689. SPECIAL TOPICS IN MARITIME ADMINISTRATION. (4-0). Credit 4. Selected topics in identified area of Maritime Administration. Prerequisites: Graduate classification and instructor permission.

691. RESEARCH IN MARITIME ADMINISTRATION. Credit 1-4. For thesis or dissertation. Prerequisite: Approval of instructor, graduate status or special approval.

Maritime Systems Engineering (MASE)

100. INTRODUCTION TO OFFSHORE AND COASTAL ENGINEERING. (2-0). Credit 2. Introduction to offshore and coastal engineering principles with emphasis on offshore structures, underwater pipelines, floating production systems, current advances in offshore technologies; coastal structures, coastal processes, port and harbor design, and advances in ocean/wind energy technologies. Prerequisite: MATH 151 or registration therein; only UI and U2 classification students are allowed to enroll.

210. PROPERTIES OF ENGINEERING MATERIALS. (0-3). Credit 1. Atomic and crystalline structures of materials; mechanical properties, failure, corrosion and thermal processes of metallic materials; tensile, hardness, impact and torsion testing of metal alloys. Prerequisites: ENGR 212, 221 and PHYS 208.

212. ENGINEERING SCIENCE IN THERMODYNAMICS. (2-3). Credit 3. Theory and application of thermodynamics as an engineering science; applications of the laws of thermodynamics and energy equations to heat transfer and flow. Prerequisites: ENGR 221 and MATH 251 or concurrent enrollment.

213. PRINCIPLES OF MATERIALS ENGINEERING (2-2) Credit 3. Description of properties of materials using a unified approach; discussion of the chemical structure, crystalline structure, microstructure, interface structure, and phase diagrams for materials; develop bulk properties and characteristics of metals, polymers, and ceramics; mechanical, electrical, magnetic, thermal, and optical properties for these materials. Prerequisites: CHEM 107, CHEM 117; MASE 221; MASE 216; PHYS 208; MATH 308 or concurrent registration.


215. PRINCIPLES OF ELECTRICAL ENGINEERING (2-2). Credit 3. Fundamentals of electric circuit analysis, AC power, and electronics; intended as a terminal course in these areas for most engineering disciplines. Prerequisites: ENGR 212, 221; PHYS 208, MATH 308 or concurrent registration.

216. PRINCIPLES OF THERMODYNAMICS. (2-0). Credit 2. Theory and application of thermodynamics as an engineering science; study of work, heat and energy as applied to open and closed systems; introduction to entropy, reversible and irreversible processes; intended as a terminal course in these areas for OCSE students. Prerequisites: MASE 221 and MATH 251 or registration therein.

217. ELECTRICAL ENGINEERING: CIRCUITS. (2-0). Credit 2. Fundamental principles of electric circuit analysis, DC and AC electricity, electric power; designed to prepare students for topical questions from the P.E. exam; intended as a terminal course in these areas for OCSE students. Prerequisite: PHYS 208.

221. ENGINEERING MECHANICS: STATICS. (2-2). Credit 3. I, II General principles of mechanics; concurrent force systems; statics of particles; equivalent force/moment systems; centroids and center of gravity; equilibrium of rigid bodies; trusses, frames and machines; internal forces in structural members; moments of areas. Prerequisites: ENGR 111; MATH 251 or MATH 253 or registration therein; PHYS 218; enrollment in OCSE or OCSE major degree sequence.

261. APPLIED NUMERICAL METHODS. (3-0). Credit 3. Application of numerical methods to ocean-related engineering problems; development, evaluation and comparison of various techniques for root finding, curve fitting, numerical integration, simultaneous linear algebraic equations, matrix methods, probability and statistics and ordinary differential equations in ocean-related engineering applications. Prerequisites: MATH 308 or concurrent enrollment, ENGR 111, ENGR 112.

265. INTRODUCTION TO GEOTECHNICAL ENGINEERING (2-2). Credit 3. Physical properties of soils, classification systems, soil exploration, permeability, consolidation, compaction and shear strength. Laboratory tests conducted to determine the physical and engineering soil properties needed for application in geotechnical engineering design. Prerequisites: MASE 221. Enrollment in OCSE or OCSE.

