



MEMORANDUM

To: Donna E. Shalala, President

From: Stephen Sapp
Chair, Faculty Senate

A handwritten signature in black ink that reads "Stephen Sapp". The signature is written in a cursive style with a large, prominent "S" at the beginning.

Date: February 5, 2008

Subject: Faculty Senate Legislation #2007-34(B) –Transferring of the undergraduate marine and atmospheric science program from the College of Arts and Sciences to the Rosenstiel School of Marine and Atmospheric Science

On January 30, 2008 the Faculty Senate approved the transfer of the undergraduate marine and atmospheric science program from the College of Arts and Sciences to the Rosenstiel School of Marine and Atmospheric Science. This change becomes effective upon your approval.

This legislation is now forwarded to you for your action.

SS/ef

cc: Thomas LeBlanc, Executive Vice President and Provost
David J. Birnbach, Vice Provost for University Administration and Faculty Affairs

Faculty Senate Legislation #2007-34(B) –Transferring of the undergraduate marine and atmospheric science program from the College of Arts and Sciences to the Rosenstiel School of Marine and Atmospheric Science

PRESIDENT’S RESPONSE

APPROVED: *Demetrius E. Shible* DATE: 2/6/08
(President’s Signature)

OFFICE OR INDIVIDUAL TO IMPLEMENT: Dean Otis Brown


EFFECTIVE DATE OF LEGISLATION: immediately
(if other than June 1 next following)

NOT APPROVED AND REFERRED TO: _____

REMARKS (IF NOT APPROVED): _____

UNIVERSITY OF
Miami
THE ROSENSTIEL SCHOOL
MEMORANDUM

TO: Stephen Sapp
Chair, Faculty Senate

FROM: Otis B. Brown 
Dean

DATE: January 7, 2008

SUBJECT: Marine and Atmospheric Science Program

Please find appended an updated proposal for consideration by the Faculty Senate. This revised document entitled "A Proposal for an Undergraduate Marine and Atmospheric Science Program at the Rosenstiel School of Marine and Atmospheric Science" requests movement of the current program taught in the College of Arts and Sciences to the Rosenstiel School of Marine and Atmospheric Science. We have incorporated advice we received from the Faculty of the College of Arts and Sciences during their discussions and eventual approval of the original proposal.

We welcome your comments and request that the Faculty Senate provide a positive endorsement as soon as is practical.

Attachment

pc: Thomas J. LeBlanc, Executive Vice President and Provost
William Green, Senior Vice Provost and Dean
Michael Halleran, Dean
Larry Peterson, Associate Dean
Anthony Hynes, Vice Chair, RSMAS School Council

A Proposal for Transfer of the Undergraduate Marine and Atmospheric Science Program to the Rosenstiel School of Marine and Atmospheric Science

**Submitted by the Rosenstiel School Faculty
and Amended to Reflect A&S Discussions
January 2008**

Introduction

There is currently a university-wide effort to significantly strengthen science education at UM so as to attract and retain an ever stronger undergraduate student body. The Faculty of the Rosenstiel School is committed to the University's goal of strengthening undergraduate education at UM and believes that the school can be a major resource to leverage the improvement and advancement of both academics and research in all UM's science endeavors. Rosenstiel School faculty members are among the most active and productive researchers nationally and internationally in the fields of marine and atmospheric science and constitute the teaching faculty of the existing undergraduate degree programs in marine science, meteorology and marine affairs. Despite this Rosenstiel School involvement in undergraduate teaching, the administration of these programs is housed in the College of Arts and Sciences, an arrangement that has historical roots but is not optimal for either program enhancements through curricular innovation or faculty participation. In light of these facts, the Rosenstiel School Faculty believes that the interests of undergraduates in these programs would be best served if the administrative and degree-granting responsibilities for them were transferred formally from the Faculty in the College of Arts and Sciences to the Faculty of the Rosenstiel School. This document outlines a rationale and proposal for doing so.

