Coastal and Marine System Science, MS

Program Description

Coastal and Marine System Science studies the interactions within the coastal and marine environment which includes most of the critical physical and biological systems which support life on Earth. The mission of the Coastal and Marine System Science (CMSS) program is to support interdisciplinary research and scholarship on the biotic and abiotic components of this zone, including quantitative investigation of socio-economic and political processes. The program addresses this mission by integrating the tools of Earth System Science: biogeochemistry, geographic information science, ecosystem dynamics, and quantitative modeling.

With the increasing efficiency of real-time data collection, transfer, and processing, aided by autonomous observation systems such as satellite sensors, oceanic buoys, and remotely controlled or autonomous submersibles, Coastal and Marine System Science is at the forefront of extracting meaningful scientific results from large data sets in near real time. Graduates of the CMSS program will demonstrate proficiency in understanding and applying the concepts and principles of all of the natural sciences as well as a working competence in mathematical modeling and geospatial analysis.

All students share a core of five interdisciplinary courses that cover the foundations of mathematical modeling, environmental policy, and case studies in system science. Topical specialized coursework (determined by the graduate advisory committee of each individual student) provides grounding in the specific scientific disciplines needed to effectively manage the coastal and marine system. The required thesis involves an independent, detailed research project of importance to the international scientific community. The graduate advisory committee of each student will guide them through the conception, design, construction, and execution of a systems-based inquiry. Students who earn graduate degrees in the sciences are typically employed in teaching or research positions in universities, or in pure research applications at specialized institutions or governmental agencies.

Student Learning Outcomes

As part of their progression through the Coastal and Marine System Science program, the students will:

- acquire the skills required for system science studies applied to coastal and marine topics such that they are prepared to conduct CMSS original research;
- perform original and hypothesis-driven quantitative analyses that will lead to comprehensive verifiable models of natural systems;
- emphasize mathematical and/or analytical skills to generate new data and critically evaluate models that will aid in our understanding of dynamic natural systems, become a resource capable of answering environmental “what if” questions by providing comprehensive interpretation;
- develop the skills necessary to present and publish their work at national and international venues;
- develop the skills necessary to teach effectively a college level class in the area of Sciences and Technology; and
- develop a skill set and research record such that they can secure employment in universities, federal agencies, private companies or non-governmental organizations where they can apply the skills and knowledge acquired during the program.

Admission Requirements

Persons seeking admission to the CMSS Program should apply through the College of Graduate Studies. In addition to the documents required by that office, applicants must submit GRE general test scores, an essay of no more than 1,000 words describing their educational background, career interests, goals and challenges, a curriculum vitae, and three letters of evaluation from persons knowledgeable about their potential for success in graduate studies. Persons seeking admission to the MS Program in CMSS should first contact the program faculty and identify a faculty member willing to serve as the graduate advisor. Applicants will not be admitted to the program without a graduate advisor. Applicants may optionally submit other relevant materials, e.g. copies of published works or reports of past scientific research. All materials submitted will be considered. A campus visit with personal interviews involving prospective faculty mentors is required.
highly recommended. Completed applications should be received by the College of Graduate Studies by the specified priority deadlines:

- Fall Semester - February 1
- Spring Semester - June 1
- Summer Semester - January 1

Incomplete applications are not considered. The applicant will be notified of acceptance or rejection by letter.

Students accepted into the degree program must demonstrate proficiency in the natural sciences, mathematical modeling, and geospatial technology. This proficiency can be demonstrated by the successful completion of undergraduate classes in these topics, or by presentation of satisfactory evidence to the CMSS Program Coordinator. Students who are unable to demonstrate proficiency in the natural sciences, mathematics, or geospatial technology may be required to take undergraduate or graduate courses. These courses will not apply towards the total required for the MS degree.

Teaching assistantships, graduate research assistantships, and fellowship positions are available to admitted degree-seeking students who maintain full-time graduate student status (9 credit hours per semester). For additional information, please contact the CMSS Program Coordinator, College of Science and Engineering, Texas A&M University-Corpus Christi, 6300 Ocean Dr., Corpus Christi, Texas 78412-5850.

