Program Requirements

Required Courses

		Hours
MAR 501	Biological Oceanography	3
MAR 501L	Biological Oceanography Laboratory	1
MAR 541	Marine Chemistry	3
MAR 541L	Marine Chemistry Laboratory	1
MAR 561	Physical Oceanography	3
MAR 561L	Physical Oceanography Laboratory.	1
MAR 581	Geological Oceanography	3
MAR 581L	Geological Oceanography Laboratory	1
MAR 689	Seminar in Marine Science	2
MAR 898	Dissertation	12
	Approved Electives	12*

*MAR 691, MAR 791 - Directed Research in Marine Science, MAR 697, MAR 797- Independent Study and Research, MAR 698 - Thesis and MAR 898 - Dissertation, do not count toward this twelve (12) credit hour approved elective requirement for the Ph.D. The above courses account for forty-two (42) of the total fifty-four (54) hours (students entering with a master's degree) or eighty-four (84) hours (students entering with a bachelor's degree) required for the Ph.D. Course listings for the additional 12-42 required hours can be obtained by writing to the department chair.

Other Requirements

1. The student is required to pass an oral or written qualifying examination or both.
2. Research tool(s) requirement for marine science doctoral students is tailored to the specific tools and skills needed by the student for his/her dissertation research or future career. Contact the department for specific requirements.
3. Selection and approval of a suitable research problem.
4. The student is required to pass an oral or written comprehensive examination to determine the student's comprehension of course material and the student's ability to pursue the proposed research.
5. Completion and successful defense of a scholarly dissertation based on the student's original research. (12 hours of 898 are required)
6. A 3.0 GPA is required for graduation.
7. Residency. Students must meet the residency requirements specified in the *Bulletin.*
8. In addition to the degree program requirements described in this *Bulletin*, all students in the Ph.D. degree program must accumulate at least ten (10) days of appropriate field experience in order to successfully complete the degree program. Contact the department chair for information on appropriate types of field experience.
9. Continuous enrollment - Students must meet the requirement specified in the front section of this *Bulletin*.

Department of Mathematics

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The Department of Mathematics offers the master of science in mathematics and the doctor of philosophy in computational science with an emphasis in mathematics. Individuals interested in obtaining graduate degrees in mathematics education should contact the Center for Science and Mathematics Education. The Center offers the master of science in science and mathematics education with an emphasis in mathematics, and the doctor of philosophy in science education with an emphasis in mathematics.

Admission Requirements

Applicants wishing to enter either the master of science in mathematics degree program or the doctor of philosophy in computational science with an emphasis in mathematics degree program must satisfy the requirements of The Graduate Studies Office. Among those factors considered in the admission decision are the GPA, submission of test scores on the GRE, and three letters of recommendation from persons qualified to assess the candidate's readiness for graduate study. Letters should be sent to the department. Students whose native language is not English must achieve a score of 580 or above on the TOEFL exam.

Plan of Study. Students must submit their signed, official *Plan of Study Form* to the Graduate Studies Office by the end of the **first semester** they are enrolled. The *Plan of Study Forms* are available at **www.usm.edu/graduatestudies - click on "Current Students" and then the "Plans of Study" link.**

Master of Science in Mathematics

Program Requirements

Upon completing one semester of graduate work, the student should select a three-person advisory committee from the graduate faculty. The student, with the help of his or her academic adviser, should prepare an Application for Approval of Graduate Program form. The advisor will distribute copies to the graduate faculty, the student's advisory committee, the department chair, the departmental file, and the student. The department chair and all three committee members must approve subsequent changes in the program.

The student must enroll in the two-semester advanced calculus sequence at the graduate level at the beginning of the graduate program if the equivalent of this sequence was not included in the student's undergraduate preparation. None of these courses can satisfy any part of the minimum hour requirements for the master's degree, and a grade of B or above must be earned in each of the two courses.

The following minimal requirements must be included in the program.

1. 30 hours of graduate coursework beyond the equivalent of a Southern Miss undergraduate degree in mathematics;
2. 21 hours of courses numbered above 600;
3. 18 hours of mathematics courses numbered above 600;
4. 3.0 GPA for graduation; and
5. a comprehensive examination.

NOTE: Subject to approval of the department chair and the student's advisory committee, an outside minor consisting of nine (9) semester hours may be used as a portion of the 30-hour program.

Courses offered by the department are grouped into nine areas. The student with the help of his or her academic adviser should select a suitable balance in at least three of the nine areas.