Background and Statement of Problem

The present status of the undergraduate Marine and Atmospheric Science program (MSC) as a joint program offered by the Rosenstiel School and the College of Arts and Sciences is largely a consequence of historical events and perspectives. At the time of its creation in 1977, neither the Rosenstiel School dean (Bill Hay) nor a majority of the Rosenstiel School Faculty wanted primary responsibility for an undergraduate program, even though Rosenstiel School then, as now, would have been its natural home. It was argued that enhanced teaching loads and undergraduate supervision would interfere with shipboard research and professional travel and put Rosenstiel School at a competitive disadvantage with the other major oceanographic institutions of the day, such as Scripps and Woods Hole, all of which were graduate and research institutes only. Professor Cesare Emiliani, who

spearheaded the creation of the MSC program and became its founding director, was chairman of Geological Sciences at the time and so Arts and Sciences became its administrative home.

Thirty years ago, oceanography and atmospheric science were subjects generally encountered only in graduate school. Indeed, there was concern at the time among some Rosenstiel School faculty members as to whether marine science was a proper undergraduate major. It was largely that concern which led to the requirement that MSC be a dual major program, with a degree in marine science possible only if coupled with a second full major in one of the basic sciences. In this regard, the linkage between the Rosenstiel School and College of Arts and Sciences is a natural one that has existed from the beginning. Problematic, however, is the cumbersome way in which the MSC program itself has evolved, especially with regard to its administration. If one were to design a program such as MSC today from scratch, it would seem unwise to build a program where the administration is housed in one academic unit and the entire teaching faculty in another. This artificial division of the MSC program between the Marine and Coral Gables campuses has led to the current "hired instructor" model for faculty participation and contributed to academic and administrative problems that have hampered the continued development of the program.

The undergraduate Marine and Atmospheric Science Program at UM was one of the first of its kind and has grown to become one of the largest (~300 majors) and best known programs in the country. While both Arts and Sciences and Rosenstiel School justifiably claim its successes, and campus guides tout it as one of UM's most distinctive programs, the undergraduate MSC program effectively exists in cross-campus limbo. Because the program is administratively housed in Arts and Sciences, its director has historically held an appointment in an A&S department. The director thus answers to his/her own department chair as well as the deans of both Arts and Sciences and the Rosenstiel School. Since MSC is only a program and not a department, there is no formal representation within Arts and Sciences at the level of the chairs, the College Council, the A&S curriculum committee, or other major administrative bodies, despite having the third largest enrollment of majors in the College. On the Rosenstiel School side, annual reports from the MSC director are made to the Rosenstiel School Council, but there is little active representation for day-to-day planning. An executive committee comprised of a small subset of the MSC teaching faculty meets once a semester with the director to discuss program issues and curricular planning, but this group has little authority to control the curriculum since all new MSC course proposals, revisions or additions must be passed through and approved by an Arts and Sciences curriculum committee with little direct knowledge of the subject.

Except for those courses taught by the current program office staff, Director Daniel DiResta and Lecturer Jill Richardson, 100% of the courses in the MSC program (e.g., marine science, meteorology, marine affairs) are taught by Rosenstiel School faculty. In spite of this, the teaching arrangements are *ad hoc* and somewhat problematic. The heart of the problem is simply that there are at present few incentives for Rosenstiel School faculty members to conduct undergraduate teaching other than in exchange for a certain percentage of their salary. Rosenstiel School faculty teach graduate courses in their division in addition to

conducting research, but undergraduate teaching carries little weight in the process by which faculty are evaluated and rewarded. The result is that the MSC director must often search for volunteers to teach open course sections, appealing to "duty, university, and good will", or accept faculty for teaching who are only interested in the salary coverage and only when they experience a salary shortfall. Given the success of the MSC program, it is clear that this method generally works thanks to a committed group of core faculty. In fact, nearly forty RSMAS faculty members currently teach undergraduate courses in the program, though some do so on an alternate year basis. Nevertheless, the "hired instructor" model this arrangement has created leaves most of a world-class faculty largely dissociated from the full breadth of formal undergraduate education at a time when the University is looking to strengthen and invigorate undergraduate science training across the board. As a result, the student experience in the marine and atmospheric sciences, both for majors and those who take MSC courses to fulfill their general education requirements (25% of all courses taken by UM undergraduates to satisfy science distribution requirements are MSC courses), is less robust than we feel it could be if Rosenstiel School faculty members were more fully engaged and had sole administrative responsibility for the program.

