UNIVERSITY
OF MIAMI
FACULTY SENATE

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MEMORANDUM

To: Donna E. Shalala, President

From: Tomas A. Salerno
Chair, Faculty Senate

Date: February 27, 2015

Subject: Faculty Senate Legislation #2014-28(B) – Establish a new Certificate Program in Applied Carbonate Geology and name changes of the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) from Marine Geology and Geophysics (MGG) degree programs to Marine Geosciences (MGS), Rosenstiel School of Marine and Atmospheric Science

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The Faculty Senate, at its February 25, 2015 meeting, voted by majority with 1 abstention to approve the restructure of the graduate programs at the Rosenstiel School of Marine and Atmospheric Science as amended. Each department's proposal is written as separate legislation for administrative purposes and includes the proviso that the School will give a report to the Senate in two years after the programs' implementation.

As noted in the proposal, then name changes of the Master of Science and Doctor of Philosophy programs will align the name of the department with the name of the degrees.

The certificate in Applied Carbonate Geology is proposed to properly formalize a former certificate program. This program can be fulfilled in approximately six months for professional development of degreed industry scientists.

This legislation is now forwarded to you for your action.

TAS/rh

Enclosure

cc: Thomas LeBlanc, Executive Vice President and Provost
Roni Avissar, Dean, Rosenstiel School of Marine and Atmospheric Science
Amy Clement, Associate Dean, Rosenstiel School of Marine and Atmospheric Science
Sharanya Majumdar, Program Director, Rosenstiel School of Marine and Atmospheric Science
Peter Swart, Chair, Department of Marine Geosciences, Rosenstiel School of Marine and Atmospheric Science

CAPSULE: Faculty Senate Legislation #2014-28(B) – Establish a new Certificate Program in Applied Carbonate Geology and name changes of the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) from Marine Geology and Geophysics (MGG) degree programs to Marine Geosciences (MGS), Rosenstiel School of Marine and Atmospheric Science

APPROVED: _____ DATE: 03/06/2015
(President's Signature)

OFFICE OR INDIVIDUAL TO IMPLEMENT: Dean Avissar

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

NOT APPROVED AND REFERRED TO: _____

REMARKS (IF NOT APPROVED): _____

UNIVERSITY OF MIAMI
ROSENSTIEL
SCHOOL of MARINE &
ATMOSPHERIC SCIENCE

Rosenstiel School of Marine and Atmospheric Science
University of Miami
4600 Rickenbacker Causeway
Miami, FL 33149, USA

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Memoranda

Rosenstiel School of Marine and Atmospheric Science
University of Miami
4600 Rickenbacker Causeway
Miami, FL 33149, USA

MEMORANDUM

TO: Professor Brian Blake (Dean, University of Miami Graduate School)
FROM: Sharan Majumdar (Assoc. Professor and Chair, Academic Committee, Rosenstiel School)
Amy Clement (Professor and Associate Dean of Graduate Studies, Rosenstiel School)
DATE: November 10, 2014
SUBJECT: **Graduate Program Restructuring at the Rosenstiel School**

The Rosenstiel School of Marine and Atmospheric Science has entered an exciting phase of its evolution, with externally funded new buildings and research facilities, a major investment by UM in renovating infrastructure, new business models for faculty and graduate students aligned with national models, and plans to hire the next generation of faculty. On June 1, 2014, the Rosenstiel School was restructured from 6 divisions into 5 new departments, following approval by the Faculty Senate on March 26, 2014. The main reason for this restructure has been to develop the School into academic units that can be administered more autonomously.

The establishment of the new departments has provided an opportunity to rethink and revitalize our graduate programs into new or improved programs. Currently, there exist 6 programs with the names of the 6 former divisions. We are proposing a new structure in which 5 graduate programs are aligned with the 5 new departments, and one existing program will continue as an inter-departmental program. The package presented here describes how we will transition to this new structure, which includes the development of 3 new Ph.D. programs, 3 program name changes, 1 new certificate program, and the phasing out of 2 existing programs. A schematic showing the old divisions/programs, new departments, and new proposed structure is on the next page. We wish for this package to be considered holistically, since the various actions of developing, renaming and phasing out programs are interdependent.

The contents of the package together with results from faculty votes are as follows:

School-wide Memos

S1. This cover letter, explaining the programmatic restructure from a School-wide perspective.
S2. Dean of the Rosenstiel School.
S3. Vice Chair of the Rosenstiel School Council.
S4. Associate Dean of Master of Professional Science (MPS), on the transfer of MPS degree programs.

Departments

D1. Department of Ocean Sciences (OCE)
- New M.S. and Ph.D. program proposal in Ocean Sciences. **Supported 19-1** (1 abstain)

D2. Department of Atmospheric Sciences (ATM)
- New M.S. and Ph.D. program proposal in Atmospheric Sciences. **Supported 11-0.**

D3. Department of Marine Ecosystems and Society (MES)
- New Ph.D. program proposal in Marine Ecosystems and Society. **Supported 10-0.**
- M.S. program name change from Marine Affairs and Policy (MAF) to Marine Ecosystems and Society (MES). **Supported 10-0.**

D4. Department of Marine Biology and Ecology (MBE)
- M.S. and Ph.D. program name change from Marine Biology and Fisheries (MBF) to Marine Biology and Ecology (MBE). **Supported 14-0.**

D5. Department of Marine Geosciences (MGS)

- Proposal for new Certificate Program in Applied Carbonate Geology. **Supported 8-0.**
- M.S. and Ph.D. program name change from Marine Geology and Geophysics (MGG) to Marine Geosciences (MGS). **Supported 8-0.**

Existing Programs

E1. Applied Marine Physics (AMP)

- Memo stating faculty intention to admit new graduate students solely into the new programs in 2016. **Supported 6-0.**

E2. Marine and Atmospheric Chemistry (MAC)

- Memo stating faculty intention to admit new graduate students solely into the new programs in 2016. **Supported 7-0.**

E3. Meteorology and Physical Oceanography (MPO)

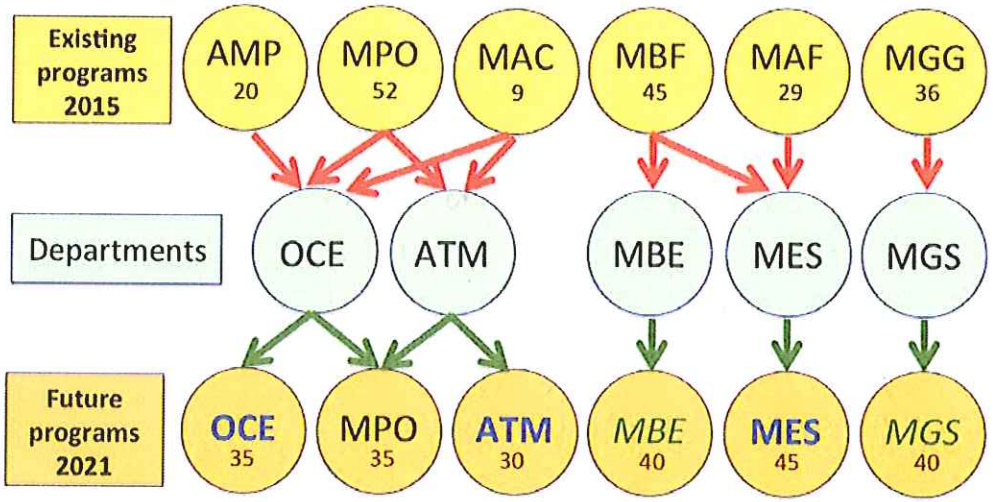
- Memo stating support for new programs and long-term continuation of MPO. **Supported 14-6.**

E4. Abess Center for Ecosystem Science and Policy

- Memo stating support from the Director of the Abess Center.

Each new program aligned with the new departments will offer M.S. and Ph.D. degrees with the degree title matching the program name. The three departments that are proposing new graduate programs: OCE, ATM, and MES, are proposed to begin in Fall 2015. The MBE and MGS departments, and the MES Master's Program, are proposing a name change to their existing programs. We propose that students in the existing programs will be allowed to transfer into the new programs beginning in Fall 2015. Current MPS tracks will be transferred into new departments, but will otherwise remain unchanged.

This diagram illustrates the 6 existing graduate programs (M.S. and Ph.D. combined, except MAF which is M.S. only) and student populations in each program (yellow circles). The red arrows illustrate how the existing graduate programs are mapped onto the 5 departments (green circles). The orange circles list the 6 proposed graduate programs with conservatively projected student populations in 2021, five years after the enrollment of new students in the new programs. These numbers are based on polls of faculty on their projected student intake, and average graduation rates. The green arrows illustrate the alignment between the new departments and the future programs. The programs listed in blue are new programs, while the two programs listed in green are renamed programs. The MPO program will continue as is and will be maintained as an interdepartmental program served by faculty from OCE and ATM.



School-wide Rationale

An overview of the rationale for the establishment of the new programs is summarized here, with explanations in further depth provided in each of the individual program proposals.

In the UM Strategic Plan (2008), the need was stated for UM to advance up the National Research Council (NRC) rankings, and in turn reach the highest echelon of national research universities: the private institutions of the Association of American Universities (AAU). This intention included aiming for a top-10 ranking for the Rosenstiel School with nationally prominent graduate programs that are distinguished by their breadth and depth, and quality of the student body that matches that on the campuses of private AAU institutions. In the 2010 NRC Rankings, the 5th & 95th percentile rankings for the Rosenstiel School out of 50 comparable schools and departments were 11 & 40 respectively in criteria deemed important for scholars, and 10 & 42 respectively in research rankings. These numbers suggest that the Rosenstiel School is on average in the middle, with most opinions ranging from the highest 20% to the lowest 20%. Our goal is to elevate the Rosenstiel School's graduate education into the top tier.

