Coastal and Marine System Science, PhD

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. After the completion of any required leveling courses and all core classes, students must successfully complete a comprehensive examination for advancement to doctoral candidacy. This examination must be scheduled no later than 24 months after initial enrollment. The required dissertation 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 PhD 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
- 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 university 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 PhD 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 highly recommended. Completed applications should be received by the Office of Research and Graduate Studies by the specified priority deadlines:

- Fall Semester - February 1
- Spring Semester - August 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 PhD 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**

Each student accepted to the PhD in the Coastal and Marine System Science degree program must complete a minimum of 90 hours beyond the bachelor's degree or 60 hours beyond the master's degree. No more than one-third of the required hours may be taken at the 5000-level with approval from the student's graduate advisory committee. The remainder must be taken at the 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 dissertation defense, to be administered by their advisory committee, during their last semester before graduation.

The program normally requires a minimum of 18 credit hours (for students with an MS degree) or 30 credit hours (for students without an MS degree) of regular graded coursework on a PhD degree plan. 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.

### A. Admission from a Bachelor's Degree Option (90 semester credit hours)

Students accepted into the Coastal and Marine System Science PhD Program with only a bachelor's degree (i.e., without an MS degree) must complete a minimum of 90 semester hours of coursework and research.

- CMSS 6102 - Seminar in Coastal and Marine System Science 1 sem. hrs. (must be taken 3 times for a total of 3 sem. hrs.)
- Elective Coursework 15 sem. hrs.
- Research Coursework 51-57 sem. hrs.
- CMSS 6999 - Dissertation Defense 3-9 sem. hrs.

Choose four from the following:

- 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.

Total: 90

### B. Admission from a Master's Degree Option (60 semester credit hours)

Students accepted into the Coastal and Marine System Science PhD Program with a master's degree (i.e., with an MS degree) must complete a minimum of 60 semester hours of coursework and research.
CMSS 6102 - Seminar in Coastal and Marine System Science 1 sem. hrs. (must be taken 3 times for a total of 3 sem. hrs.)
Elective coursework 6 sem. hrs.
Research coursework 30-36 sem. hrs.
CMSS 6999 - Dissertation Defense 3-9 sem. hrs.

Choose four from the following:

- 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.

Total: 60

C. Elective, Specialized, and Topical Coursework

Elective and Specialized coursework are 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 admitted from a Bachelor's Degree Option must choose two electives with substantial marine content from this list of CMSS courses: Coastal and Marine Systems, Physical Oceanography, Coastal Oceanography, Geological Oceanography, Global Geochemical Cycles and Change, Global Change and its effects on Aquatic Ecosystems, Coastal Geoenvironments and Change, Marine Ecosystem Dynamics. Students admitted to the doctoral program from a Master's Degree Option must choose one elective course from this list.

Topical coursework is offered under the heading of CMSS 6590 - Advanced Topics. 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.

D. Dissertation Format and Style

The dissertation 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, consult the College of Graduate Studies.

Upon approval by a student's graduate advisory committee, a copy of the dissertation will be sent to the Dean of Graduate Studies. At the time of successful completion of the dissertation exam, committee members will sign the dissertation and return it to the Dean of Graduate Studies for final approval and signature. See also "Requirements for Doctoral Programs" in the general section of this catalog.

E. Research, Dissertation Research, and Dissertation Defense

Three courses are taken for the main research component of the degree: CMSS 6996 - Research (1-9 credit hours), CMSS 6998 - Dissertation Research (1-9 credit hours), and CMSS 6999 - Dissertation Defense (3-9 credit hours). During the initial phase of the program, students take CMSS 6996 - Research (1 - 9 credit hours), with approval of their advisor. Students can also enroll in CMSS 6596 - Directed independent Study (1 - 5 credit hours), supervised by their advisor or other faculty members at any stage of the program progression. Once students have passed their qualifying exam and become degree candidates, they should take CMSS 6996 - Research (1-9 credit hours) with approval of their advisor. The courses CMSS 6996 - Research and CMSS 6998 - Dissertation Research are graded with an S or U, and may be repeated. Finally students must enroll in CMSS 6999 - Dissertation Defense (3-9 credit hours), during their last semester (see below). CMSS 6999 - Dissertation Defense is taken as Credit/No Credit.
F. Final Dissertation Defense

Each student must pass a final dissertation 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 dissertation 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 6999 during the semester in which they are planning to take the dissertation defense and/or graduate.

For Additional Information

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<th>Website:</th>
<th><a href="http://cmss.tamucc.edu/">http://cmss.tamucc.edu/</a></th>
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</thead>
<tbody>
<tr>
<td>Campus Address:</td>
<td>Center for Instruction, Room 130E; Phone: (361) 825-2681</td>
</tr>
</tbody>
</table>
| Mailing Address: | Coastal and Marine System Science Program, Unit 5850  
College of Science and Engineering  
Texas A&M University-Corpus Christi  
6300 Ocean Drive, Corpus Christi, Texas 78412-5850 |