The MSC Curriculum

A brief review of the MSC curriculum is warranted since few outside of the program but reading this proposal are likely to be familiar with its contents and requirements. There are three main programs of study within MSC, namely those in marine science, meteorology and marine affairs. Marine science, the largest "track" in terms of student numbers, is a dual major program while meteorology and marine affairs currently exist as single majors. Minors are also offered in marine science and in meteorology. The specific degree requirements for the major in each subject are listed in the Appendix.

It should be noted that all students in the MSC program, regardless of their area of study and whether they are dual or single majors, are currently required to fulfill the General Education Requirements (GER) of the College of Arts and Sciences for their B.S. or B.A. degree. These include:

- English Composition (6 credits: ENG105 and ENG106 or ENG107)
- Humanities (12 credits)
- Social Sciences (12 credits)
- Mathematics (two semesters of calculus-MTH111, MTH112; one approved statistics or computer programming course)
- Foreign Language (3 credits at the 200 course level or higher)
- Five writing intensive courses beyond ENG105 and 106 or 107.

I. Marine Science

Currently, the Rosenstiel School and the College jointly offer a Bachelor of Science degree (B.S.) with majors in Marine Science/Biology, Marine Science/Chemistry, Marine

Science/Geological Sciences, Marine Science/Physics and Marine Science/Computer Science. The dual major is intended to prepare students for admission to graduate programs and for careers in teaching and research as well as for technical careers in government and private industries concerned with the oceans and atmosphere. Each of the areas of concentration constitutes a rigorous program requiring 120-130 credits for graduation. Most students participate in field research or attend classes for an additional summer to complete the double major. All of the courses for the Marine Science major are currently taught by Rosenstiel faculty while courses for the corresponding basic science major are taught by the relevant Arts and Sciences department.

II. Meteorology

In addition to Marine Science, the MSC program offers a single major in Meteorology that leads to the B.S. degree. A minor in Mathematics is required along with a second minor in chemistry, physics, computer science or biology. In lieu of two minors, students preparing for graduate school will often choose to complete a second major in Mathematics. The undergraduate Meteorology program is designed to prepare students for careers in industry, government, and education in fields that range from weather forecasting and basic research to air transportation, environmental protection, emergency planning, and computer modeling.

III. Marine Affairs

The Rosenstiel School and the College jointly offer a Bachelor of Arts degree with a single major in Marine Affairs and a minor in Anthropology, Communication, Economics, Geography, General Business, or Political Science. This program is designed for students who wish to prepare themselves for graduate studies and careers in ocean related areas of business, policy, management, law, and communication.

The Proposal

As an outcome of the long-term Rosenstiel School strategic planning process, and with strong faculty endorsement at our most recent Faculty Retreat (November 2006), it is proposed that all programmatic responsibilities for the undergraduate Marine and Atmospheric Science Program be formally transferred from the College of Arts and Sciences to the faculty of the Rosenstiel School of Marine and Atmospheric Science. This would make Rosenstiel an undergraduate degree granting school, give it an undergraduate student body, and bring it and its research base more fully into the mainstream of the teaching mission of the University of Miami at a time when the University is looking to move up significantly in the ranks of American higher education. The requested program transfer will effectively eliminate the hired instructor mentality that currently exists and create a sense of Rosenstiel program ownership that can only benefit the undergraduate majors. With the

recent retirement of long-time MSC director, Dr. Linda Farmer, it is timely to make this move and institute a new administrative structure.