**Degree Requirements (36 semester credit hours)**

Each student accepted to the MS in the Coastal and Marine System Science degree program must complete a minimum of 36 hours beyond the bachelor’s degree (at the 5000- or 6000-level). A student’s advisory committee must approve the program degree plan. All students must successfully complete at least nine semester credit hours per long semester to remain in the program. All students must pass a final thesis defense, to be administered by their advisory committee, during their last semester before graduation.

The program normally requires a minimum of 18 credit hours of regular graded coursework. Justification for exception to this rule should be prepared by the student and advisor(s), endorsed by the advisory committee, and attached to the degree plan when submitted for the department head’s signature.

**Core: Required Courses (12 sem. hrs.)**

- CMSS 6102 - Seminar in Coastal and Marine System Science 1 sem. hrs.
- ESCI 5203 - Professional Skills for Scientists 2 sem. hrs.

**Core: Course Choices (12 sem. hrs.)**

Choose four courses (12 sem. hrs.) from the list below:

- CMSS 6303 - Natural Systems Analysis 3 sem. hrs.
- CMSS 6305 - Natural Systems Modeling 3 sem. hrs.
- CMSS 6307 - Coastal and Marine Systems 3 sem. hrs.
- CMSS 6330 - Geospatial Analysis 3 sem. hrs.
- CMSS 6370 - Coastal Management and Ocean Law 3 sem. hrs.

**Elective, Specialized and Topical Courses (12 sem. hrs.)**

Elective coursework (12 sem. hrs.) supporting student’s individual research goals is chosen from among approved biology, chemistry, coastal and marine system science, computer science, environmental science, geographic information science, geology, marine biology, or other course offerings, in consultation with student’s advisory committee.

Students must choose two courses (6 sem. hrs.) from this list of seven CMSS courses with substantial marine content:

- CMSS 6307 - Coastal and Marine Systems 3 sem. hrs. (If not already taken as part of the Core: Course Choices.)
• CMSS 6308 - Coastal Geoenvironments and Change 3 sem. hrs.
• CMSS 6327 - Physical Oceanography 3 sem. hrs.
• CMSS 6334 - Geological Oceanography 3 sem. hrs.
• CMSS 6357 - Global Geochemical Cycles and Change 3 sem. hrs.
• CMSS 6359 - Marine Ecosystem Dynamics 3 sem. hrs.
• CMSS 6362 - Global Change and Its Impact on Aquatic Ecosystems 3 sem. hrs.

Topical coursework should be approved by the graduate advisory committee, and is offered under the heading of:
• CMSS 6590 - Advanced Topics 1-5 sem. hrs.

Students can also enroll in a Directed Independent Study, supervised by their advisor or other faculty members, at any stage of the program progression:
• CMSS 5596 - Directed Independent Study 1-5 sem. hrs.

The remainder of classes or research projects designated as part of the elective coursework requirement must receive the approval of a student’s graduate advisory committee. Students must demonstrate to the committee that the selection of classes or research projects produces a coherent course of study focused on the student’s particular area of emphasis. Depending on the emphasis area, selections may include coastal and marine system science, marine biology, the natural sciences, computer science, geographic information science, mathematics, political science, public administration, business law, or other areas as stipulated by the graduate advisory committee.

Thesis Information

Thesis Course Series

Thesis Format, Style and Submission
The thesis must be prepared in a standard format and style dictated by the advisory committee. Guidance can be found in the CMSS Student Handbook. For more information, contact the College of Graduate Studies. Upon approval by a student’s graduate advisory committee, a copy of the thesis will be sent to the Dean of the College of Science & Engineering. At the time of successful completion of the thesis exam, committee members will sign the dissertation and return it to the Dean of the College of Science & Engineering for final approval and signature.

Final Thesis Defense
Each student must pass a final thesis defense examination during the last semester before graduation, to be administered by the student’s graduate advisory committee. The exam will cover topics related to (1) all graduate coursework undertaken for the CMSS program, (2) a student’s thesis research area, and (3) broad concepts of system science, including familiarity with the literature and appropriate professional societies. The student is responsible for scheduling the defense with the faculty involved. A student who fails the defense may repeat it once, but only after an interval of four months or more. If a student fails the second defense, he or she will be terminated from the program. Students must enroll in the course, CMSS 5394 Thesis III: Thesis Submission during the semester in which they are planning to defend the thesis and/or graduate.