The improvement of our graduate programs relies on our ability to recruit top-class students. Currently, the number and quality of applicants especially in the physical and chemical sciences are sub-optimal, even with highly competitive stipends and 5-year research assistantships. The faculty have expressed a need to offer broader opportunities to prospective graduate students, and the proposed programs are designed to meet this need. In developing our new proposed programs, the core curricular structures have been revisited (something that has not been done in existing programs for decades), and the result is more curricular options offering greater flexibility for students, and adding more prominence in attractive areas including interdisciplinary studies. We expect that the programs will be more visible to high-caliber students in the oceanic and atmospheric sciences via the identity of the departments. This increased visibility will also serve to enhance the pool of high quality students in the retained program (MPO).

The 6 programs that used to reside within the old divisions have been in existence for several decades (yellow circles in diagram). As is indicated by the red arrows in the diagram, these programs are presently not well aligned with the 5 new departments (green circles). The new graduate program structure aligns cleanly with the 5 departments (green arrows). The MPO program will continue as an inter-departmental program that attracts students with interests in the physical processes of both the atmospheric and oceanic media, a core strength at UM that will continue to contribute to the overall growth in the graduate student population. All the main 6 programs (5 departments and MPO) will be of comparable size to each other, with a conservative projection of at least 30 graduate students in each program in the long-term (2021). The new programmatic structure will align with our parallel undergraduate and MPS programs, which are also expected to align with the departments moving forward. The proposed structure will also enable opportunities for joint programs or concentrations across both the Rosenstiel School and UM (such as the recently revived Ocean Engineering program).

The reorganization into new departments has left some important disciplines without a distinctive 'home'. Chief among these are fisheries, marine physics, marine chemistry, and atmospheric chemistry. The new M.S. and Ph.D. program in Marine Ecosystems and Society is designed to accommodate fisheries. Faculty in the other three disciplines have had difficulty recruiting into the existing small programs, and have formally stated their interest in recruiting new students solely into the new OCE and ATM programs. One top priority is to expand our programmatic structure in the well-funded physical and chemical sciences from one large program (MPO) and two small programs (AMP, MAC) into three thriving complementary programs that accommodate the diverse range of research expertise across the faculty in the OCE and ATM departments. This reorganization ensures that all graduate programs have critical mass – a robust cohort class is important for attracting students and for a collaborative learning environment.

The equilibrium faculty size of the Rosenstiel School in the Provost's business model is 68. Working within this number, there is a robust plan to recruit up to 16 new faculty in the School by 2020. The announcements for hiring 5 new faculty members (1 in each department) have recently been advertised. The presence of exciting new and diverse *research-enhancing* graduate programs with high visibility is expected to be more attractive to top faculty applicants than the existing uneven structure, together with the incentive for future and current faculty to make a substantial contribution to their development. Furthermore, the School contains a large core of internationally recognized, well-published and funded mid-career faculty who maintain large research programs and advise many graduate students, who also contribute substantially to the educational mission of UM. The 'positive feedback' through the recruitment of high-quality students remains an important factor in the retention of top faculty. Many faculty have expressed the need for the new programs to enhance their student recruitment.

We anticipate that the new programs will overall be more *reputation-enhancing* than is possible with the current structure, with an excellent student body, placements among top academic and research institutions, faculty highly committed to advancing course offerings and mentoring students one-on-one, and providing financial and research support to students. The ultimate goal is to develop a culture of academic excellence and long-term stability in all 6 M.S. and Ph.D. programs.

Budget and Student Numbers

A standard business model exists for all students in 5-year Ph.D. programs who are not on Fellowships. Each student's annual stipend, tuition and health insurance are supported for 3 years on the advisor's extramurally funded research grant. In the remaining 2 years, the student is fully supported by the School. The M.S. students have their stipend and tuition supported by the advisor. Additionally, several M.S. students are self-funded. This School-wide model will continue for students entering the proposed new programs.

This business model for graduate students is in line with the principles in the UM Strategic Plan, which suggests a strategy for building nationally prominent Ph.D. programs within resource constraints. These principles include competitive stipends, leveraging external funds wherever possible, and graduate students playing important roles in undergraduate education. The annual stipend will be approximately $30,000 per year in Fall 2016, higher than most comparable programs nationwide (which are generally $20,000-$28,000). External grants come from federal agencies such as the National Science Foundation, NASA, NOAA, Department of Energy, Department of Defense, National Institute of Health etc. While the student intake is in part dependent on the available funding in the field and the faculty members' success in winning grants, this funding has generally been steady both nationally and at the School in recent years, and it is expected to remain steady over the next decade. Another method of leveraging funds is to be more aggressive in pursuing external fellowships, through initiatives such as those developed by the UM Graduate School and guidance from advisors. A new model for self-funded M.S. students across the School has recently been introduced.

There currently are 191 M.S. and Ph.D. students in the 6 programs. For the new faculty, it is anticipated that the start-up package for each new hire would include two new graduate students. Based on the new hires, steady national funding levels, and modestly improved recruitment of students within the new programs, a conservative projection is for 220 M.S. and Ph.D. students by 2021. The majority of students (80-90%) in OCE, ATM, MGS and MBE will be Ph.D. students. In MES, at least 15 Ph.D. students are anticipated around 2021, with most of the remainder being self-funded M.S. students as exists now. Hence, the projected 220 students may be divided into 50 M.S. students and 170 Ph.D. students in 2021.

Impact on Existing Programs

The faculty in the **AMP** and **MAC** programs have voted that they do not intend to recruit into these programs after the new OCE and ATM programs have been formally established. AMP and MAC will continue as long as students remain in the programs, with few students expected to remain by 2021.

The existing programs in **MAF**, **MBF** and **MGG** are being renamed to align with the MES, MBE and MGS departments. The fisheries component of MBF will become part of the new MES program.

The only existing program that will continue is **MPO**, which houses about 50 students advised by faculty belonging to the former MPO division. This program will remain as is, governed by a Program Director and an Academic Committee across the ATM and OCE departments. The programmatic structure of MPO will remain as is, including the same required courses and suite of elective courses taught by faculty in the ATM and OCE departments. The new programs are designed so as not to increase the graduate or undergraduate teaching loads of faculty involved in any of the programs, including MPO. Students enrolled in the MPO program will share several courses and seminars with students enrolled in the ATM and OCE programs, and therefore there will be broader student camaraderie and a cohort that extends beyond each individual program. There will be no impact on the existing program budget, which is largely handled by the School, and there will be no impact on facilities or space.

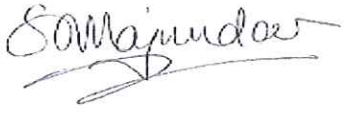
The main impact on MPO will be a reduction in the number of students pursuing a degree in MPO. The current number of about 50 is expected to decrease slowly to an equilibrium of about 35 over the next 7 years, as students begin to enroll in the new programs. Several faculty in ATM and OCE have expressed their desire to continue to recruit students in MPO. Therefore, it is expected that MPO will have a stable future. The program will admit students in the same way as the other programs.

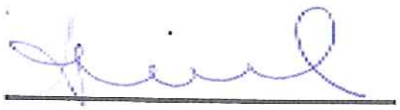
Given the natural connections between the atmosphere and ocean, there will be some common ground across ATM, OCE and MPO. At the same time, each program will also possess a distinct identity and be complementary to each other. ATM will focus on the dynamics, physics, and chemistry of the atmosphere, with extensions to other relevant areas (e.g. atmospheric science policy). OCE will include studies of the dynamics, physics, chemistry and biology in the ocean, with interdisciplinary connections. MPO will continue to admit students interested in weather, climate, ocean circulation and physical processes, and air-sea interactions. The establishment of the new programs will also be necessary in order to extend beyond the scope and reach of MPO that could not be achieved by simply reorganizing MPO. Therefore, we are confident that the three complementary programs will all thrive, and synergies between each of them will be exploited through coordination and inclusivity across the programs.

The programs and budgets are self-contained, being handled internally within the Rosenstiel School. Therefore, no other programs at UM will be impacted. The new programs will complement those within the **Abess Center** of Ecosystem Science and Policy, as stated in a separate memo by their Director.

We thank you and the Graduate Council for your consideration.

Sincerely,





Sharanya J. Majumdar

Amy C. Clement

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MEMORANDUM

DATE: January 27, 2015

TO: Dr. Sharan Majumdar
Associate Professor and Chair, Academic Committee
Rosenstiel School of Marine and Atmospheric Science

FROM: David E. Wiles, Executive Director
Assessment and Accreditation

SUBJECT: Graduate Program Restructuring/New Programs and Program Changes

On December 16, 2014, the Rosenstiel School of Marine and Atmospheric Science submitted a proposal notifying our office of its intent to restructure its graduate departments; create five new graduate degree programs and one certificate program; rename eight other existing degree programs; the planned phase-out of four existing degree programs, although students presently enrolled these programs will be allowed to complete their studies under the existing curriculum or to transfer to the corresponding new degree program. The changes are scheduled to take effect beginning in the fall of 2015 and are summarized in the chart below.