It is important to stress that this proposal does not call for the creation of a *new* program but simply a transfer of administration and responsibility for the *existing* MSC program from the College to Rosenstiel, inarguably its natural academic home. On a day-to-day basis, we envision only modest change in the way that the program operates; indeed, the present academic model has worked well for 30 years. The traditional MSC dual major in conjunction with the College will be retained as a degree requirement for the basic marine science tracks (MSC/Biology, /Chemistry, /Physics, /Geology, /Computer Science) since this has proven to be popular with students and excellent preparation for graduate school. Meteorology and Marine Affairs will remain as single majors. Regardless of track, undergraduate MSC students will still take the vast majority of their courses in Arts and Sciences, as they do now.

We believe that having the undergraduate MSC program administratively based out of Rosenstiel will lead to a stronger sense on the part of our majors that they are a key ingredient within an integrated marine and atmospheric sciences community at UM. Much of the research conducted by Rosenstiel School faculty is highly interdisciplinary in nature, and we believe we can utilize this expertise to create an enhanced educational experience for our undergraduates. The greater involvement of Rosenstiel School faculty in the life of MSC students will allow better tracking of the interests of specific students, and help match them with opportunities and individual faculty mentors for research experiences in the laboratory and field. This increased interaction with faculty role models in their chosen discipline will likely lead to improved retention in the program and University, and engender stronger MSC alumni loyalty.

It is difficult, and probably unwise at this point, to provide a detailed plan and timetable for how the MSC curriculum might change in response to a program transfer to Rosenstiel, as it would be at best an educated guess. Indeed, a strong message that emerged from our last Faculty Retreat was "do no harm" to a program that by almost any measure is highly successful as it stands; this alone suggests that any future changes will be incremental rather than drastic. In addition, the ongoing deliberations of the Provost's STEM Committee, tasked to look at restructuring of the entire undergraduate science experience at UM, is likely to recommend large-scale revisions to foundation course contents and sequencing that are impossible to predict or evaluate at this time. However, some general comments about our approach to improving the MSC curriculum can be made.

We plan to review and revise the content of our MSC courses with the goal of streamlining the curriculum to minimize duplication and overlap between lower and upper division courses. In doing so, we hope to create room for more elective classes that integrate among the sciences and bring cutting-edge interdisciplinary research into the classroom. We will do this through more hands-on instruction in smaller classes and by increasing the number of Tier-2 laboratory courses (upper level laboratory courses that bridge between "normal" science laboratory instruction and independent studies in individual laboratories).

We also plan to develop a series of new track-specific capstone courses with a hands-on research component designed to enrich and culminate the undergraduate experience. At present, in any given term, roughly a quarter of MSC upperclassmen work and gain research experience in Rosenstiel School laboratories. We believe that every MSC undergraduate should have the opportunity to participate in some form of research before they graduate, and the inclusion of research within the capstone experience is one way to move towards this goal.

We recognize the concerns of the College over the degree to which the MSC major might eventually diverge from a liberal arts major if the degree granting authority for the program is transferred to the Rosenstiel School. We agree that a reduction in humanities and other broad foundation courses could potentially limit the options available to our graduates after graduation. We know from past experience that many of our majors go on to careers in non-science fields or choose to attend law, medical, and veterinary schools or pursue graduate studies in non-marine science programs. As noted previously, all MSC students in the current program are required to fulfill the General Education Requirements of the College rather than the less comprehensive university distribution requirements. Recognizing that students are likely to drop or add MSC as a major in the future, as they frequently do now, we propose to continue the policy that our undergraduate MSC majors satisfy the stricter General Education Requirements of the College. This will facilitate the movement of students back and forth between Rosenstiel and the College if their degree aspirations change during the course of their undergraduate tenure, and provide them with the same solid liberal arts core that they receive now.

We respect the tradition that the College is the only academic unit of the University with authority to grant an unqualified Bachelor of Science and Bachelor of Arts degree. We propose that degrees conferred to undergraduates by the Rosenstiel School should be designated as the Bachelor of Science in Marine and Atmospheric Sciences and the Bachelor of Arts in Marine Affairs.

In accepting responsibility to serve as a primary provider of undergraduate education, the Rosenstiel School faculty understands that it will be fully responsible for curriculum development and implementation, including the staffing of all courses, laboratories and field experiences required by the program. Furthermore, Rosenstiel School faculty will be responsible for program advertising, advising students on course selection within the majors, and providing appropriate career and graduate education advice.

