

# MARINE SCIENCE, MS

The Master of Science (MS) in Marine Science is a research-intensive degree designed to prepare students for careers in marine science or further training in preparation for pursuing a PhD in the biological or marine sciences. Students are required to conduct their own independent research while participating in either the Plan I (with thesis) or Plan II (without thesis) degree tracks leading to the MS in Marine Science. Plan I is the traditional track in which students are required to perform independent research and submit a formal thesis formatted to university guidelines and give a public defense of the thesis. Plan II also requires independent research and the completion of a Capstone Experience Research Report, as well as a formal defense of the research. Students in the marine science program may either have primary mentors who are located at the University of Alabama campus in Tuscaloosa, AL or University of Alabama faculty who are primarily located on the coast at the Dauphin Island Sea Lab campus in Dauphin Island, AL.

## Admissions

See the Admission Criteria section of this catalog for more information.

## Curricular Requirements

Each candidate will be guided by an Advisory Committee consisting of at least three members, at least one of whom is a qualified member of the Biological Sciences faculty resident on the UA Tuscaloosa campus. All members of a Plan I M.S. Advisory Committee must be members of the Graduate Faculty and exactly one member must be from outside the student's major department and may be from another institution. For Plan II M.S. degree-seeking students, all Advisory Committee members may be Graduate Faculty in the Department of Biological Sciences or no more than one Advisory Committee member can be from outside of the department and University. The Department Chair is a non-voting, *ex officio* member of all graduate student Advisory Committees.

A student's program at the M.S. level must provide sufficient association with the resident faculty to permit individual evaluation of the student's capabilities and achievements. The student's Advisory Committee, with the approval of the Department Chair, will determine residency requirements.

Each student, upon completion of the coursework and thesis or capstone experience, will present a faculty- and peer-reviewed seminar on the thesis content. Additionally, the Advisory Committee will administer a final oral examination. The master of science in marine science degree requires at least 30 hours of graduate credit. Both Plan I and Plan II are acceptable. Additional information is in the Degree Requirements section of this catalog.

## Thesis - Plan I

Code and Title	Hours
<b>Required Courses</b>	
BSC 505 Intro to Grad Studies	2
BSC 601 Biological Sciences Seminar or DISL Marine Science Seminar	1
<b>Thesis Courses</b>	
BSC 599 Thesis Research	6
<b>Marine Science Electives Courses</b> <sup>1</sup>	21
Elective Options include UA and Dauphin Island Sea Lab Courses	
<b>Total Hours</b>	<b>30</b>

## Additional Requirements:

- 24 credit hours other than BSC 599 Thesis Research, including:
- At least 19 credit hours with a letter grade (i.e., not Pass/Fail)
- A maximum of 6 credit hours with a letter grade may be taken from BSC 507 Research Tech In By and/or BSC 607 Adv Research Tech In By combined
- Up to 5 hours of Pass/Fail credit can be applied toward fulfillment of degree requirements. Pass/Fail hours can include up to a total of 4 credit hours of BSC 601 Biological Sciences Seminar or the Marine Science seminar series held at the Dauphin Island Sea Lab.
- Of the 30 required credit hours, 18 must carry the BSC or MS designation.

## Non-Thesis - Plan II

Code and Title	Hours
<b>Required Courses</b>	
BSC 505 Intro to Grad Studies	2
BSC 601 Biological Sciences Seminar	1
<b>Marine Science Elective Courses</b> <sup>1</sup>	27
<b>Total Hours</b>	<b>30</b>

## Additional Requirements:

- At least 25 credit hours with a letter grade (i.e., not Pass/Fail)
- A maximum of 6 credit hours with a letter grade may be taken from BSC 507 Research Tech In By and/or BSC 607 Adv Research Tech In By combined
- Up to 5 hours of Pass/Fail credit can be applied toward fulfillment of degree requirements. Pass/Fail hours can include up to a total of 4 credit hours of BSC 601 Biological Sciences Seminar or the Marine Science seminar series held at the Dauphin Island Sea Lab.
- Of the 30 required credit hours, 18 must carry the BSC or MS designation.
- BSC 599 Thesis Research may not apply toward this degree