Credential	Level	Program *=courtesy master's awarded to doctoral student **=inactive program	Changes in 2015-16
		Rosenstiel School of Marine and Atmospheric Science	
Certificate		Applied Carbonate Geology -- Graduate Credit	new
M.S.	M	Applied Marine Physics	phase out
Ph.D.	D	Applied Marine Physics	phase out
M.S.	M	Atmospheric Sciences	new
Ph.D.	D	Atmospheric Sciences	new
B.A.M.A.	B	Marine Affairs	
M.P.S.	M	Marine Affairs and Policy rename "Marine Ecosystems and Society"	rename
M.S.	M	Marine Affairs and Policy rename "Marine Ecosystems and Society"	rename
M.S.	M	Marine and Atmospheric Chemistry	phase out
Ph.D.	D	Marine and Atmospheric Chemistry	phase out
M.P.S.	M	Marine Biology and Fisheries rename "Marine Biology and Ecology"	rename
M.S.	M	Marine Biology and Fisheries rename "Marine Biology and Ecology"	rename
Ph.D.	D	Marine Biology and Fisheries rename "Marine Biology and Ecology"	rename
Ph.D.	D	Marine Ecosystems and Society	new
M.S.	M	Marine Geology and Geophysics rename "Marine Geosciences"	rename
Ph.D.	D	Marine Geology and Geophysics rename "Marine Geosciences"	rename
B.S.M.A.S.	B	Marine Science (all tracks)	
B.S.M.A.S.	B	Meteorology (all tracks)	
M.P.S.	M	Meteorology and Physical Oceanography rename "Atmospheric Science(-s)?"	rename
M.S.	M	Meteorology and Physical Oceanography	
Ph.D.	D	Meteorology and Physical Oceanography	
M.S.	M	Ocean Sciences	new
Ph.D.	D	Ocean Sciences	new

The proposal also mentions the recruitment of 16 new faculty members, including the immediate hiring of five new faculty members, and an expanded curriculum. Although our office will need to submit the changes and new program additions as a notification to the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC), please provide written clarification on the following matters:

- Specify the minimum number of **post-baccalaureate** credit hours for each new graduate degree program (should be at least 30 credits for a master's degree and 60 for the Ph.D.).
- For each of the five new faculty currently sought, please indicate whether the hire will be (1) teaching new courses, (2) minimum qualifications for the appointment or provide the C.V. (if already hired), and (3) whether the hire will be an addition to the faculty or will fill a vacancy.
- The exact new name for the existing M.P.S. in Meteorology and Physical Oceanography.
- For the five new courses that will be offered as part of the Certificate in Applied Carbonate Geology, whether these courses will be a subset of the curriculum for an existing graduate degree program at RSMAS—if so, which program(s)?
- Student Learning Outcomes (SLOs) should be stated in terms of the knowledge, skills, values, or behaviors students will develop; should be worded in active voice (e.g., "Students will demonstrate…" or "Graduates will be able to…"); and include at least **two** measures.
- Where standardized examinations are used for admission, minimum scores should be reported on the current exam scale (e.g., 0-120 for the TOEFL iBT).
- Finally, it would be helpful if all pages of the proposal were numbered.

Please allow six months for review by the SACSCOC once the notifications are submitted by our office. Feel free to contact us should you have any further questions (305) 284-9431.

cc: Faculty Senate
Dr. M. Brian Blake, Vice Provost and Graduate School Dean
Dr. Roni Avissar, Dean, RSMAS
Dr. Amy Clement, Professor and Associate Dean of Graduate Studies, RSMAS

MEMORANDUM

DATE: February 4, 2015

TO: Tomas Salerno
Chair, Faculty Senate

FROM: M. Brian Blake
Dean, The Graduate School

SUBJECT: Revised Memo - Restructuring of the Graduate Programs in RSMAS

The Rosenstiel School of Marine and Atmospheric Sciences submitted a proposal to restructure the graduate programs in RSMAS. The proposal was discussed at the meeting of the Graduate Council on Tuesday, January 20, 2015, and was approved by those present. The second reading was waived.

Several discussions from the meeting are notable:

1. The Graduate Council received concerns from member(s) of the Graduate Faculty that the program would cause undue competition and that the new divisions would weaken the overall program. The proposers provided a rationale to explain the material differences between ATM/OCE/MPO vs. OCE/MPO. The Graduate Council discussed the concerns and the rationale in detail. The Graduate Council found favorable the ability for the programs to evolve separately with the changing faculty. The Council also appreciated that there might be some overlap in the programs but found it acceptable. The Graduate Council did not perceive a sense of competition between the two programs considering material differences and the nature of graduate programs in general.
2. The Graduate Council requested that the proposers prepare a 1-page document with a projected synopsis of graduate programs that will retire in addition to a date when the Graduate Council should revisit the status of those retirements.
3. The proposers favorably distinguished between MES and the ABESS program in response to a question from the Council.

cc: Roni Avissar, Dean, RSMAS
Amy Clement, Associate Dean of Graduate Studies, RSMAS
Sharan Majumdar, Graduate Academic Committee Chair, RSMAS
Office of Planning, Institutional Research and Assessment

UNIVERSITY OF MIAMI
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MEMORANDUM

TO: Professor Brian Blake, Dean, UM Graduate School
FROM: Roni Avissar, Dean
DATE: November 10, 2014
SUBJECT: **Graduate Program Restructuring at RSMAS**

The Rosenstiel School of Marine and Atmospheric Science (RSMAS) has recently reorganized into five departments: (1) Ocean Sciences (OCE); (2) Atmospheric Sciences (ATM); (3) Marine Biology and Ecology (MBE); (4) Marine Geosciences (MGS); and (5) Marine Ecosystems and Society (MES). Previously, RSMAS was organized into six divisions: (1) Meteorology and Physical Oceanography (MPO); (2) Marine and Atmospheric Chemistry (MAC); (3) Applied Marine Physics (AMP); (4) Marine Biology and Fisheries (MBF); (5) Marine Geology and Geophysics (MGG); and (6) Marine Affairs (MAF). This evolution of RSMAS was required due to the combination of multiple factors, including the needs to reduce the size of the faculty that was unable to sustain itself financially because of the disproportion between its size and its teaching portfolio, and also because of its lack of competitiveness in some of its programs that were clearly not visible to many potentially interested students. Indeed, priorities and interest of potential students have changed over the past few decades, but RSMAS maintained its organization and academic offerings during that same period.

Following this reorganization and the multiple discussions that took place before, during and after its implementation, the overwhelming majority of faculty members at RSMAS (see all attached memos summarizing all anonymous votes) believe that now is the right time (and unique opportunity) to reconsider our graduate program portfolio. The attached proposal, and especially the memo of Professor Sharan Majumdar (Chair of our Graduate Academic Committee) and Professor Amy Clement (Associate Dean for Graduate Programs) provides an excellent summary of the issues that we are trying to resolve by proposing to restructure our graduate programs. This includes a net gain in the number of graduate students that we could easily absorb with our existing research funds available for fellowships, but we are unable to recruit within the inadequate current programs. Very conservatively, we anticipate a growth of about 20% in our student population and not less importantly, we anticipate in at least some of the programs a considerable increase in the quality of the students applying to our programs. This would be achieved without increasing the total number of our graduate programs at no additional cost to the School. Thus, the income realized by the additional students would in fact increase the net revenues of the School and, as a result, of the University.

There is no point for me to repeat here the arguments provided in the memo of Professors Majumdar and Clement. Rather, **the purpose of this memo is to emphasize my unambiguous and enthusiastic support for this proposal, which was put together by the faculty in their new departments led by the Graduate Academic Committee**. It was reviewed carefully and approved by the School Council (see attached memo of the School Council Vice Chair, Professor

Roni Avissar, Ph.D.
Professor and Dean
Phone: 1 305 421-4000 • Fax: 1 305 421-4711 • E-mail: ravissar@rsmas.miami.edu

Rana Fine) and was unanimously approved by the School Leadership (which at RSMAS consists of the five department chairs, the five associate deans, and the VC of the School Council).

But I would like also to emphasize the importance of considering this proposal in its entirety, rather than each program separately. This is because any of the programs is interconnected directly or indirectly to the five others and modifying only part of them would necessarily leave out some of our faculty members. Indeed, two of our current programs that the faculty has decided to abandon (AMP and MAC) would have no home for their graduate students if ATM and/or OCE were not approved, and faculty members formerly in the MBF Division who joined the former MAF Division to create the new MES Department would not have a home for their students. The Graduate Academic Committee together with the faculty in the newly created departments choreographed very carefully the entire proposal and it is key to the success of this initiative to move forward as a single proposal for restructuring.

In this proposal we are requesting to restructure the existing six graduate programs that were associated with the six former divisions into six programs, five of them aligned with the five new departments and one of them, MPO, the largest of the existing programs becoming a cross-departmental program that will serve students interested in both the ocean and the atmosphere, and their interactions. The support for the alignment between new departments and their own graduate program is overwhelmingly positive. Indeed, from all five departments, only one single vote rejects the proposal to create a new OCE graduate program (see summary of confidential votes provided in the document). The only minor disagreement to this entire proposal is regarding the future of the MPO program jointly with the ATM and OCE programs. Yet even in that case, it is essential to appreciate that 70% of the faculty are in favor of moving forward with the three programs (see faculty vote of MPO, ATM and OCE).

Last but not least, with expected retirements that will occur at RSMAS during the next 5-7 years, we anticipate a recruitment of 16 new faculty members to maintain the total number of tenured and tenure-track faculty at 68 (we are in the process of recruiting a first wave of five faculty). The restructuring proposed here will facilitate the integration of these new faculty members in their department. Indeed, the alignment of programs with departments is quite typical in academia and the confusion of six programs aligned with previously existing divisions would not be helpful in recruiting top faculty members. We anticipate this new faculty recruitment to significantly impact in a very positive way the newly created programs.

I hope that the Graduate School will appreciate the tremendous effort put together by the Graduate Academic Committee, the School Council, the School Leadership and the entire RSMAS faculty to develop this very exciting proposal, which is very considerate for the interest of all faculty at the School while enhancing the benefits for the School and the University. It is extremely well thought, it will contribute to the quality and the population of graduate students at UM, and I strongly urge you to support RSMAS' effort to improve and to contribute to the Graduate School.