In order to administer an in-house undergraduate program, the Rosenstiel School will appoint new leadership and oversight in the form of a senior faculty member at the Associate Dean or similar high level. Dr. Daniel DiResta, the current MSC program Director, will continue to have responsibility for the day-to-day management of the program and will be based, as now, on the Coral Gables campus. In addition, we will establish a separate undergraduate academic committee at Rosenstiel with full curricular authority that parallels the existing graduate academic committee. Having both a graduate and undergraduate program based together at Rosenstiel will allow for a tighter integration of undergraduate and

graduate coursework, facilitate program advertising, and promote hands-on research experiences where faculty members, graduate and undergraduate students work together with common scientific goals. Quality undergraduate teaching will assume a greater role in the evaluation of faculty for promotion and award of tenure.

In preparation for this proposed transfer of responsibility, the Dean of the Rosenstiel School and its faculty pledge to work with our counterparts in Arts and Sciences and the Office of the Provost to discuss how to handle the present and future space requirements of the program and other needs currently provided by the College. Because of logistical and transportation issues, daily administrative activities and the bulk of program teaching must of necessity remain based on the Coral Gables campus. With the anticipated increase in Rosenstiel School faculty participation, opportunities to foster new collaborative research efforts with faculty in Arts and Sciences, Engineering, and other units based on the Coral Gables campus should naturally develop and will be actively encouraged. Rosenstiel School faculty are keen to work with their Arts and Sciences counterparts to develop innovative team teaching approaches to whatever new core science curriculum is developed as a result of the ongoing STEM Committee deliberations. The design and offering of new upper level MSC courses that are co-listed or approved for elective credit in the basic science departments of Arts and Sciences can potentially serve the curricular needs of both MSC students and those majoring in these departments.

Though the majority of MSC program operations must remain on the Coral Gables campus, we will seek opportunities for an increasing presence on the Rosenstiel School campus for students beginning in their junior year for upper level and/or 500-level elective courses, as well as for the new capstone courses where access to Virginia Key facilities will be required. Block scheduling for at least one semester as an upperclassman is a realistic solution to coordinating student schedules to overcome transportation and course conflict issues that presently make it difficult for undergraduates to spend significant time on Virginia Key. We do this successfully now for a limited number of students who participate in our "Saltwater Semester" program. In order to accommodate greater student numbers on Virginia Key, increases in classroom and lab space, computer and library resources, and study space at Rosenstiel School will be required.

Summary

Our objective in proposing a transfer of the MSC program administration to the Rosenstiel School is improved integration of undergraduates into the Rosenstiel School environment, a more cohesive curriculum, enhanced opportunities for students to participate in cutting-edge research in the company of graduate students and faculty, and a richer educational experience for majors in the marine and atmospheric sciences. The Rosenstiel School faculty is willing and prepared to assume this responsibility and the school is primed to move to an increased student centric teaching and training approach, as well as a more integrated role in the basic science education of all University of Miami students.

APPENDIX

The present science and math requirements for each of the programs of study within MSC are as follows:

Marine Science Curriculum

Marine Science/Biology

Marine Science 111, 215, 216, 230,232, 301, Geological Science 110 and 114 and six elective credits in Marine Science for a total of 25 credits.

Biology 150, 151, 160, 161, 235, 236, 250, 255, 265 and nine credits of elective as described for Biology majors for a total of 34 credits.

Chemistry 111, 112, 113, 114, 201, 202, 205, 206.

Mathematics 111, 112 and one semester of a computer programming or statistics course. The following classes are approved to satisfy the computer/statistics requirement: Biology 311 or 511, Mathematics 224, Computer Science 120, Industrial Engineering 124, Electrical and Computer Engineering 117 or 118, Psychology 204.

Physics 205, 206, 207, with one laboratory; or 205, 210 with one laboratory; or 101, 102, 106 and 108.

*Marine Biology and Fisheries 514 may be substituted for Marine Science 231 or 232.

