

MARS - MARINE SCIENCE

MARS 601 Teaching Environmental Sciences

Credits 3. 2 Lecture Hours. 4 Lab Hours. This course will concentrate on the basic principles of environmental education using a hands-on approach to learn environmental principles and how to teach them. This course will have a special emphasis on coastal issues. **Prerequisite:** Graduate status or approval of instructor.

MARS 603 Quantitative Methods for Resource Management

Credits 3. 3 Lecture Hours. Comprehensive introduction to descriptive and inferential statistical techniques; regression models; quantitative data analysis; research designs essential for understanding resource management and policy related issues. **Prerequisite:** Graduate classification.

MARS 604 Quantitative Methods for Resource Management II

Credits 3. 3 Lecture Hours. Continuation of a two semester sequence course; extends knowledge of quantitative methods beyond basic statistical inference and the linear regression models; advanced topics and quantitative methods used for resource management and policy related research; emphasis on panel data models, random effects and fixed effects models, spatial regression analysis, instrumental variable model, nonlinear models and maximum likelihood estimation, binary and multinomial response models and regression models for count data.

Prerequisite: MARS 603 or approval of instructor.

MARS 610 Environmental Law

Credits 3. 3 Lecture Hours. This course is designed to provide a broad overview of basic environmental laws including statutes, regulations, and cases. It also focuses on the both economic and ethical issues within the context of environmental law and policy. **Prerequisite:** Approval of instructor; graduate status or special approval.

MARS 615 Physical and Geochemical Marine Resources

Credits 3. 3 Lecture Hours. Location, identification, extraction and exploitation of non-fisheries marine resources, including: water, salt, hydrocarbons, minerals, energy from the thermal, wave, tidal, current and wind fields, chemical compounds, pharmaceuticals, and construction materials in estuarine, coastal and open ocean areas. **Prerequisites:** CHEM 102, GEOL 104, OCNG 251 or equivalent. Graduate status or approval of instructor.

MARS 625 GIS Use in Coastal Resources

Credits 3. 2 Lecture Hours. 2 Lab Hours. GIS Use in Coastal Resources. Basic concepts of design, planning, and implementation of Geographical Information Systems; computer hardware and software evaluation; practical experience in data entry, analysis and update of spatial and characteristic data; use of maps and remotely sensed data as data. **Prerequisites:** Any computer science course or equivalent; graduate classification or approval of instructor.

MARS 626 Advanced GIS for Coastal Systems

Credits 3. 2 Lecture Hours. 2 Lab Hours. Conceptual and technical expansion of GIS and spatial analysis methods; hands on experience with multidisciplinary data sets relevant to coastal systems; spatial and statistical methods, creation, manipulation and analysis of various datasets that address the interaction of human and natural systems in coastal habitats. **Prerequisite:** MARS 625 or similar course; graduate status or approval of instructor.

MARS 635 Environmental Impact Statements and Natural Resource Damage Assessment

Credits 3. 3 Lecture Hours. The course presents an overview of: a) environmental impact statements (EIS) under the National Environmental Policy Act (NEPA); and b) natural resource damage assessment (NRDA) under the Oil Pollution Act of 1990 (OPA 90) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). It is designed to cover requirements for a wide variety of EISs. NRDA hypothetical cases will be presented in which students are asked to calculate assessments. **Prerequisite:** Approval of instructor; graduate status or special approval.

MARS 640 Environmental Administrative Law

Credits 3. 3 Lecture Hours. Environmental law is governed, in large part, by administrative law. This course covers the processes involved in administrative environmental law. The primary focus of this course will be on: the Environmental Protection Agency, the U.S. Coast Guard, the Corps of Engineer; and NOAA. A review of international administrative bodies will also be included. **Prerequisites:** Approval of instructor; graduate status or special approval.

MARS 642 Coastal Resiliency and Hazard Mitigation

Credits 3. 3 Lecture Hours. Origins of the term resilience and its application to hazard mitigation in coastal areas; examination of resilience from ecological, organizational, and social perspectives; problem-based evaluation of hazard mitigation strategies to promote resiliency in the context of climate change and flooding. **Prerequisites:** Graduate classification.

MARS 644 Research Methods in Coastal Resources

Credits 3. 3 Lecture Hours. In-depth treatment of the research process, the components necessary to carry out a research project and the evaluation of research designs; topics include research ethics, causality, study designs, sampling strategies, data collection and measurement and measures of validity. **Prerequisite:** Graduate classification or approval of instructor.

MARS 650 Geochemical Marine Resources Management

Credits 3. 3 Lecture Hours. The purpose of this course is to provide an overview of the issues involved in geochemical marine resources management. This course explores the management of exploration, production, and protection of the geochemical marine resources of the earth and the interface of the many players. **Prerequisites:** Approval of instructor; graduate status or special approval.

MARS 651 Coastal Ecosystem Management and Environmental Planning

Credits 3. 3 Lecture Hours. Environmental planning from both a social and natural science perspective; application of the principles of environmental planning to realistic problems and settings; development and evaluation of plans that seek to manage ecological systems and promote ecologically sustainable approaches to development. **Prerequisites:** Graduate classification.

MARS 652 Sustainable Management of Coastal Margins

Credits 3. 3 Lecture Hours. The class will study federal, state, and local laws, regulations, ordinances and programs pertaining to management of coastal margins, visit the Texas General Land Office, attend meetings of the Coastal Coordinating Council, the Texas Legislature when a coastal-related bill is being debated, or attend the Galveston County Commissioner's Court or Galveston City Council when a coastal ordinance is being considered. **Prerequisite:** Approval of Instructor.