## <sup>1</sup>Plan I and Plan II Electives

Marine Science Electives	Hours
BSC 507 Research Tech In By	
BSC 511 Phage Discovery Laboratory	
BSC 512 Limnology	
BSC 516 Disease Ecology	
BSC 517 Environmental Modeling	
BSC 519 Evolutionary Genomics	
BSC 520 Principles Of Systematics	
BSC 521 Pers Gen Med	
BSC 526 Computational Biology Lab	
BSC 528 Biology Of Fishes	
BSC 530 Introduction to Pharmacology	
BSC 534 Plant Systematics	
BSC 535 Immunology	
BSC 539 Bch/Molecular Biology Lab	
BSC 541 Developmental Biology	
BSC 542 Integrated Genomics	
BSC 544 General Virology	

BSC 548	Animal Behavior
BSC 549	Endocrinology
BSC 550	Fundamentals of Biochemistry
BSC 551	Bch/Molecular Biology II
BSC 553	Biochemistry Lab
BSC 555	Chemical Ecology
BSC 556	Microbial Ecology
BSC 558	Drug Discovery Laboratory
BSC 564	Biology Of Algae
BSC 565	Principles Of Toxicology
BSC 570	Prin Pop Genetics
BSC 571	Plant Physiology
BSC 573	Bioinformatics
BSC 581	Adv Biostatistics with R
BSC 582	Conservation Biology
BSC 583	Evolution
BSC 585	Found Forest Res and Conserv
BSC 598	Non-Thesis Research
BSC 607	Adv Research Tech In By
BSC 656	Microscopical Techniques
BSC 675	Global Change Biology
BSC 695	Spec Topics Biolog Sci

#### Dauphin Island Sea Lab Electives

Advanced Analysis for Ecological Sciences
Advanced Marine Ecology
Anthropogenic Impacts on Coast
Biological Oceanography
Chemical Oceanography
Coastal Fisheries Ecology
Coastal Processes
Environmental Toxicology
Field Marine Science
Geological Oceanography
Marine Conservation Biology
Marine Ecosystem Modeling
Marine Resources Management
Marine Sediment Ecology
Marine Trophic Processes
Ocean Variability and Global Change
Oceanographic Experiences
Physical Oceanography
Physiology and Ecology of Marine Microalgae
Quantitative Methods in Fisheries & Ecology
Scientific Communication
Sediment Biogeochemistry
Stable Isotope Ecology
Marine Science Seminar

## Transfer Credit

See information on transfer credit.

## Accelerated Master's Program

See information on the Accelerated Master's Program.

## Comprehensive Exams

**Plan I:** All students must pass a final oral examination (defense) related to their thesis. Final oral examination questions may also include other subjects beyond the student's research that the M.S. Advisory Committee or other faculty consider relevant. Final oral examinations for the M.S. Plan I must be taken **not less than six weeks prior** to the proposed graduation date (Note: This deadline does not include time required for revision of the thesis after the defense). The outside member of the student's committee must attend and participate in the final defense; this may be a virtual presence if the member can see and hear the presentation and actively participate in questioning of the candidate. All students are required to notify the departmental office of their final oral examination 14 days prior to the exam and provide a copy of their thesis for public display.

All departmental faculty members have the right to attend the final oral defense, and have the right to ask questions of the student that are relevant to the goals of the examination. Only faculty on the student's Advisory Committee may vote on whether the student has passed or failed the examination.

**Plan II:** All M.S. Plan II students must pass a final oral examination related to their research or literature survey topic. Final oral examination questions may also include other subjects beyond the student's research that the M.S. Plan II Advisory Committee or other faculty members consider to be relevant. Final oral examinations must be taken not less than two weeks prior to the proposed graduation date. All committee members must attend and participate in the oral examination, either in-person or virtually as long as the committee member can see and hear the presentation and actively participate in questioning of the candidate. All students are required to notify the departmental office of their final oral examination 14 days prior to the exam and provide a copy of their research report or literature survey for public display.