310. ENGINEERING ANALYSIS. (3-0). Credit 3. Application of numerical methods to ocean-related engineering problems; development, evaluation, and comparison of various techniques for root finding, curve fitting, numerical integration, simultaneous linear algebraic equations, matrix methods, probability and statistics, and ordinary differential equations in ocean-related engineering applications. Prerequisites: Junior or senior classification or approval of instructor, MATH 308 or concurrent registration, ENGR 111, ENGR 112.


336. FLOW MEASUREMENT FUNDAMENTALS. (2-2). Credit 3. Introduction to fundamental principles of measuring fluctuating fluid velocities in open channels, simple pipe flow systems and surface waves. Laboratory includes experimental investigation of classic fluid dynamics and introduction to PIV systems. Prerequisites: PHYS 208, CVEN 311 or concurrent registration. Junior or senior classification or approval of instructor. Enrollment in OCSE major degree sequence.

341. ENGINEERING ECONOMICS AND PROJECT MANAGEMENT. (3-0). Credit 3. Analysis of engineering economics and management, using costs and benefits of various engineering options; project scheduling covered in detail including PERT, GANT and CPM methods. Additional topics include time value of money, cash flows, analysis techniques, interest rates, inflation, depreciation, optimization, statistics, network analysis and critical path programming. Prerequisites: Junior or senior classification. Enrollment in the OCSE major degree sequence.

344. REINFORCED CONCRETE STRUCTURES. (2-3). Credit 3. Analysis and design of reinforced concrete beams, columns, slabs and footings using ultimate strength methods. Prerequisite: CVEN 345. Enrollment in OCSE major degree sequence.

363. DYNAMICS AND VIBRATIONS. (3-0). Credit 3. Application of Newtonian and energy methods to model dynamic systems with ordinary differential equations; dynamics and vibrations of linear single- and multi-degree of freedom systems of particles and rigid bodies; solutions of models using analytical approaches; interpreting solutions; application to simple floating systems. Prerequisites: MASE 221 with a grade of C or better; MATH 308 with C or better; MASE 261. Enrollment in OCSE major degree sequence and junior or senior classification.

400. INTRODUCTION TO COASTAL ENGINEERING (3-0). Credit 3. Mechanics of shallow water wave motion; wave diffraction, refraction and reflection; wave forecasting; water level fluctuations; coastal processes and geomorphology; erosion control and shoreline stabiliza-
401. UNDERWATER ACOUSTICS. (3-0). Credit 3. Fundamentals of underwater acoustics, SONAR equations, propagation of underwater sound, acoustic transducers and arrays, noise in the ocean environment, design and prediction of SONAR systems, ocean engineering applications of underwater sound. Prerequisites: CVEN 311, CVEN 336. Junior or senior classification or approval of instructor. Enrollment in OCSE major degree sequence.

405. FINITE ELEMENT ANALYSIS IN ENGINEERING DESIGN. (3-0). Credit 3. Introduction to the fundamental theory and techniques; direct approach and energy formulation; element equations, assembly and solution schemes; computer implementation, design considerations; applications to field problems; original computer project required. Prerequisites: CVEN 345, MASE 214, MASE 261. Junior or senior classification or approval of instructor. Enrollment in OCSE major degree sequence.

406. CAPSTONE DESIGN I. (1-0). Credit 1. Part one of a two-course sequence; development and presentation of detailed proposals for offshore or coastal engineering projects, which will form the basis for MASE 407 design projects; includes formulation of project objectives, design constraints, delineation of alternatives, scheduling and analysis of economic and environmental impact. Prerequisites: Prior completion or co-enrollment in MASE 405, 415, 463. Successful completion of ENGL 210. All required 300-level engineering and technology courses. Enrollment in OCSE major degree sequence.

407. CAPSTONE DESIGN II. (0-6). Credit 3. Design of a major engineered system based on a proposal developed in MASE 406 completed as a group project; realistic application of engineering skills and tools, experience managing a significant engineering-design effort. This is a writing-intensive course including a major report and weekly one-page written reports. Prerequisites: MASE 406. Enrollment in OCSE major degree sequence.

410. MEASUREMENTS IN THE OCEAN LABORATORY. (0-3). Credit 1. Fundamental techniques and instrumentation for field and laboratory measurements pertaining to coastal and ocean engineering (e.g., currents, wave height, wave/sediment interaction, mass transport, surveying, etc.); experiment planning; data analysis and presentation; written reports on methodology, analysis, and results of experiments. Prerequisites: CVEN 300, MASE 400. Junior or senior classification or approval of instructor. Enrollment in OCSE major degree sequence.