MARS 654 Coastal Hydrology

Credits 3. 3 Lecture Hours. Coastal hydrological cycle; surface water and groundwater flow, direction, and movement in coastal environments; types of coastal morphology and its implication to water flow; land to ocean contaminant transport via river and groundwater; introduction to field techniques for measuring surface water and groundwater fluxes; numerical methods for solving hydrological processes and problems; the impact of anthropogenic activities and hydroclimate extremes on coastal hydrology and water resources. **Prerequisites:** Graduate classification.

MARS 655 Wetlands Management

Credits 4. 3 Lecture Hours. 3 Lab Hours. This course surveys the interrelationship of chemistry, physics, geology and biology of coastal wetland systems and explores and defines the context of wetlands sustainability and management. Field exercises are an integral component providing students "hands on" experiences. Guest lectures, seminars and field trips lead by agency personnel who are experts in these fields of research are included. **Prerequisite:** Background in chemistry, physics, geology and biology.

MARS 656 Coastal Water Policy

Credits 3. 3 Lecture Hours. History, past and present legislation, the government entities and agencies molding the policies affecting coastal water policy in Texas. **Prerequisite:** Graduate classification or approval of instructor.

MARS 660 Environmental Conflict Resolution

Credits 3. 3 Lecture Hours. Origins and development of alternative environmental conflict resolution, a range of conflict resolution strategies for environmental conflict and the nature and process of environmental conflict resolution for both domestic and international disputes, across multiple issue areas and involving multiple scales - local, state, and national; emphasis on negotiation and mediation tactics of conflict resolution. **Prerequisites:** Graduate classification or approval of instructor.

MARS 670 Eco-Environmental Modeling

Credits 3. 3 Lecture Hours. Biological organisms are surrounded by chemical and physical environments which are influenced by the bio-system and flows of energy, water, and chemical species. Coupling to atmospheric, aquatic, and terrestrial systems is important. Modeling entails both mathematical tools and the underlying science. This course focuses on scientific models, from the simplest to more elaborate. **Prerequisites:** BIOL 111, 112; CHEM. 101, 102; MATH 151, and 161 or 166; graduate status or special approval.

MARS 675 Environmental Management Strategies

Credits 3. 3 Lecture Hours. The elements of EMS strategist's skills, including what environmental laws may be triggered by scientific activities; the fundamental structure of an EMS; EMS alternatives; concepts in an audit; uses of an effective EMS to reduce costs and increase profits. **Prerequisites:** Approval of instructor or graduate classification.

MARS 676 Environmental Policy

Credits 3. 3 Lecture Hours. This course will provide a general introduction to the basic concepts and mechanisms of international and U.S. federal environmental law and policy. It will survey the field and its development as well as focus on case studies that illustrate the basic types of environmental problems. **Prerequisites:** Approval of instructor; graduate status or special approval.

MARS 680 Integrative Analysis in Marine Resources

Credits 2. 2 Lecture Hours. Integrative Analyses in Marine Resources. Review of public policy change mechanisms in marine resources management, including Congressional testimony, agency recommendations and structure, and NGO reports. Students propose and defend a public policy change with detailed documentation and an oral presentation demonstrating a professional understanding of marine resources issues within the context of current law. **Prerequisites:** 24 hours of MARS course credits completed, or in concurrent enrollment, approval of instructor.

MARS 681 Seminar

Credit 1. 1 Lecture Hour. Presentation of recent research by students, faculty and visiting faculty. **Prerequisite:** None.

MARS 683 Field Practicum in Marine Sciences

Credits 1 to 4. 1 to 4 Lecture Hours. 1 to 4 Lab Hours. An overview of marine sciences in remote locations varying by instructor and selected topics. Lectures on recent scientific papers, methods, and concepts related to field area. Individual projects and data collection including data analysis and presentation of results in a formal seminar and paper based on the research and findings. **Prerequisite:** Enrollment in graduate program.

MARS 684 Internship in Marine Resources Management

Credits 1 to 9. 1 to 9 Other Hours. This is a faculty supervised study with an agency or other position within or outside the Texas A&M University System. Student involvement consists of real-life learning of marine resources management issues. It is a full-immersion course that provides students with hands-on experience in marine resources management. **Prerequisites:** Approval of faculty sponsor; graduate status or special approval.

MARS 685 Directed Studies

Credits 1 to 4. 1 to 4 Other Hours. Selected Topics in an identified area of science, law policy or management of marine natural resources not covered in any other courses in the curriculum. **Prerequisite:** Approval of instructor.

MARS 689 Special Topics in Marine Resources Management

Credits 1 to 6. 1 to 6 Lecture Hours. Selected topics in an identified area of marine resources management. May be repeated for credit. **Prerequisites:** Approval of instructor; graduate status or special approval.

MARS 691 Research in Marine Sciences

Credits 1 to 12. 1 to 12 Other Hours. For thesis or dissertation.

MARS 693 Professional Study for Marine Resource Management

Credits 1 to 3. 1 to 3 Lecture Hours. Guidance for preparation of a professional paper and abstract by the advisor; intended for non-thesis (professional track) Marine Resources Management students. **Prerequisite:** Approval of instructor.