All departmental faculty have the right to attend the oral examination, and have the right to ask questions of the student that are relevant to the goals of the examination. Only faculty on the student's Advisory Committee may vote on whether the student has passed or failed the examination.

## Plan I- Thesis Process Requirements

**M.S. Plan I Advisory Committee:** A student must form a M.S. Advisory Committee prior to their first annual review meeting. The first committee meeting is to be held after completion of the first semester of studies (by January 31st for students entering in the fall semester and by June 30th for students entering in the spring semester) to evaluate progress toward a degree. In subsequent years of study, the committee will meet prior to December 15th to review progress during the previous academic year. It will also meet as needed to administer the final presentation, and to examine and approve the thesis.

**M.S. Research Proposal:** A formal research proposal is required and should be completed by the end of the student's second semester in the program. This proposal should include:

1. A full but concise statement of the specific goals of the research.
2. A review of the relevant literature to place the proposed work in a solid theoretical context.
3. A discussion of the significance of the proposed research and how it addresses a novel question.

4. A description of the experimental design, including experimental methods, procedures, and methods used in analysis and interpretation of results.
5. Literature citations.

The M.S. Advisory Committee can establish additional requirements such as page length and format. The proposal should be submitted to and approved by the student's M.S. Advisory Committee no later than the end of the student's second semester enrolled in the Graduate Program. A new proposal will be required if the thesis research changes significantly.

**Research Expectations:** A formal thesis, prepared in accordance with university regulations, is required. The thesis shall be based upon research approved by the student's M.S. Advisory Committee and conducted under the supervision of the major professor.

**Formal Departmental Seminar and Final Oral Defense:** In addition to participation in the departmental research symposiums, a publicly announced final formal departmental seminar concerning the student's research is required. The seminar is scheduled immediately preceding the final oral examination. All students are required to notify departmental office personnel of the date, time and room location of their formal seminar a minimum of **14 days prior to the seminar**. A title and an abstract must be submitted to the departmental office at the time of seminar notification so that a public announcement can be made. In addition, a copy of the final draft of your thesis must be made available in the departmental office for those wishing to review it.

All students must pass a final oral examination (defense) related to their thesis. Final oral examination questions may also include other subjects beyond the student's research that the M.S. Advisory Committee or other faculty consider relevant. Final oral examinations for the M.S. Plan I must be taken **not less than six weeks prior** to the proposed graduation date (Note: This deadline does not include time required for revision of the thesis after the defense). The outside member of the student's committee must attend and participate in the final defense; this may be a virtual presence if the member can see and hear the presentation and actively participate in questioning of the candidate.

All departmental faculty members have the right to attend the final oral defense, and have the right to ask questions of the student that are relevant to the goals of the examination. Only faculty on the student's Advisory Committee may vote on whether the student has passed or failed the examination.

## Plan II- Non-Thesis Process Requirements

**M.S. Plan II Advisory Committee:** A student must form a M.S. Advisory Committee prior to their first annual review meeting. The first committee meeting is to be held after completion of the first semester of studies (by January 31st for students entering in the fall semester and by June 30th for students entering in the spring semester) to evaluate progress toward a degree. In subsequent years of study, the committee will meet prior to December 15th to review progress during the previous academic year. It will also meet as needed to administer the final presentation, and to examine and approve the culminating Capstone Experience.

**Culminating "Capstone" Experience:** In addition to earning a minimum of 30 semester hours of credit, candidates for the M.S. Plan II degree are required to complete one or more of the following:

**A. Non-thesis research project.** This requirement is met by completing a research project under the supervision and to the satisfaction of the student's M.S. Plan II Advisory Committee. The M.S. Plan II Advisory Committee determines the nature and

extent of the research project. The student must prepare a report, present a public seminar, and pass an oral examination on this research. The oral exam will take place immediately following the public seminar. The research report must be submitted to the M.S. Plan II Advisory Committee for review at least 14 days prior to the public seminar and oral exam. In addition, a copy of the research report must be submitted to the department office and the public defense announced at least 14 days prior to the seminar and exam date. Students selecting this option may apply up to 6 hours of BSC 507/607 and up to 5 hours of BSC 598 toward fulfillment of requirements for the degree.