411. ENVIRONMENTAL NEARSHORE HYDRODYNAMICS. (3-0). Credit 3. Fundamentals of current and shallow water wave motions. Beach response to nearshore processes. Coastal sediment and pollutant transport including nearshore currents, longshore onshore-offshore transport and shoreline configuration; facilities for shoreline stabilization, backshore protection and inlet stabilization. Environmentally conscious coastal engineering design is emphasized. Prerequisites: OCEN 300. Junior or senior classification or approval of instructor. Enrollment in OCSE major degree sequence.

415. OFFSHORE STRUCTURE DESIGN. (3-0). Credit 3. Design of large structures using diffraction analysis. Design project: Design of a fixed offshore structure including dynamics effects. Prerequisites: MASE 463 or concurrent enrollment. MASE 265, CVEN 446 and OCEN 300. Junior or senior classification or approval of instructor. Enrollment in OCSE major degree sequence.

421. NAVAL ARCHITECTURE DESIGN II. (2-3). Credit 3. Ship motion and mooring. Theory and practice of naval architecture, basic principles and design calculations. Hull structural design considerations, ship resistance and propulsion power prediction, propeller selection concepts, dynamic positioning systems, mobile offshore drilling unit (MODU) design considerations, practical design work on a vessel or MODU of the student’s choosing under the guidance of the instructor. Prerequisites: MASE 319, CVEN 346, OCEN 462. Junior or senior classification or approval of instructor. Enrollment in OCSE major degree sequence.

459. MECHANICAL VIBRATIONS. (3-0). Credit 3. Basic theory of vibrating systems with single and multiple degrees of freedom and principles of transmission and isolation of vibrations. Prerequisites: MASE 214, 221, 310. Junior or senior classification or approval of instructor. Enrollment in OCSE major degree sequence.

461. OCEAN INSTRUMENTATION AND CONTROL THEORY. (3-0). Credit 3. Electrical systems components; analog and digital filters-amplifiers; network analysis; instrument behavior and displacement, velocity, acceleration, force, and flow measurements; simple feedback and control theory for linear electromechanical systems; digital data acquisition. Prerequisites: PHYS 208 and ENGR 215. Junior or senior classification or approval of instructor. Enrollment in OCSE major degree sequence.

463. HYDRODYNAMICS OF OFFSHORE STRUCTURES. (3-0). Credit 3. Introduction to offshore structures, wave force formulation; wave forces on small structures, floating structure dynamics, modeling dynamics systems of rigid body motion, structure response statistics. Prerequisites: Junior or senior classification or approval of instructor; MASE 261, MASE 363, CVEN 345, OCEN 300. Enrollment in OCSE major degree sequence.

465. SUBSEA PIPELINE DESIGN. (3-0). Credit 3. Design and construction practices of submarine oil/gas pipelines and risers; pipe selection, coating, insulation; route selection, operation and installation stresses; stability during laying and operation due to wave and current action; cost analysis considering long term operability and safety. Prerequisites: CVEN 345, CVEN 365, CVEN 446, OCEN 300. Junior or senior classification.

467. OFFSHORE RANDOM PROCESSES. (3-0). Credit 3. Basic probability theory and engineering statistics; irregular structural excitation and response; random vibration theory with application to offshore processes and structures; development of extreme values used in design of ocean structures. Prerequisites: MASE 261, MASE 301 and MASE 363; or approval of instructor. Enrollment in OCSE major degree sequence.

474. PORT AND HARBOR ENGINEERING. (3-0). Credit 3. Engineering background and specific skills for design of marine facilities and harbors; includes development of design criteria, channel design, evaluation of operations and extreme loads, dredging and disposal. Prerequisite: Junior or senior classification or approval of instructor.

482. SEMINAR. (1-0). Credit 1. State of technology topics in ocean engineering; professional ethics, membership in professional societies and professional registrations; case studies and lectures presented by staff and practicing engineers. Prerequisite: Junior or senior classification or approval of instructor. Enrollment in OCSE major degree sequence.