Nine Specialty Areas

1. Topology/Geometry: 572, 575, 601, 683
2. Complex Analysis: 536, 636, 682
3. Algebra: 521, 523, 524, 603, 681
4. Linear Algebra: 526, 610, 681
5. Analysis and Probability: 520, 641, 642, 682, 684
6. Conbinatorics and Graph Theory: 537, 539, 629
7. Computational Mathematics: 560, 561, 610, 684, 685
8. Differential and Partial Differential Equations: 515, 517, 605, 606, 684, 685
9. Optimization: 518, 519, 684, 685

The focus of the master's program is computational mathematics. This is reflected in its course scheduling. The courses 560, 561, (area 7); 526, 610, (area 4); and 605, 606 (area 8) are scheduled biannually. Thus, these courses can form the core (three areas) for most, if not all, students. However, areas other than these three are offered in response to the interests and research of the graduate faculty.

Each candidate for the master's degree will be expected to demonstrate subject matter mastery on the master's comprehensive examination. For the non-thesis student, the master's comprehensive examination is a written examination, it must be successfully completed two weeks prior to graduation, and it will cover the content of two courses (selected by the advisory committe in consultation with the student) from each of the student's three areas of specialization. For the thesis student, the master's comprehensive examination is an oral examination that will be primarily a defense of the thesis.

The student who desires to write a thesis must selct a graduate faculty member who agrees to serve as thesis director. Prior to beginning the thesis, a student must submit (for approval to his or her advisory committee) a prospectus, the guidelines for which are available in the departmental office.

Summary of Important Events for the Thesis Option

1. Arrange for a graduate advisor during the second semester;
2. Gain approval of a written thesis prospectus from the master's advisory committee by the end of the second semester;
3. Pass a comprehensive examination and successfully defend the thesis by the end of the fourth semester; and
4. Continuous enrollment - Students must meet the requirement specified in the front section of this *Bulletin*.

Doctor of Philosophy Degree: Computational Science (Mathematics Emphasis)

Plan of Study. Students must submit their signed, official *Plan of Study Form* to the Graduate Studies Office by the end of the **second semester** they are enrolled. The *Plan of Study Forms* are available at **www.usm.edu/graduatestudies - click on "Current Students" and then the "Plans of Study" link.**

Program Requirements

Students must complete the nine-hour core: MAT 771 (Functional Analysis for Computational Science), MAT 772 (Numerical Analysis for Computational Science), and MAT 773 (Signal Analysis for Computational Science). They must also complete the techniques courses (COS 701, 702, 703), and include four hours of Seminar (COS 740).

Students must meet the general requirements set forth by The Graduate Studies Office: 54 hours beyond a masters and 84 hours beyond a bachelor's degree. A 3.0 GPA is required to graduate. For students entering the program with only a bachelor's degree, successful completion of the master of science in mathematics is required. The following are additional requirements:

1. Pass the comprehensive examination by the end of the sixth semester covering the core courses;
2. Gain approval of a written prospectus from the doctoral advisory committee by the end of the fourth semester and pass qualifying examination on research prospectus;
3. Research Tool(s): Research tool(s) are required and will be determined by the student's doctoral committee;
4. Successfully defend the dissertation by the end of the sixth year;
5. Fulfill the research tool requirement as specified by the doctoral advisory committee and approved by the department chair.
6. Continuous enrollment - Students must meet the requirement specified in the front section of this *Bulletin*.
7. Residency: Students must meet residency requirements set forth in the front of this *Bulletin*.

Department of Physics and Astronomy

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The Department of Physics and Astronomy offers or participates in programs leading to the Master of Science in Physics and the Doctor of Philosophy in Computational Science with an emphasis in Physics. At the master's level, the department offers a traditional master's program in physics as well as emphasis areas in computational science and polymer science. At the doctoral level, the department participates in the Computational Science Ph.D. program.

Admission Requirements

All applicants must satisfy the admission requirements of The Graduate Studies Office as outlined in the *Graduate Bulletin*. Admission to graduate programs in physics is based upon several factors including a student's previous academic performance, recommendation letters (minimum of three), and scores on the Graduate Record Examination (GRE). Letters of recommendation should be from persons qualified to assess the applicant's readiness for graduate study and should be sent to the physics department. A minimum TOEFL score of 540 on the paper-based examination or 207 on the computer-based examination is required of those applicants for whom English is not their native language. It is recommended, but not required, that students applying for a stipend take the Advanced Physics GRE.