**B. Research practicum.** This requirement is met by earning 6 credit hours of BSC 507 (Research Techniques in Biology) under the supervision and to the satisfaction of the student's M.S. Plan II Advisory Committee. The M.S. Plan II Advisory Committee determines the nature and extent of the BSC 507 research project. Examples of research practicum experiences include, but are not limited to, conducting research in the M.S. Plan II Advisor's laboratory, at a regional research center (e.g., HudsonAlpha Institute for Biotechnology, Joseph W. Jones Ecological Research Center), or at a national lab (e.g., National Institutes of Health). The student must prepare a report, present a formal public seminar, and pass an oral exam on the research experience. The oral exam will take place immediately following the public seminar. The research report must be submitted to the M.S. Plan II Advisory Committee for review at least 14 days prior to the oral exam. In addition, a copy of the research report must be submitted to the Department office and the public seminar and exam announced at least 14 days prior to the date. Students selecting this option may apply up to 6 hours of BSC 507/607 toward fulfillment of requirements for the M.S. Plan II degree. BSC 598 may not be applied toward fulfillment of requirements for the degree under this option.

**C. In-depth topical literature survey.** Students selecting this option must prepare a formal paper and pass an oral exam on a research topic approved by the M.S. Plan II Advisory Committee. Students selecting this option may not apply BSC 507, BSC 598, BSC 607, or BSC 698 toward fulfillment of requirements for the degree.

**Culminating "Capstone" Experience Proposal:** A formal Capstone Experience proposal is required and should be completed by the end of the student's second semester in the program. This proposal should include a full but concise statement of the specific goals of the Capstone Experience. M.S. Plan II option A candidates must also include in their proposals the following:

1. A full but concise statement of the specific goals of the research.
2. A review of the relevant literature to place the proposed work in a solid theoretical context.
3. A discussion of the significance of the proposed research and how it addresses a novel question.
4. A description of the experimental design, including experimental methods, procedures, and methods used in analysis and interpretation of results.
5. Literature citations.

The M.S. Advisory Committee can establish additional requirements such as page length and format. The proposal should be submitted to and approved by the student's M.S. Advisory Committee not later than the end of the second semester. A new proposal will be required if the thesis research changes significantly.

**Formal Departmental Seminar (M.S. Plan II Options A and B only):** In addition to participation in the departmental research symposiums, a publicly announced final formal departmental seminar of the student's research is required for students selecting M.S. Plan II Options A and B. The seminar is scheduled immediately preceding the final oral examination. All students are required to notify departmental office personnel of the date, time and room location of their formal seminar and exam a minimum of **14 days prior to the date**. A title and an abstract must be submitted to the departmental office at the time of defense notification so that a public announcement can be made. In addition, a copy of the final draft of your written report must be made available in the departmental office for those wishing to review it. The report copy will be kept at the front desk during the 2-week period. When you deliver your draft to the office, you will be required to enter it into a logbook that will be kept in the office. Failure to meet any of these requirements will result in a delay of the Plan II M.S. defense.

**Final Oral Examination:** All M.S. Plan II students must pass a final oral examination related to their research or literature survey topic. Final oral examination questions may also include other subjects beyond the student's research that the M.S. Plan II Advisory Committee or other faculty members consider to be relevant. Final oral examinations must be taken not less than two weeks prior to the proposed graduation date. All committee members must attend and participate in the oral examination, either in-person or by electronic means (e.g., Skype). All students are required to notify the departmental office of their final oral examination 14 days prior to the exam.

All departmental faculty have the right to attend the oral examination, and have the right to ask questions of the student that are relevant to the goals of the examination. Only faculty on the student's Advisory Committee may vote on whether the student has passed or failed the examination.

**For M.S. Plan II as a transitional degree (pre-Ph.D.):** In order to qualify for the M.S. degree, Ph.D. students must fulfill all requirements of the M.S. Plan II culminating "Capstone" experience option A, namely (i) submit a written report detailing the research experience, (ii) present a formal departmental dissertation and (iii) pass a final oral examination. Research applied toward fulfillment of the M.S. Plan II degree requirements may not be applied toward fulfillment of requirements for the Ph.D. degree.

## Time Limits for Degree Completion Requirements

See information on time limits for degree completion.

## Student Progress Requirement

**Annual Progress Review:** First year students must meet with their committee after completing the first semester of studies (by January 31st for students entering in the fall semester and by June 30th for students entering in the spring semester) Subsequently, each graduate student will meet annually prior to December 15th with her/his M.S. Advisory Committee for the purpose of reviewing the student's progress toward a degree during the previous academic year. The student is expected to make a formal presentation to the Advisory Committee during the annual meeting that includes a description of progress made with respect to research and completion of other degree requirements.

This evaluation will result in a "Pass", "Probationary pass", or "Fail". Guidelines for these rankings are given below:

- **Pass:** The graduate student is making satisfactory research progress commensurate with their time in the program, has maintained at least a 3.0 cumulative GPA, and has met other requirements of the program (e.g., formed a committee, presented a research proposal, etc.) in a timely manner.
- **Probationary Pass:** The graduate student has fallen behind schedule with respect to such requirements as formation of a committee, literature search and submission of a research proposal, scheduling and taking required examinations (for PhD students only), writing of the thesis or dissertation etc. (see degree timeline), or little or no research progress has been made since the last annual review. It may apply to a student receiving a grade lower than a B in a course during the previous year even though the (overall cumulative) GPA is 3.0 or higher. Committees awarding a Probationary Pass for students who have fallen behind schedule must provide a written rationale to the Graduate Committee and the Department Chair in the annual committee report, including clearly defined milestones or benchmarks the student must reach in order to bring their performance up to standard. The student must submit a remediation plan to their committee members addressing the concerns of the committee, including procedures for how milestones and benchmarks will be met, as well as a timeline, within two weeks of notification of their Probationary Pass. This plan must be signed by the major advisor and two other members of the student's advisory committee, and presented for approval to the Graduate Program Director. Once approved, the remediation plan document will be placed in the student's file, and a copy given to the student. Furthermore, the graduate student must have a follow-up committee meeting within six months of the annual review to evaluate their progress on the remediation plan. At the conclusion of the six-month follow-up meeting, the student will be awarded either a Pass or a Fail.
- **Fail:** The graduate student's progress is unacceptable for reasons such as a cumulative GPA of less than 3.0 in all (both graduate and undergraduate) courses attempted, insufficient research progress, or not completing the degree within time limits without an acceptable/approved reason.

Graduate students receiving a ranking of Fail for any annual review, or two rankings of Conditional Pass for any two annual reviews, will be dismissed from the Biological Sciences Graduate Program.

**Appeal of a dismissal decision.** If a decision was made to dismiss the student from the program, the student may make a formal appeal. This should be done according to the University of Alabama's University-wide Academic Grievance Procedures, described in the faculty handbook.

## Additional Academic Requirements

All graduate students are required to register for and attend the weekly departmental seminar, enrolling in BSC 601 Biological Sciences Seminar or the Marine Science seminar series held at the Dauphin Island Sea Lab each semester.

## Academic Misconduct Information

See information on academic misconduct.

## Withdrawals and Leave of Absence Information

See information on withdrawals and leave of absence in the handbook.

## Academic Grievances Information

See information on academic grievances.

## **Grades and Academic Standing**

See information on grades and academic standing.

## **Graduate School Deadlines Information**

See information on Graduate School deadlines.

## **Application for Graduation Information**

See information on application for graduation.