UNIVERSITY OF Miami

February 4, 2015

To: Dr. Amy Clement, Associate Dean Graduate Studies

From: Rana Fine, Professor and Vice Chair RSMAS School Council

This is written in enthusiastic support of the graduate program restructuring package submitted to the Graduate School for the Rosenstiel School. On 3 February the School Council met and **unanimously approved** the entire package with a vote of 5-0. The wording of the resolution was:

"I approve the entire package, including all of the individual proposals to establish new programs, together with the renaming of other programs."

At RSMAS, there is widespread support for the restructuring, which basically involves name changes for two of the existing programs and three new programs. The proposed new programs for Marine Ecosystems and Society, Ocean Sciences and Atmospheric Sciences have strong support within their departments for starting them as evidenced by the near unanimous votes of approval they received. Also, there is unanimous support for a new Certificate Program in Applied Carbonate Geology. There is strong support for continuing the existing academic program in Meteorology and Physical Oceanography. It is the full intension of the School to continue other existing graduate programs at least until the last student graduates, and many of the faculty involved have indicated a preference for recruiting into new programs instead of existing programs.

Cc: Dean Avissar, Dr. Sharan Majumdar, Ms. Cassandra Wiggins

UNIVERSITY OF MIAMI
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SCHOOL of MARINE &
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Office of Professional Studies
Rosenstiel School of Marine and Atmospheric Science
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Phone: 305-421-4930 Email: bsoden@rsmas.miami.edu

Memorandum

To: M. Brian Blake, Dean of the Graduate School
Cc: Roni Avissar, Dean of RSMAS

From: Brian J. Soden, Associate Dean for Professional Studies

Date: November 9, 2014

Re: Proposed transferring of the M.P.S. degree programs

The purpose of this memorandum is to indicate our intentions to transfer the degree programs with the RSMAS Master of Professional Science (M.P.S.) from their legacy divisional names to align with the current departmental structure at RSMAS.

There are currently 3 M.P.S. degree programs with a total of 14 tracks in the following divisions: Marine Biology and Fisheries (MBF), Marine Affairs (MAF), Meteorology and Physical Oceanography (MPO). We wish to transfer these programs to coincide with their respective departments where the majority of faculty and courses reside. The attached tables outline the proposed renaming for each of the current tracks.

Faculty in each of the departments where the M.P.S. degrees will reside have been asked to vote on the transfer of the programs The vote in MBE was 13-1 in favor of the transfer; the vote in MES was 8-0 in favor of the transfer; and the vote in ATM was 7-0 in favor of the transfer.

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Memorandum

To: M. Brian Blake, Dean of the Graduate School
Cc: Amy Clement, Associate Dean of Graduate Studies, RSMAS
Roni Avissar, Dean of RSMAS

From: M. J. Olascoaga and William Drennan (Applied Marine Physics Academic Committee)

Date: November 6, 2014

Re: Applied Marine Physics Graduate Program

The Applied Marine Physics (AMP) Graduate Program was housed in the academic division of the same name. On June 1, 2014, as part of the restructuring at RSMAS, the AMP division ceased to exist and all graduate faculty but one became members of the Ocean Sciences department (OCE).

In a vote conducted anonymously by the RSMAS School Council, 6 faculty in the AMP program voted upon and unanimously approved 6-0 the following statement:

"As a faculty member in the AMP program, I support the establishment of the new OCE and ATM graduate programs. My future students will not be recruited into the AMP program. The AMP program will continue to function for existing students until they graduate and/or transfer to the new programs."

M. Josefina Olascoaga

William M. Drennan

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Memorandum

To: M. Brian Blake, Dean of the Graduate School
Cc: Amy Clement, Associate Dean of Graduate Studies, RSMAS
Roni Avissar, Dean of RSMAS

From: Jingfeng Wu, Associate Professor, Department of Ocean Sciences
and Program Director, Marine and Atmospheric Chemistry

Date: November 6, 2014

Re: **Marine and Atmospheric Chemistry Graduate Program**

The Marine and Atmospheric Chemistry (MAC) Graduate Program was housed in the academic division of the same name. On June 1, 2014, as part of the restructuring at RSMAS, the MAC division ceased to exist and all graduate faculty became members of the new Ocean Sciences (OCE) and Atmospheric Sciences (ATM) departments.

In a vote conducted anonymously by the RSMAS School Council, the faculty in the MAC program voted upon and unanimously approved 7-0 the following statement:

"As a faculty member in the MAC program, I support the establishment of the new OCE and ATM graduate programs. My future students will not be recruited into the MAC program. The MAC program will continue to function for existing students until they graduate and/or transfer to the new programs."

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Memorandum

To: M. Brian Blake, Dean of the Graduate School
Cc: Amy Clement, Associate Dean of Graduate Studies, RSMAS
Roni Avissar, Dean of RSMAS

From: Sharanya J. Majumdar, Associate Professor, Department of Atmospheric Sciences and Program Director, Meteorology and Physical Oceanography

S Majumdar

Date: November 6, 2014

Re: Meteorology and Physical Oceanography Graduate Program

The Meteorology and Physical Oceanography (MPO) Graduate Program was housed in the academic division of the same name. On June 1, 2014, as part of the restructuring at RSMAS, the MPO division ceased to exist and all graduate faculty became members of the new Ocean Sciences (OCE) and Atmospheric Sciences (ATM) departments.

Through a meeting of faculty in the MPO program and additional e-mail discussions, the future of MPO in the new programmatic structure was discussed. In a vote conducted anonymously by the RSMAS School Council, the MPO program faculty were polled on the following statement:

"As a faculty member in the MPO program, I support the establishment of the new OCE and ATM programs that are being developed within their respective departments, together with the long-term continuation of the MPO program."

14 faculty supported this statement. 6 faculty did not support this statement.

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Memorandum

TO: M. Brian Blake, Dean of the Graduate School

CC: Roni Avissar, Dean of RSMAS
Amy Clement, Associate Dean of Graduate Studies, RSMAS

FROM: Kenny Broad, Director, Abess Center for Ecosystem Science and Policy

DATE: November 7, 2014

RE: **Support for Marine Ecosystems and Policy M.S. and Ph.D. program**

The proposed Marine Ecosystems and Society (MES) M.S. and Ph.D. Program will complement the current Abess Center program along several dimensions:

(a) it will provide options for Abess Center's advanced undergrad and PhD students for additional courses at the 500 and 600 levels that address human-environment interaction related to use of scientific information to inform policy decisions;

(b) it will likely increase the size of current Abess Center core courses which tend to only have 3-5 PhD students (the courses are required for incoming PhD students only, but would be open to MES PhD students;

(c) The MES program will allow Abess students who want to go into further depth (no pun intended) in linking their research to marine science themes additional opportunities and will allow MES PhD students access to courses in terrestrial and decision science courses that are not part of the MES formal curriculum.

It should also be noted that the Abess Center does not have a master's degree program.

In summary, the MES program would complement the existing Abess Center mission

February 19 2015
To: General Welfare Committee
From: David J. Die Program Director, MAF (on behalf of MES Department Chair who is absent)
Subject: Impact of proposed graduate programs in OCE on existing graduate programs

Summary:

M.S. and Ph.D. programs in Marine Ecosystems and Society are proposed, with the program governed by an academic committee of Graduate Faculty within the department Marine Ecosystems and Society. This program will serve the needs of the students and faculty of that department by providing a challenging and flexible curriculum that encompasses the breath of research areas in the social and ecological sciences related to the marine environment. MES faculty voted unanimously and enthusiastically to support the establishment of this program.

Impact on Existing programs:

Currently, RSMAS offers a PhD program for students interested in fisheries science through the Marine Biology and Fisheries program but it does not offer such possibility to students interested in other aspects of marine resource management research. Such students are limited to an MSc degree within the existing Marine Affairs Program.

The existing MSc program in MAF, however, has traditionally attracted large number of students, many of whom have expressed in the past their interest in pursuing a PhD. A reason behind this demand for a PhD is the increasing number of opportunities for careers in government institutions and NGOs that work in the interface between social and ecological sciences applied to the ocean. Increasingly, graduates are seeking to differentiate themselves in the market by having an interdisciplinary PhD.

The existing Marine Biology and Fisheries program has serviced well students interested in an MSc and PhD in fisheries science as proven by the number of PhD graduates and their professional success. The program, however, has always been constrained by the requirements of a traditional marine biology program. Today's more fishery students are seeking an academic experience that includes social sciences than those that seek other areas of marine biology. The creation of the MES department and the proposal for a new academic program on MES will greatly enhance the opportunities for enhancing the academic experience of such students to match the new needs of the current fisheries professional market place. Faculty in the Marine Biology and Ecology Department, with

interests in fisheries and marine ecology, will also be involved and support the new MES program.

The University of Miami also has a PhD program in Ecosystem Science as part of the Abess Center. Such program, however, has a larger emphasis on land-based ecosystem science and on research in support of ecosystem services derived from land ecosystems. The new MES program will not compete with the Abess center program[1] because of its emphasis on marine resources, moreover, the new program is likely to enhance academic programs at the University of Miami that offer graduate level education in support of natural resource management.

In summary, the proposed MES program will greatly increase opportunities for recruiting graduate students to interdisciplinary research teams in the interface between fisheries, ecology, oceanography, policy, anthropology and economics at both the MSc and PhD level. The program is likely to support in the order of 30 to 40 students and have 15 faculty actively engaged in it. All of the faculty currently in MES or that are planned to be recruited into the department will have one thing in common: an emphasis of translating scientific products into practical management of ocean and coastal natural resources. Such emphasis, highlighted in the department's strategic plan, should ensure the success of the new proposed MES program.

[1] See memo from Abess Center Director

MEMORANDUM

TO: Professor Thomas Salerno (Chair, Faculty Senate)
FROM: Sharan Majumdar (Assoc. Professor and Chair, Academic Committee, Rosenstiel School)
Amy Clement (Professor and Associate Dean of Graduate Studies, Rosenstiel School)
Roni Avissar (Dean, Rosenstiel School)
DATE: January 21, 2015
SUBJECT: **Responses to questions and comments from Senate Chair, Vice Chairs and General Welfare Committee Re: Graduate Program Restructuring at the Rosenstiel School**

Since the package on the restructuring of the graduate programs at the Rosenstiel School was submitted to the UM Graduate School on November 10, 2014, the following meetings have taken place:

- Graduate Council: First Reading held on November 18, 2014.
- Graduate Council: Second Reading held on January 20, 2015. (Program Restructuring Approved)

- Meeting with Senate Chair and Vice Chairs held on December 8, 2014.
- General Welfare Committee (Discussion only) held on January 14, 2015.

Except for the Second Reading of the Graduate Council, Professors Majumdar, Clement and Avissar were present at each meeting. This memorandum serves as a written response to the questions and comments raised at the latter two meetings. We thank the Senate Chair, Vice Chairs, and General Welfare Committee for their questions, and for the opportunity to respond both in person and here in writing.

Q1: Describe the process so far in the development of the programs.

In June 2014, shortly after the Rosenstiel School was reformed into new Departments, Brian Blake (Dean, Graduate School) met with Associate Dean Clement and the Rosenstiel School Graduate Academic Committee (GAC). Dean Blake recommended that the introduction of new programs, closing of some programs, and any changes to existing programs be considered holistically, and submitted as one coherent package at one time as opposed to a series of individual proposals. The timeline of early November 2014 was suggested for the submission to the Graduate School. The GAC, comprising Directors of the existing and proposed new programs, was charged with leading the development of a coordinated package.

Between June and November 2014, each of the Departments met several times to discuss the graduate programs, in formal meetings called by their Chairs. Other informal meetings and in-person and e-mail discussions were initiated by the relevant Program Directors. For the Departments proposing new programs, several drafts of their new program proposals were shared with the Department faculty for comments and suggested revisions. In parallel, the faculty in the individual AMP, MAC and MPO programs also had meetings and were engaged in e-mail discussions across their respective mailing lists. The proposed restructure across the School was presented and discussed at a School-wide faculty meeting on October 10, 2014. Following this, two meetings were held with the Rosenstiel School Council, in which the voting process was formalized. Further meetings were held with the Rosenstiel Leadership Group (comprising the Dean, all Chairs and Associate Deans, and the Vice Chair of the School Council).

The Provost attended one of these Leadership Group meetings and was briefed on the proposed restructure.
All votes were conducted anonymously via e-mail. The Departmental votes were administered by their respective Chairs. The Program votes were administered by the Vice Chair of the School Council, in which only those faculty belonging to the program were eligible to vote. The language in the program votes was determined by the School Council, in consultation with the Program Academic Committees and faculty.

The 5-page cover memo, presented at the front of the full package, was distributed among all Rosenstiel School faculty for comments and revisions. Following the input from faculty and the collection of memos from the Dean, School Council, and all Chairs and Program Directors, the full package was finalized and submitted to the Graduate School on November 10, 2014.

Q2: Describe the process so far with the Graduate School.

The first reading with the Graduate Council was held on November 18, 2014. A presentation of the full package was given, and questions by the Graduate School Dean and Graduate Council were responded to at the meeting. The personnel leading the development of each of the three proposed new M.S. and Ph.D. programs (ATM, MES, OCE) were present to respond to questions.

The second reading with the Graduate Council will be held on January 20, 2015. Graduate School Dean Brian Blake notified us that the program restructuring was all approved, and that a formal memorandum and minor comments would be forthcoming.

The process with PIRA has also been initiated, as per the guidelines on new programs from the Senate.

Q3: Describe the governance process for the new programs.

The new programs will be governed following the UM Faculty Manual and the Bylaws of the Rosenstiel School. In each of the five Departments, the respective program will be led by a Program Director who is appointed by the Department Chair, in consultation with the Department faculty. In an inter-departmental program such as MPO, the Director is appointed by the Associate Dean of Graduate Studies, in consultation with the relevant Department Chairs and the program's faculty. Each program will have its own Academic Committee. All academic matters relevant to most or all of the School will be handled through the Graduate Academic Committee, which will comprise the Directors in each program, as well the Associate Deans of Graduate Studies.

In situations where there is common ground across two or more programs, there will also be careful coordination between the Program Directors and Academic Committees of the respective programs and the relevant Department Chairs when needed. As is done presently in programs that currently share common ground, the programs will collaborate on preparing materials to attract prospective graduate students, and to present at other universities and at conferences. Student applications to different programs will continue to be shared between programs, consistent with the current practice. The coordination of courses, seminars, awards etc. will be conducted by the Program Directors, seminar chairs etc. as is relevant, in consultation with the relevant Department Chairs.

Q4: What is the financial model and impact on the University?

There will be no need for additional financial support from the University.

There will be no proposed changes to the current financial model. The activities of graduate students are supported by graduate tuition income. The following standard models exist for most Ph.D. and M.S. students (there is a little variability for students with Fellowships):

- Ph.D. Students
  - Years 1-3: Annual stipend, tuition, health insurance, conference travel etc. supported on extramurally funded research grant
  - Years 4-5: Student supported by School
- M.S. Students
  - Supported by extramural grants or self-supported

The projected number of M.S. and Ph.D. students is conservatively projected to increase by about 15% by 2021. Therefore, the financial impact on the School is expected to be positive, through increased tuition revenue.

Q5: What is the impact on undergraduate teaching?

There will be no net change to the undergraduate teaching or advising load.

At the Rosenstiel School, there is a need to increase the efficiency of some courses (e.g. those with small class sizes). The proposed programmatic restructure offers the opportunity to restructure both the graduate and undergraduate courses. There are under-utilized faculty resources at the Rosenstiel School to teach, especially in Ocean Sciences who have a large faculty body and no undergraduate program yet.

A few revised or new graduate courses will be made available to suitably qualified senior-level undergraduate students, thereby enhancing the undergraduate program.

The introduction of the new graduate programs will not necessitate a proliferation of new courses, unless there are available faculty resources for teaching. Several courses (such as Geophysical Fluid Dynamics and Climate Dynamics) will be shared by students belonging to the ATM, OCE and MPO programs, thereby enhancing the cohort across the different programs. The faculty teaching resources committed to the existing programs at both graduate and undergraduate level will not be reduced.

Q6: For the two programs that are proposed to be phased out (AMP and MAC), what is the plan for the programs and the current students enrolled in these programs?

The AMP and MAC programs will continue, for as long as students are enrolled in the programs. Each program will remain on the books until after the last student has graduated.

There will be no impact on the current students who elect to remain in the AMP and MAC programs. The relevant core courses will still be taught, and there will be no substantial changes to key elective courses.

All students will be given the opportunity to transfer into the new programs.

Q7: There are currently 3 programs in the physical and chemical sciences (AMP, MAC, MPO), and the proposal is for MPO to continue and for two new programs (ATM, OCE) to be established. What do the new programs bring to the table in addition to what is already offered in MPO?

The inter-departmental MPO program reflects an existing strength at the Rosenstiel School, in which students are educated in the physical processes of both the atmosphere and ocean. There is student demand in this area, and interest from many MPO program faculty in preserving the program with no changes. The new ATM and OCE programs provide the opportunity to expand beyond this scope. For

example, many students are interested in studying either the atmospheric medium or the ocean medium, each of which can be inter-disciplinary in its own right (e.g. chemistry and physics and biology intertwined). Some students prefer a specific focus in only one discipline (e.g. atmospheric dynamics). The expansion of opportunities provided by these new programs is expected to attract a broader range of talented students, together with top faculty applicants. The new programs are also expected to raise the visibility worldwide, through distinctive identities aligned with the departments that students can easily find.

The new ATM and OCE programs will also be aligned with the relevant Master of Professional Science tracks housed in the respective departments, and respectively with the ATM undergraduate program and a future OCE undergraduate program that is under development.

Q8: How is inter-disciplinary education handled within the new programmatic structure?

The MPO program offers an inter-disciplinary education in the physical sciences, across both the atmosphere and ocean. The OCE program will be inter-disciplinary in its own right, with students interested in the physics, chemistry, biology and geosciences of the ocean being able to take a diverse range of courses and organize dissertation committees that span these disciplines. Similarly, students in ATM interested in inter-disciplinary studies of the atmosphere would be able to engage in the physics, chemistry and dynamics of the atmosphere, and opportunities will be provided for them to also engage in atmospheric science policy and other potential disciplines such as communication and sustainability.

Additionally, some scientific areas are inter-disciplinary across several programs. One example is climate. While the student would obtain a M.S. or Ph.D. degree in a 'home' program, meeting the requirements of that program, they would simultaneously engage in a new 'concentration' in climate. This concentration would involve a climate seminar series, an annual Colloquium with invited experts from outside Miami, and recommended courses that expand beyond the student's home program, thereby building a cohort of climate-oriented students in several different core disciplines. For example, a student in the MPO program can take courses on the effects of climate change on coral reefs (MBE) and climate policy (MES), and others if they are interested. Hence, while the programs are proposed to be more cleanly aligned with the departments in the new structure than is presently the case, opportunities for inter-disciplinary studies will be emphasized more formally than is presently being done.

Q9: The vote by MPO program was 14-6 in favor; what was the thinking behind the votes against?

The language in the MPO vote, as recommended by the Rosenstiel School Council, was the following: "As a faculty member in the MPO program, I support the establishment of the new OCE and ATM programs that are being developed within their respective departments, together with the long-term continuation of the MPO program." An interpretation of the six "No" votes could represent a lack of support for the new OCE and ATM programs, or a lack of support for the long-term continuation of the MPO program. Since the voting process was anonymous, the precise interpretation is unknown. There have been numerous faculty meetings (within departments, programs, and RSMAS-wide) in which concerns have been discussed. In particular, the question of overlap between MPO and the two other new programs (ATM and OCE) has been extensively discussed. Moving forward, this concern will be addressed by continuing with our practices of coordination (through the Graduate Studies Office and through the Graduate Academic Committee) among programs that currently overlap (see response to Q3).

Overall, 70% of the faculty in the MPO program were in favor of both the establishment of the new programs and the long-term continuation of the MPO program.

Q10: How will we evaluate the success of the new programs?

The success of the new programs will be evaluated both in the short-term and long-term, comparing against previous years in our programs, and also against comparable national programs.

The number of applicants, and the quality of applicants (via GPA, GRE and undergraduate program strengths) will be evaluated against previous years. For example, the combination of ATM, MPO and OCE applicants from 2016 will be evaluated against AMP, MPO and MAC applicants up to and including 2015. The ratio of students given offers by the programs to students enrolling in the programs will also be assessed. The quality of the students enrolled in the new programs will be monitored each year.

The assessment measures related to the learning outcomes in the annual SACS assessments provide another metric for evaluation, for students at different stages in the program. These measures include: success in the comprehensive and qualifying exams, quality of student seminar presentations, and the quality of the defense. Additionally, the quality and quantity of papers published in the peer-reviewed literature are an important metric, and any prestigious awards won at conferences will also be counted. Finally, the number of students receiving national scholarships and UM fellowships will be documented.

In the long-term, the career paths of M.S. and Ph.D. graduates will be monitored and compared with the career paths of students who have graduated in the past 5 years, whom we have been in contact with. In particular, the ability of our graduates to attain high-profile positions such as a faculty member at a top university, a researcher being a principal investigator of their own funded projects, or an influential figure in science policy will be recorded.

Q11: There is a typo on the third line from the bottom on Page 4 of the cover memo in regard to the number of Ph.D. students expected to be enrolled in MES by 2021. How many students are expected?

From discussions with the MES faculty, a conservative total of about 15 Ph.D. students enrolled in MES by 2021 are expected. The MES program will remain largely comprised of M.S. students, whose body is presently enrolled in the Marine Affairs and Policy M.S. program (about 30).

[End Memorandum]

Voting Process and Results

The Voting Process and Results

School Council Votes

On the advice of the Chair and Vice Chairs of the Senate, a vote on all the different actions was conducted by the Rosenstiel School Council, on behalf of the School. The School Council discussed and voted on the following statement at a School Council meeting on February 3rd, 2015: "I approve the entire package, including all of the individual proposals to establish new programs, together with the renaming of other programs." This statement was **supported 5-0** by the voting School Council members.

Departmental Votes

Voting on the 5 departmental programs was conducted in October 2014, led by the respective department Chair. In the MES, MBE and MGS departments, the votes were conducted and counted at their respective faculty meetings. In the OCE and ATM departments, the votes were conducted via e-mail, in a process organized by their respective Chair. Each faculty member casted their vote anonymously via e-mail to the Secretary. For each of the 5 departments, their Chair reported the results in a Memorandum, contained within this package.

D1. Department of Ocean Sciences (OCE)

- New M.S. and Ph.D. program proposal in Ocean Sciences. **Supported 19-1** (1 abstain)

D2. Department of Atmospheric Sciences (ATM)

- New M.S. and Ph.D. program proposal in Atmospheric Sciences. **Supported 11-0.**

D3. Department of Marine Ecosystems and Society (MES)

- New Ph.D. program proposal in Marine Ecosystems and Society. **Supported 10-0.**
- M.S. program name change from Marine Affairs and Policy (MAF) to Marine Ecosystems and Society (MES). **Supported 10-0.**

D4. Department of Marine Biology and Ecology (MBE)

- M.S. and Ph.D. program name change from Marine Biology and Fisheries (MBF) to Marine Biology and Ecology (MBE). **Supported 14-0.**

D5. Department of Marine Geosciences (MGS)

- Proposal for new Certificate Program in Applied Carbonate Geology. **Supported 8-0.**
- M.S. and Ph.D. program name change from Marine Geology and Geophysics (MGG) to Marine Geosciences (MGS). **Supported 8-0.**

Existing Program Votes

All votes pertaining to the 3 existing programs in the physical and chemical sciences (AMP, MAC, MPO) were conducted by the Rosenstiel School Council between October 30 – November 3 2014. The process and the language of the votes were formalized by the School Council together with the faculty in the respective programs. The proposals for the new OCE and ATM programs were distributed to all faculty in these programs prior to the initiation of the voting, which was held at the same time as the departmental voting. All votes were made anonymously via e-mail to an account handled solely by the Library staff. The Vice Chair of the Rosenstiel School Council reported the results to the Faculty. The results from each program are reported in Memoranda from the respective Program Directors, which are included in this package.

E1. Applied Marine Physics (AMP)

- "As a faculty member in the AMP program, I support the establishment of the new OCE and ATM graduate programs. My future students will not be recruited into the AMP program. The AMP program will continue to function for existing students until they graduate and/or transfer to the new programs."
  Supported 6-0.

E2. Marine and Atmospheric Chemistry (MAC)

- "As a faculty member in the MAC program, I support the establishment of the new OCE and ATM graduate programs. My future students will not be recruited into the MAC program. The MAC program will continue to function for existing students until they graduate and/or transfer to the new programs."
  Supported 7-0.

E3. Meteorology and Physical Oceanography (MPO)

"As a faculty member in the MPO program, I support the establishment of the new OCE and ATM programs that are being developed within their respective departments, together with the long-term continuation of the MPO program."
Supported 14-6.

NOTE: Each faculty member with voting rights in the OCE and ATM departments was eligible to vote only once for their department, and only once for the existing program that they presently belong to. No faculty member voted in more than one department. No faculty member voted in more than one existing program.

Department of Marine Geosciences

9 October 2014

From: Peter Swart, Chairman
Dept of Marine Geosciences

Re: Proposed Degree Program Name Change; Certificate Program

This memo summarizes (1) the proposed name change of the former Marine Geology & Geophysics (MGG) degree programs to Marine Geosciences (MGS) and (2) MGS faculty approval of a certificate program in Applied Carbonate Geology that had been previously offered by MGG under a provision for certificate programs in the RSMAS bulletin. Both were approved by unanimous 8-0 votes at an MGS faculty meeting today.

I. Degree Program Name Change: Marine Geology & Geophysics to Marine Geosciences

For many decades, the former Division of Marine Geology & Geophysics has offered highly regarded M.S. and Ph.D. programs, producing many successful graduates who went on to careers in both academia and industry. With the departmentalization of RSMAS in June 2014, the MGG faculty were preserved intact in the new Department of Marine Geosciences and the pool of course offering in MGS remains as defined in the former MGG. Thus, we request approval for a simple name change of the degree program to Marine Geosciences, to be consistent with the new departmental name. If the name change is approved, the 3-letter course designations would also be changed from MGG to MGS, assuming the MGS designation remains available at UM. (It is not currently used in the UM course listings.)

As in MGG, MGS M.S. and Ph.D. students will continue to be required to meet all degree requirements outlined by the UM Graduate School, any additional school-wide requirements specified by RSMAS, and the following additional requirements specific to the MGG/MGS degree programs:

1. Participate annually in the MGS student seminar course (currently MGG/MGS 601, one credit) and register for it at least once.
2. Attend regularly the weekly MGS Geotopics seminar.
3. Take two out three of the three introductory MGG/MGS courses in Earth System Process, Geochemistry, and Geophysics.
4. Take one course outside of MGG/MGS for credit.
5. For Ph.D. students only, earn a total of 36 course credits, compared to UM and RSMAS requirements for 24 course credits.

II. Certificate Program in Applied Carbonate Geology

In the past, MGG has offered certificates in certain aspects of carbonate geology, mainly to employees of petroleum companies who already have B.S. or M.S. degrees. This has been conducted under a two-sentence provision for in the RSMAS Bulletin for certificate programs that are otherwise not documented properly. To remedy that situation for the MGG/MGS program, the following pages provide full documentation for a formal certificate program in Applied Carbonate Geology, suitable for tuition-paying, degreed industry scientists to fulfill in about six months for professional development purposes.

Department of Marine Geosciences

Proposal to Offer a

Certificate in Applied Carbonate Geology

1. RATIONALE – *Summary of intellectual and academic need for each proposed degree*

Society is greatly in need of groundwater and energy. In Florida, large portions of the aquifer are in limestone, which is a type of porous carbonates. Saltwater intrusions and potential contamination from sewage, gas stations and other industrial facilities and proposed pipelines need to be evaluated by trained geoscientists. Similar problems exist in other parts of the country and the world. Another major challenge is energy. Despite advances in renewable sources of energy, non-renewable oil and gas are still in great demand and new discoveries of these energy sources will be necessary if the demand is to be met. In the last ten years most of the new hydrocarbon discoveries have been in carbonates. As a consequence there is a considerable demand for well-trained carbonate geologists. Yet, opposite to the demand by society, there has been a decline in carbonate geology positions in the United States.

In recognition of these major challenges to society, and given the expertise of a core of faculty at the CSL - Center for Carbonate Research at the Department of Marine Geosciences at RSMAS, we propose a new certificate program targeting both students and geoscientists already working in industry to acquire the necessary skills for solving societal needs in regards to groundwater and energy. Because the Department of Marine Geosciences has several faculty and researchers with expertise in carbonates, the program is expected to attract a large number of students from all over the world. There are no comparable programs offered anywhere in the US. Thus, this certificate program is expected to be highly successful.

a. Exact degree title

- Certificate in **Applied Carbonate Geology**

b. Purpose and goals of the Certificate Program

To advance student's knowledge and understanding of the physical and chemical processes operating in carbonate systems and to apply the knowledge gained regarding these processes to the sedimentary and stratigraphic record. The goal is to provide students and geoscientists with an integrated education in carbonate geology, geophysics and geochemistry and thereby transforming them into experts in carbonates that can tackle and the problems related to

ground water and hydrocarbon accumulations. The certificate program is designed for working professionals who want a specialization in this field. The goal is to provide high first-rate continuing education to such professionals or geology students who want to become specialist in this field. This is not a program for undergraduate students or for MPS students but should be regarded as a high-level continuing education program. Consequently the courses offered in the Certificate Program are all at the 500 and mostly at the 600 level.

c. Level of Demand for the Program

Based on our "market analysis" there is high demand for a Certificate Program rather than a MPS degree, especially from the hydrocarbon industry. The CSL- Center for Carbonate Research had several requests from oil companies to offer a comprehensive advanced carbonate training program for gesoscientists that is at the same time concise and limited in time requirements. It is expected that geoscientists working in the hydrocarbon industry will be sent by their employer to Miami for the certificate program in applied carbonate geology.

i. Job market outlook

The job market for normal graduates in Marine Geosciences is at an all time high, in particular in industry. We expect that this very good outlook would improve even further with the specialization in the field of "Applied Carbonate Geology". Geoscientists and students attending the certificate will gain a specialization that will increase their potential for promotion and/or employment in another company. Because the major discoveries in hydrocarbon exploration in the last decade have been in carbonate strata geoscientists with in depth knowledge of carbonate geology are in high demand by the industry.

ii. Similar programs at other universities

No university offers a similar certificate program. Based on an assessment of the needs in industry such a program would be very welcomed. The CSL – Center for Carbonate Research at the University of Miami is a leading research institution in many aspects of carbonates. This Certificate Program would make it also Center for Education in carbonates.

d. Relationship of proposed program to other cognate fields

The proposed program will be complementary to two programs at the University of Miami:

- **Marine Geosciences (MGS)** – the M.S. and Ph.D. program that is currently being offered at the Rosenstiel School of Marine and Atmospheric Science (RSMAS).
    - **Courses**: Certificate students would take several graduate courses in common with first- and second-year M.S. and Ph.D. students in Marine Geosciences.

- **Seminars and Activities**: Certificate students, M.S. and Ph.D. students would participate together in regular Departmental Seminars, and other activities such as field seminars and core workshops.

e. Relationship of proposed program to undergraduate and professional programs

- **Department of Geological Sciences within the College of Arts and Sciences** – The Department of Geological Sciences offers undergraduate courses in geology with some classes in carbonate sedimentology. The certificate program is a graduate level program and, thus, the undergraduate classes offered in the Department of Geological Sciences are not adequate for the certificate program.

- **No MPS program exists in geology**

2. ***RESOURCES*** *– List and evaluate all of the physical resources available and what will be needed in addition to implement the proposed program.*

a. Library. The current library resources are sufficient for the new program

b. Laboratory Facilities, Equipment and Space

Petrophysics Laboratory

The Petropyhiscs Laboratory contains two pieces of equipment. The Verde Geoscience I is a semi-automatic velocity measurement machine. The Autolab 1000 is an automated machine that allow for the measurement of velocity, resistivity and permeability under variable confining pressure.

Stable Isotope Laboratory

The stable isotope laboratory contains six fully operational stable isotope mass spectrometers, an ICP-OES, an IC, 3 CRDSs, and a XRD. These instruments have been purchased from a mixture of NSF & DOE funding to Swart and co-PIs, University of Miami funds, and private sources.

Seismic Processing and Interpretation Laboratory

The laboratory has several workstations running software programs for both the processing and interpretation of subsurface seismic data. Software packages are maintained with generous academic license agreements. They include Petrel, Geoprobe and the entire Landmark package for interpretation, Kingdome Suite, and Reflex.

GPR laboratory

Near-surface geophysics would be impossible without this laboratory. Ground Penetrating Radar equipment and positioning systems are state of the art.

Neptune Isotope Laboratory

The Neptune Isotope Laboratory (NIL) at the University of Miami – RSMAS is equipped with a 14x16x8 ft clean room enclosure, a 6-ft exhaust hood and two 6 and 8-ft Trace Metal Workstations, providing a class-100 environment for low-blank sample processing and wet chemistry. NIL also includes six 4-6-ft, class-100 vertical and horizontal laminar flow hoods, two Millipore MQ-Reference water purification systems, two Savillex sub-boiling acid distillation units, centrifuge systems, two large-capacity ovens, a muffle furnace capable of sustaining 1200 °C and a micro-balance. Analytical instrumentations at NIL include a state-of-the-art ThermoFisher Neptune Plus Multi-Collector Inductively Coupled Plasma Mass Spectrometer (MC-ICP-MS), which is interfaced with an ESI Apex-Q desolvation nebulizer, auto-sampler and a New Wave Excimer 193 nm Laser Ablation system.

The Geobiology Laboratory

The Geobiology Laboratory (GBL) at the University of Miami (30x20 ft) is designed as a versatile platform supporting a broad range of tasks related to the study of microorganisms in the environment. The major tools of this facility are designed to be implemented as modules applicable to almost any sample type, with a current emphasis on seawater and marine sediments. Available equipment includes a full spectrum of tools enabling the collection, processing, and storage of quality samples for the detection and cultivation of environmental microorganisms.

Computing facilities

All students have access to a nationally leading Center for Computational Science at UM. The high-performance supercomputing facility is used by many students, especially for fluid flow and reservoir modeling.

c. *Other Resources.*

i. *The CSL – Center for Carbonate Research has offered courses in the field of carbonate geology for many years and as a result most resources are in place for a limited number of students. If the number of students starts to increase, additional space for teaching (larger classrooms), computers in the seismic laboratory, and microscopes for petrographic classes will be required.*

The course content requires that several courses are taught or co-taught by scientists working within the CSL – Carbonate Research.

ii. *Estimated cost of the addition of such resources*

The potential costs for additional computers and microscopes will be a small portion of the expected tuition income.
The salaries of the scientists covering specialized topics within the program will depend on the salary class of the scientist. Tuition income will be sufficient to cover these costs.

3. *CURRICULUM*

a. *Major division or divisions of the discipline in which the proposed graduate work will be offered*

Geochemistry
Geophysics
Geo-Microbiology
Sedimentology and Stratigraphy

b. *Evaluation of adequacy of our present undergraduate and graduate curricular structure for the proposed program*

The present undergraduate and graduate curriculum is not specialized enough to fulfill the needs of this Certificate Program. As a consequence, a request for several new courses has been submitted to the RSMAS Academic Committee. After approval of these courses the program can now offer 10 courses (five existing and five new ones).

c. *List of anticipated additions, deletions and changes in current curricular structure resulting from the new program (involved faculty listed for each item)*

Overview

The Certificate Program will require 16 course credits to be taken during the spring semester and 1st Summer Session. The current courses offered at MGS are not sufficient for this requirement and, thus, new courses were designed that cater to the carbonate specialty.

The following courses offered within the existing curriculum of MGS are also offered in the Certificate Program:

MGG 511 3 Cr Earth Surface Systems

MGG 541	2 Cr	Field Evaluation of Fossil Platforms, Margins and Basins
MGG 681	2 Cr	Field Seminar: Facies Successions on Great Bahama Bank
MGG 682	2 Cr	Field Seminar: Heterogeneity of a Windward Margin
MGG 601	1 Cr	Seminar in MGG

For the new Certificate Program the following courses were designed and approved by the RSMAS academic committee.

MGS 6xx	2 Cr	Seismic Interpretation of Carbonate Systems
MGS 6xx	2 Cr	Petrophysics of Carbonates
MGS 6xx	2 Cr	Microbial Carbonates
MGS 6xx	2 Cr	Carbonate Diagenesis and Petrography
MGS 6xx	2 Cr	Carbonate Depositional Systems: Subsurface Analysis in Cores

d. List of current, anticipated, or agreed upon cooperative or interdisciplinary work with other components of the University, or with an extramural agency as pertinent to the proposed program

The Certificate Program will maintain a close link with the existing interdisciplinary MGS program. Several courses will be courses of both MGS and Certificate Programs. Students in the MGS and Certificate Programs will also attend common seminars.

e. Detailed description of the proposed program

Unless otherwise stated, the following description is presented for the two semesters program, in which the Certificate students are expected to be enrolled.

Program Requirements (consistent with a graduate bulletin masthead)

Certificate Degree

- Credit Requirements

  At 16 MGS graduate-level course credits.
- Thesis Committee

  NA.
- Comprehensive Examination

  NA

- Thesis

  NA
- Anticipated program mission and learning outcomes

Mission: "To advance students' knowledge and understanding of the physical, chemical, and dynamic processes that form carbonates. The goal is for certificate graduates to have acquired specialty knowledge in carbonate geology that can be applied to societal needs."

Learning Outcome 1: Students will gain a broad knowledge of carbonate geology and an awareness of how scientific research in their subject areas bears on societal issues.

Learning Outcome 2: Students will learn how to incorporate acquired knowledge and available data and tools into the workflow of applied projects.

Learning Outcome 3: Students will learn oral and written communication skills, and be able to effectively communicate and defend their ideas and findings to peers, managers and administrators.

- Assessment methods (qualitative and quantitative) intended to measure student attainment of learning outcomes

Learning Outcome 1: *Students will gain a broad knowledge of carbonate geology and an awareness of how scientific research in their subject areas bears on societal issues.*

Assessment Measure 1: All students will take several exams during their courses to assess their basic knowledge and ability to convey learned concepts clearly. The Director of the certificate program monitors the exam results with participation from all teaching faculty. A rubric will be used to quantitatively evaluate the student performance on the exams.

Learning Outcome 2: *Students will learn how to incorporate acquired knowledge and available data and tools into the workflow of applied projects.*

- **Assessment Measure 1:** Several of the courses are structured in a way that classroom knowledge is directly used in subsequent laboratory classes and projects. Presenting these projects in front of the class and/or writing a report will help assess the ability to incorporate classroom knowledge into projects.

Learning Outcome 3: *Students will learn oral and written communication skills, and be able to effectively communicate and defend their ideas and findings to peers, managers and administrators.*

- **Assessment Measure 1:** Students are required deliver a 15-minute seminar on a chosen subject, which must be intelligible to non-specialists and explain the objectives and the outcome of the performed work. A written report of the presentation is also required. Other students and faculty rank the presentations. Direct feedback by a faculty member is delivered to each student immediately following their seminar concerning clarity of the report and presentation, quality of visual materials, verbal communication style, and intellectual merit of the presented project.

- Tracks for degree

  NA

Prerequisites, Courses, Examinations, Core courses, Graduate Level Electives, Seminar

- Prerequisites: a bachelor degree or a strong background in geology, as evaluated during the admissions process

- Courses: a variety of graduate level courses are offered.

- Examinations

  Courses will have their own examinations (mid-term and final)

- **Core courses (mostly 2 credits)**

Students are required to take 16 course credits from the following course offerings.

Existing Courses within the MGS

MGG 511	3 Cr	Earth Surface Systems
MGG 541	2 Cr	Field Evaluation of Fossil Platforms, Margins and Basins
MGG 681	2 Cr	Field Seminar: Facies Successions on Great Bahama Bank
MGG 682	2 Cr	Field Seminar: Heterogeneity of a Windward Margin
MGG 601	1 Cr	Seminar in MGG

Approved Special Topics Courses

MGS 6xx	2 Cr	Seismic Interpretation of Carbonate Systems
MGS 6xx	2 Cr	Petrophysics of Carbonates
MGS 6xx	2 Cr	Microbial Carbonates
MGS 6xx	2 Cr	Carbonate Diagenesis and Petrography
MGS 6xx	2 Cr	Carbonate Depositional Systems: Subsurface Analysis in Cores

e. Thesis Research, Additional Coursework, Dissertation

NA

f. Teaching

What kinds of teaching will prevail in the program (i.e. clinical, classroom, independent research, seminars, online etc.), and in what proportion?

The courses are a mixture of classroom teaching but several courses include small research projects or hands-on laboratory work. Three field seminars are offered (MGG 541, 681, 682) that will bring the students in contact with the depositional environments where carbonates form, illustrate their dimensions and the sedimentary product that they will have to recognize in cores and other subsurface data.

g. Expected distribution of graduate students among advisors

NA

h. Colloquia series, special seminars, or conferences that will be held

A weekly seminar series is held each semester within MGS utilizing external speakers, faculty and research staff from UM. In addition students in this program will participate in MGG 601 seminar series where their presentation is evaluated and critiqued by faculty and students of the department.

i. Learning Outcomes Assessment Plan (Appendix B)

4. FACULTY

a. Complete C.V. for each member of the department who will participate in each program. (Appendix C)

All the faculty members in the Department of Marine Geosciences have a Ph.D. as their terminal degree.

Faculty Member	*Field*	*Rank*
Peter Swart (Chair)	Carbonate Geochemistry	Professor
Gregor Eberli	Seismic Sequence Stratigraphy	Professor
James Klaus	Paleoecology, Geomicrobiology	Associate Professor
Donald F. McNeill	Dynamics; transport and mixing processes	Scientist

Mara R. Diaz	Molecular and Geomicrobiology	Associate Scientist
Greta McKenzie	Petrography	Associate Scientist
Ralf J. Weger	Petrophysics	Associate Scientist

b. Estimate the need for additional faculty, including in each instance

i. Specialization desired

Several fields of specialization are not covered by the existing faculty within MGS but are available within the scientist pool at the CSL – Center for Carbonate Research. All scientists have an accomplished research career and possess all of the qualifications for teaching the courses. If the program is as successful as anticipated, other faculty lines might be required.

ii. Degree of experience desired

The potential new positions need to be filled with people with abundant expertise in the field of carbonate geology to guarantee the high standard of the program.

iii. Salary anticipated

Teaching is part of the duties of the faculty members and no additional salary is needed for them. It is expected that the school pay a portion of the salary of the scientists for their teaching effort, i.e. 1 – 2 Cr per year.

c. Interaction of proposed program with other graduate programs, e.g. thesis and dissertation committees.

Courses: As indicated above, the Certificate Program will have linkages with the MGS program in terms of common courses taught.

Committees: The Certificate Program will not require committees for the students, as it is course and laboratory based program.

Seminars: Students in the Certificate Program will be required to attend field seminars as part of their degree.

Concentrations: Two inter-disciplinary concentrations (Groundwater, Energy) are being developed, and are listed in the MGS program at the Rosenstiel School.

5. STUDENTS

a. *Estimated number of students in the program and the pool from which they will be selected*

At the beginning about 10 students are expected to join the program but it is anticipated that the number will increase to a total number of about 30 students.

The students will be selected from a worldwide pool sourced both in academia and industry. The program is designed to attract students and geoscientists who need a specialization in carbonate geology. We expect that most of the students in the program will be sent and supported by their employers.

b. *Requirements for admission to and expected retention of students in the proposed program*

The students will be required to have a bachelor degree or equivalent degree. This requirement can be offset by years of working experience. No GRE or TOFL are required, yet common knowledge of English is required.

c. *Anticipated need for and specific use of teaching assistants and research assistants in the program. Include the number and estimated stipends for each assistant (indicate stipend level and whether 9-month or 12-month).*

The students in this certificate program will not receive stipend. Teaching assistant needs will be covered by the students within the MGS program.

6. ADMINISTRATION

a. *Estimated administrative increments imposed by addition of this program*

i. *Need for administrative help*

The Graduate Studies Office will provide administrative support for the program on: recruitment, admissions, student academic tracking, course and classroom coordination, interactions with the UM graduate school. Additional administrative help is expected to be handled by the departmental Administrative Assistant.

ii. *Need for additional office equipment and supplies*

Office equipment and supplies will be in the departmental budget. These are not expected to exceed the corresponding budget for the existing programs.

iii. Need for additional travel, publication, costs and other funds

The budget for student recruitment is currently handled by the School. If recruitment duties are instead delegated to the department, then an additional budget would be necessary for recruitment. The budget would need to cover additional staff time to conduct a variety of activities: these include communication with prospective students in the certificate program, preparing materials, frequently updating the web site, and giving presentations at universities and companies for recruitment.

Arrangements for administration and for academic direction of the program as it pertains to

iv. The day-to-day administration of the program.

The day-to-day administration and oversight of the certificate program will be provided by the program director, who will be appointed by the department chair. The director and chair will coordinate the program with the faculty and lecturers in the courses offered in the program. Among the duties of the director are the following:

- Coordinate the courses in the program
- Coordinate faculty teaching responsibilities within the program with the department chair
- Communicate to students in the program (e.g., career development opportunities)
- Maintain office hours or availability by appointment with students
- Coordinate recruitment activities for the program
- Collect progress reports
- Review the student evaluations of courses in the program; communicate outcome of review to students and faculty
- Coordinate the admissions for the program
- Sign the form for admission of new students into the program prior to final approval by the delegated associate dean.
-

v. The academic policy-making mechanisms used to implement the program, including criteria for membership in the faculty of the program.

The program director and steering committee are responsible for proposing policies in the program. The general academic policies will follow the UM graduate handbook, followed by the RSMAS graduate handbook. Any policies that are not covered in these handbooks will be voted upon by the faculty involved in the program.

7. BUDGET (three-year)

Provide a three-year projected budget commencing with the year the program gets under way. Each year's budget should include all anticipated income (use current year tuition credit costs and projected overhead) and all anticipated incremental costs, e.g. new faculty with fringe, library additions, teaching assistantships, laboratory equipment, staff, travel funds, etc.

The budget in the table is for 10 students, estimated to be the average number of students in the first three years.

Certificate PROGRAM	**FY 2015**	**FY 2016**	**FY 2017**
Tuition INCOME	286400	286400	286400
Administrative Expenses			
Supplies, Computers	2000	2000	2000
Recruiting, Publications,	2000	2000	2000
Salary	40000	40000	40000
Total Expenses	44000	44000	44000
Total Program Profit	242400	242400	242400

8. ***COMPARISONS*** – Compare the proposed program at the University of Miami with five high-quality, established programs at comparable universities. In the comparisons, include only the sections and subsections from items #1 through #7 above that are appropriate.

No comparable program exists in the United States or elsewhere.

9. ***Online and distant degree and certificate programs only***

This Certificate Program is incorporated within the MGS graduate program with students being in residence at RSMAS. Consequently the instructional support, and all the benchmarks for the graduate program are followed.

Instructional support benchmarks
Course development benchmarks
Teaching/learning benchmarks
Course structure benchmarks
Student support benchmarks
Faculty support benchmarks
Evaluation and assessment benchmarks

10. **Transfer of coursework to graduate degree programs**

a. *Indicate if the courses taken in the Certificate Program can be substituted for courses in a graduate degree program.*

A course taken in the certificate program can be substituted for courses in the MGS graduate program. The courses offered in the Certificate program are offered to all students in the MGS graduate program.

b. *Indicate if the courses can be transferred to a graduate degree program after the certificate is completed.*

If a student in the Certificate Program is accepted into the M.S. or Ph.D. program in MGS, then they will be able to transfer the credits from the MGS graduate courses that they had already taken during their tenure within the Certificate Program.

APPENDIX A: Syllabus for each course

APPENDIX B: Learning Outcomes Assessment Plan

APPENDIX C: Complete CV of each faculty member who will participate in the program