Marine Science/Chemistry

Marine Science 111, 215, 216, 230, 231 or 232, 301, Geological Sciences 110, 114 and six credits of elective in Marine Science for a total of 25 credits.

Biology 150 or 160.

Chemistry 111, 112, 113, 114, 201, 202, 205, 206, 304, 316, 360, 364, 365, and one of 401,416,441, 520,563, or Biochemistry and Molecular Biology 401 or 506.

Mathematics 111-112 and one semester of a computer programming or statistics course. The following classes are approved to satisfy the computer/statistics requirement: Computer Science 120 or Electrical and Computer Engineering 117 or 118.

Physics 205, 206, 207, with one laboratory; 205, 210 with one laboratory; or 101, 102, 106 and 108.

Marine Science/Geological Sciences

Marine Science 111, 215, 216, 230, 231 or 232, 301, and six credits of elective in Marine Science.

Biology 150 or 160.

Chemistry 111, 112, 113, 114.

Geological Sciences 110,111,114, 260,360,410 or 514,480,482,574,580 and 6 credits of elective.

Mathematics 111-112 and one semester of a computer programming or statistics course. The following classes are approved to satisfy the computer/statistics requirement: Computer Science 120, Mathematics 224, Industrial Engineering 124, Electrical and Computer Engineering 117 or 118 Psychology 204.

Physics 205, 206, 207, with one laboratory; 205, 210 with one laboratory; or 101, 102, 106 and 108.

*Geological Sciences 110/114 may fulfill requirements in both Marine Science and Geology.

Marine Science/Physics

Marine Science 111, 215, 216, 230, 231 or 232, 301, Geological Sciences 110, 114 and six credits of elective in Marine Science for a total of 25 credits.

Biology 150 or 160.

Chemistry 111, 112, 113, 114.

Mathematics 111, 112, 210, 312, and one semester of a computer programming or statistics course. The following classes are approved to satisfy the computer/statistics requirement:

Computer Science 120, Mathematics 224, Electrical and Computer Engineering 117 or 118.

Physics 205, 206, 207, 208, 209, 321, 340, 350, 351, 360, 505, 506, and 560. (Physics 210 may be substituted for Physics 206 and 207.)

Marine Science/Computer Science

Marine Science 111, 215, 216, 230, 232, 301, and six credits of elective in Marine Science.

Biology 150 or 160.

Chemistry 111, 112, 113, 114.

Geological Sciences 110, 114.

Mathematics 111, 112, 309.

Computer Science 119, 120, 220, 314, 322, 531 and 6 credits of elective.

Physics 205, 206, 207 and one semester of laboratory or Physics 101, 102, 106 and 108.

Meteorology Curriculum

The classes required for the Meteorology track include the following:

Marine and Atmospheric Science (28 credits): MSC103, MSC111, MSC118, MSC243, MSC303, MSC305, MSC405, MSC406, MSC407, MSC409.

Mathematics (20 credits)*: MTH111, MTH112, MTH210, MTH224, MTH310, and MTH311**

*Double majors in ECS and CBR must take either MTH224 or MTH311, but are not required to take both.

**Students may substitute MTH320 for MTH311.

Physics and Chemistry (14 credits): PHY205, PHY206, PHY207, PHY208. CHM111, CHM113.

Computer Science (4 credits): CSC120 or suitable elective.

Electives: Students must complete a minimum of 15 additional elective hours of which at least 12 must be from Biology, Chemistry, Computer Science, Ecosystem Science and Policy, Geology, Marine Science, Math, or Physics (at least 6 of which must be at the 200 level or higher). The elective courses may be chosen to satisfy degree requirements for a second major or a second minor. For Broadcasting Journalism double majors, the electives may be taken from the School of Communications.

Marine Affairs Curriculum

The required courses for the B.A. in Marine Affairs are:

Biology 150, 160.

Chemistry 111, 112.

Marine Science 111, 215, 230, 313 or 314, Geological Sciences 110, 114 and eight credits of approved electives in Marine Science.

Economics 211, 345.

One approved course in computer programming or statistics.

Courses which satisfy the minor are those required by the individual departments.