483. MARINE FOUNDATION ANALYSIS AND DESIGN. (2-3). Credit 3. Design of foundations for onshore, alongshore, and offshore structures, including prediction of settlement and the bearing capacity of shallow and deep foundations; determination of earth pressure acting on retaining structures and design of steel and concrete bulkheads; design of pile foundations; and design of cofferdams and caissons. Laboratory tests conducted to determine the physical and engineering properties needed for application in geotechnical engineering design. Prerequisites: CVEN 345, 346, 365. Junior or senior classification or approval of instructor. Enrollment in OCSE major degree sequence.

485. DIRECTED STUDIES. Credit 1-8. Directed study on selected current problems in the ocean and/or maritime industry. Offered to enable individuals or groups to undertake and complete with credit some specialized investigation not covered by other courses. Prerequisites: Approval of department head. Junior or senior classification or approval of instructor. Enrollment in OCSE major degree sequence.
489. SPECIAL TOPICS. Credit 1-4. Selected topics in a identified area of maritime systems engineering. May be repeated for credit. Prerequisite: Junior or senior classification or approval of instructor. Enrollment in OCSE major degree sequence.

491. RESEARCH IN MARITIME SYSTEMS ENGINEERING. Credit 0-4. Research conducted under the direction of faculty member in Maritime Systems Engineering. May be repeated 2 times for credit. Please see academic advisor in department. Registration in multiple sections of this course is possible within a given semester provided that the per semester credit hour limit is not exceeded. Prerequisites: Junior or senior classification and approval of instructor. Enrollment in OCSE major degree sequence.

Maritime Studies (MAST)

101. CONNECTIONS. (1-0). Credit 1. A first year experience seminar to explore the connections between academics disciplines to develop creative and critical thinking strategies which will increase abilities to implement solutions, refine information literacy skills, and identify the resources available for a successful transition from high school to the university environment. Prerequisites: None.

110. SCUBA I LECTURE. (2-0). Credit 2. Fundamentals and basic academic knowledge of safe SCUBA diving practices and theory; introduction to diving tables and diving physiology. Prerequisites: Co-enrollment in KINE 199 (SCUBA I Lab), must complete a medical statement showing no contra-indications to diving, or have a recreational SCUBA diver's physical examination.

120. SCUBA II LECTURE. (2-0). Credit 2. Methods to promote safe, self-reliant diving and to improve the diver's comfort, coordination and strength in the water; to increase diver proficiency and confidence through introductory training in a variety of practical topics; to build competency in dive planning and organization. Prerequisites: Co-enrollment in KINE 199 (Scuba II Lab). NAUI SCUBA diver certification or equivalent. Must complete a medical statement showing no contra-indications to diving, or have a recreational SCUBA diver's physical examination. Current Divers Alert Network (DAN) diving insurance or equivalent.

265. ELISSA SAIL TRAINING I. (1-6). Credit 3. Fundamentals of seamanship on a late 19th century square-rigged sailing vessel. Students will learn to both sail and care for the 1877 barque ELISSA, operated by the Texas Seaport Museum. Lectures on maritime life and supplemental physical activity. Prerequisite: Department approval.

266. ELISSA SAIL TRAINING II. (1-7). Credit 3. Sailing and crewmanship on the 1877 barque ELISSA, operated by the Texas Seaport Museum. Includes sail training at sea. Prerequisite: MAST 265.

285. DIRECTED STUDIES. Credit (1-4). Individually supervised research or advanced study on restricted area not covered in regular courses.

289. SPECIAL TOPICS. Credit 1-4. Selected topics in a identified area of maritime studies. May be repeated for credit.

320. INTRODUCTION TO MUSEUMS AND CONSERVATION. (2-3). Credit 3. Introduction to basic issues related to the conservation, curation, management and presentation of museum collections. Emphasis placed on archaeology and historical collections, or other collections with cultural significance. Basic conservation techniques for materials as well as proper care and storage of collections. Museum planning and exhibit design will be discussed. Prerequisite: Junior or senior classification or approval of instructor.

330. RESCUE DIVER. (2-2). Credit 3. Relates skills necessary to perform basic life support, administer dive first aid, evacuate victim, assist/rescue other divers in water; illustrate proper dive planning; practice prevention and effective accident management. Prerequisites: Must have a recreational scuba diver’s physical examination. Must be certified as a NAUI Scuba Diver or equivalent. Divers Alert Network (DAN) diving accident insurance or equivalent. