all courses.

Core Curriculum

OC 5601 Descriptive Marine Physics / 3 credits. A discussion of the physical properties of seawater; the temperature and salinity structure of the oceans, T-S diagrams, water masses and their circulation, wind waves and swell, tides and other long waves, geostrophic and frictional currents and ice formation and movements. Requires algebra.

OC 5602 Marine Biology / 3 credits. A study of the major plankton, nektonic and benthiic groups and associations, including their diversity, distributions, metabolism, production, trophic relationships and ecological roles, with emphasis on coastal communities.

OC 5604 Marine Geology / 3 credits. The origin, form, and resources of the ocean basins and continental margins including a discussion of seafloor spreading, trenches and island arcs, mountain building, coral reefs and atolls, sedimentation, ocean mining, coastal morphology and the impact of wave action and human activities on beaches and coasts, continental shelves and submarine canyons.

OC 5605 Marine Chemistry / 3 credits. A study of the properties and composition and origin of seawater; the importance, distributions, relationships, and cycling of the major inorganic nutrients, dissolved gases, trace metals, and organic compounds; and the use of radiotracers for water mass dating.

Additional Courses

OC 6050 Marine Bacteriology / 3 credits. The morphologies, activities, dynamics, and ecological roles of free and attached marine prokaryotes in coastal and offshore environments including enumeration; culture and estimation of uptake and growth rates.

OC 6060 Marine Phytoplankton / 3 credits. Study of the major groups of phototrophic marine eukaryotic plankton, stressing current concepts of their activities, ecological role, importance, dynamics, and interrelationships.

OC 6070 Marine Botany / 3 credits. Morphology, life histories, taxonomy, physiology, and ecology of multicellular marine phototrophs including algae, seagrasses, and mangroves.

OC 6080 Marine Invertebrates / 3 credits. The important groups of planktonic and benthic invertebrates, with emphasis on their abundance, role in food webs and nutrient cycling, feeding and growth rates, productivity, reproduction, and interactions.

OC 6090 Marine Vertebrates / 3 credits. A survey of marine fishes, reptiles, birds, and mammals with emphasis on representative families, genera, and species including their anatomical and physiological features, interrelationships, distribution, and ecology.

OC 6100 Marine Ecosystems / 3 credits. The functional aspects of coastal and oceanic marine communities including nutrient cycling, production, respiration, nutrition, food webs, energy flow, efficiencies, environmental effects, and intracommunity interactions, with emphasis on coastal communities. Intertidal, epifaunal, infaunal, sea grass, macroalgal, mangrove, coral reef, hydrothermal vent, and planktonic communities will be considered.

OC 6150-6170 Topics In Field and Lab Techniques / 1-2 credits each. Instruction in specialized lab and/or field methodology which may be necessary to enable students in the M.S. (Oceanography) option to begin their independent thesis research. Requires prior arrangement with a faculty member.
OC 6900-6920 Master's Thesis Research (Marine Biology) / 3 credits each. Research and thesis preparation. No more than 9 credits toward the M.S. degree and 6 credits toward the M.A. degree may be applied. Requires prior consultation with major professor and submission of an approved thesis proposal.

CZM 601 Coastal Dynamics / 3 credits. Introduction to natural systems affecting coasts. Various types of phenomena that influence the nature of coasts and coastal features include bedrock, weathering and soil regimes, crustal movements, marine climates, changing sea levels, waves, currents, tides, erosion and sedimentation, and ice.

CZM 602 Coastal Ecology / 3 credits. A review of geographical principles with special emphasis on the coastal zone. Concepts of energy flow, nutrient cycles and community trophic structures will be discussed as relates to world coastal ecosystems. The use and preservation of living resources is described for marshes and estuaries, freshwater rivers and swamps, beaches and dunes, barrier islands, and the inner continental shelf.

CZM 603 Law and the Coastal Zone / 3 credits. General instruction in legal fields and in selected environmental sciences combined with in-depth study of administration of maritime industries and coastal activities. Focuses on the regulation of marine and maritime pursuits which pertain to the coastal zone and adjacent territorial waters.

CZM 604 Geomorphology of Coasts / 3 credits. The scientific interpretation of the origin, development, and classification of coastal landforms. Various types of mapping procedures used to delineate coastal features are described in relation to landbased aerial photo techniques as well as photo bathymetry operations. New techniques of data acquisition and application are outlined.

CZM 605 Coastal Protection and Engineering / 3 credits. Evaluation of practices of coastal and offshore engineering in terms of impacts on the shoreline. Causes of both desired and unwanted modifications of coastal configuration are described from a practical point of view. Aspects of applied geomechanics are considered in relation to civil, military, and industrial engineering projects.

CZM 606 Wet Coastal Ecosystems / 3 credits. A global review of coastal wetlands, brackish marshes, mangrove swamps, reef communities in tropical areas, and other habitats characterizing the coastal zone. There will be an in-depth analysis of ecological parameters characterizing selected ecosystems. The interaction between ecosystems as well as the impact of natural and man-induced perturbations will be explored.

CZM 607 Coastal Resources and Economic Activities / 3 credits. Inventory of global coastal zone resources and their effect on human wants and objectives; technologies; and the distribution of economic activities such as fishing, mariculture, mining, transportation and shipping, tourism, manufacturing, agriculture, forestry and settlement.

CZM 609 Principles of Coastal Zone Management / 3 credits. Management of coastal resources, based on the principles and techniques of a diverse array of disciplines, discussed in terms of a balanced coastal strategy. Practical solutions to conflicts of use, especially those of coastal zone protection versus land, mineral, and water development practices, are studied in relation to their impact on the coastal resource base.

CZM 610 Dry Coastal Ecosystems / 3 credits. A comprehensive review of coastal drylands comprising dune strands, barrier beaches, old dunes, hammocks, and the submaritime fringe. The complexities and subtleties of ecological relationships and importance of organic resources in this zone are emphasized.

Electives

CZM 625 Coastal Environmental Quality Control / 3 credits. Deals with various forms of environmental pollution as they affect both the land and maritime environment. Topics range from pollution control measures (e.g., oil spill clean-up procedures) to urban waterfront renewal.

CZM 630 Coastal Energy Resources Development / 3 credits. Consideration of the impact of energy development in the coastal zone. Various aspects of tidal power and sea-solar plants, and wave machines are dealt with in addition to the development of offshore oil and gas fields.

CZM 640 Barrier Islands and Beaches / 3 credits. Overview of Atlantic barrier beach ecology that considers hydrologic, soil, and vegetation systems. A wide range of ecological conditions is discussed in relation to the physical processes which affect shorelines.

CZM 641 Quaternary Coastal Geology / 3 credits. The morphology of coasts and littoral materials (marine sediments, beach deposits, soils, muds), especially as they were affected by Pleistocene glaciations. Analyses of coastal features, sedimentation processes, and stratigraphy are reviewed in relation to eustatic theory, palentology, and archaeology. Dating of Pleistocene events focuses on tropical and subtropical shoreline features and deposits. Prerequisite: CZM 604 or consent of instructor.
CZM 645 Coastal Zone Climatology / 3 credits. Maritime climates, local meteorological conditions, upwelling and coastal currents, and air-sea interactions reviewed in relation to their impact or importance to coastal ecosystems, resources, and national economies.

CZM 660 Marine Archaeology / 3 credits. The study of nautical antiquities, especially their detection and protection. Covers concepts related to the conservation of archaeological resources in the coastal zone as well as techniques relevant to underwater excavation, removal, and preservation of marine artifacts.

CZM 740 Marine Technology / 3 credits. Basic seamanship providing practical instruction, both at sea and in inland coastal waters, for boat operators, commercial fishermen, and coastal oceanographic technicians. Instructional assistance is provided by an advisory committee consisting of representatives from local fishing and marine-related industries. Use of marine and terrestrial navigation equipment under different sea, tide, and weather conditions will be covered. Prerequisite: CZM 601, Certification from Sea Survival Training Course (Institute of Survival Technology, Oceanographic Center) and consent of instructor.

CZM 750 Oceanographic Instrumentation / 3 credits. Instrument systems for coastal oceanography, including signal and data processing and design problems. Deals with instrumental platforms (buoys, surface ships, submersibles, SCUBA, satellites, aircraft), the measurement of waves and tides, chemical and geophysical measurements, and measurement of fluid motion. Instrument characteristics, development, and systems are reviewed. Prerequisite: Consent of instructor.

CZM 760 Coastal Fisheries Management / 3 credits. Considerations of the complex mixture of biological, economic, social, and political problems related to the management of fish stocks. Coastal marine farming and ocean ranching methods are related to finfish and shellfish industries. Artificial reefs and fish attracting devices (FAD's) are considered in relation to sport and commercial fisheries. Prerequisite: CZM 602, 606, or consent of instructor.

CZM 775, 776, 777 Directed Independent Study (DIS) 3 credits. DIS courses offered each term on an elective basis. This triad in the course sequence is reserved for student internships in the work-study program. Students working off the campus will be directed by on-site adjunct professors, counselors, or thesis mentors but must report to the Program Professor. A term paper or progress report is required by the end of each term.

CZM 780 Ports and Harbors / 3 credits. A comprehensive examination of modern trends in port and harbor engineering, maintenance, and management. Includes planning and layout of ports, harbors, and marinas, operation and maintenance of facilities and environmental impacts. Emphasis will be placed on analysis of modern practices. Prerequisite: CZM 605 or consent of instructor.
Student Rights and Responsibilities

Definitions

When used in this code—

a. The term "center" means Nova University Oceanographic Center.

b. The term "student" means any person registered for enrollment in any center course; or any person enrolled in a center program at the time of the alleged violation of this code; or any person on the premises or center-related premises for any purpose related to registration for enrollment.

Statement of Rights

a. The center affirms the right of each student to be free from discrimination on the basis of race, color, national origin, religious creed, political views, or sex.

b. The center affirms the right of each student to conduct research and to publish, discuss and exchange findings and recommendations, except that the University may promulgate rules and regulations related thereto.

c. Each student shall have the right to petition the center for redress of grievances, amendment of regulations and modification of center policies.
d. Students shall be secure in their persons, living quarters, papers and effects from unreasonable, illegal, or unauthorized searches and seizures.

e. The center affirms the right of students to be members of University and college committees, except that a student may not be a member of a committee by rule constituted exclusively of members of the university faculty.

f. The center recognizes each student's right of freedom of speech, assembly and association as guaranteed by the Constitution, and all provisions of this code shall be construed consistent with these rights.

g. The center recognizes the right of each member of the University community to interview for employment with any organization, firm, corporation, or any other body.

Reservation of Power

Nova shall reserve the right to amend, modify, change, add or delete such rules and regulations which may affect its relations with its students, as may be prescribed by law or deemed necessary by the administration.

Further, Nova reserves the right to change academic requirements, curriculum, tuition and/or fees when in the judgment of the administration such changes shall be required.

Educational Records and Privacy

Nova maintains a system of student records which includes, but is not limited to, application forms, letters of recommendation, transcripts of prior academic achievement, standardized test scores, evidence of professional standing and other admissions credentials as well as progress records (transcripts) of the student's studies at Nova.

Nova requires written consent of the student to disclose any personally identifiable information. Said consent shall specify the record to be released, to whom and for what purpose.

Nova shall release records of components thereof without the written consent of the student only in the following instances:

a. for purposes of audit and evaluation of federal and state programs

b. to authorized representatives of:
   1. the Comptroller General of the United States
   2. the Secretary of the U.S. Dept. of Health, Education and Welfare, Commissioner of Education or their deputies
   3. State educational authorities

c. Nova personnel deemed to have a legitimate educational interest

d. persons or organizations providing financial aid or determining financial aid decisions concerning eligibility, amount, condition and enforcement of said aid
e. accrediting organizations in carrying out their functions
f. parents of students who have established the student as a dependent according to the provisions of the Internal Revenue Code
g. persons in compliance with a judicial order or lawfully issued subpoena
h. persons in an emergency, if the knowledge of the information, in fact, is necessary to protect the health or safety of the student or other persons.
Nova may release without written consent information which it may deem as directory information for currently enrolled students provided:

a. the student is notified of the categories designated as directory information

b. the student is given the opportunity to refuse disclosure of any or all of the categories

c. the student is given a reasonable period of time in which to submit said refusals in writing

Nova may release without written consent of the student information expressly limited to the fact as to whether or not the student is currently enrolled.

Nova may release without written consent information which it may deem as directory information for students no longer enrolled.

Nova shall not provide access to the student of any admission records of that student unless and until that student shall be enrolled as a student.

Nova shall provide the opportunity for the student to seek correction of the information contained in the student records and add explanatory or rebuttal information.

Nova shall advise any party provided with identifiable student information, that such information is not permitted to be disclosed without the prior written consent of the student.
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The provisions set forth in this bulletin are not to be regarded as an irrevocable contract between the student and Nova University. The regulations and requirements herein, including tuition and fees, are necessarily subject to change without notice at any time at the discretion of the administration. The University further reserves the right to require a student to withdraw at any time, as well as the right to impose probation on any student whose conduct is unsatisfactory. Any admission on the basis of false statements or documents is void upon the discovery of the fraud, and the student is not entitled to any credit for work which he may have done at the University. Upon dismissal or suspension from the University for cause, there will be no refund of tuition and fees. The balance due Nova University will be considered receivable and will be collected.

A transcript of a student's academic record cannot be released until all his/her accounts, academic and non-academic, are paid.

Nova University maintains a system of records which includes application forms, letters of recommendation, admission test scores and transcripts of students' previous academic records and Nova University transcripts. These records may be made available upon written request through the Office of Registrar. The law limits access and disclosure to a third party. Such access is given only upon consent of the student or if required by law. A person does not have the right of access to educational records until he or she has been admitted and has actually begun attending Nova University. There is no prohibition from disclosing such information to the parents of students who are listed on their parents' federal income tax forms.

Parents or eligible students will be provided a hearing by Nova University if they wish to challenge the content of the record. If still not satisfied, the parents or eligible student may add explanatory or rebuttal matter to the record. If the student or parents are denied access to a hearing or if records are alleged to have been illegally disclosed to a third party, the student or parents may file a complaint with the Family Educational Rights and Privacy Act (FERPA) Office, U.S. Department of Health, Education and Welfare, Washington, D.C. 20201.

Nova University does not discriminate on the basis of handicap, sex, race, religion, national or ethnic origin in admission, access or employment for any of its programs and activities. The University Registrar and Director of Personnel have been designated as student and employee coordinators, respectively, to assure compliance with the provisions of the applicable laws and regulations relative to non-discrimination. Nova University programs are approved by the coordinator for Veterans Approval, State of Florida, Department of Education, for veterans' educational benefits.

The school is authorized under Federal Law to enroll non-immigrant alien students.

The Nova University general policies on Student Relations are on file in the office of the registrar.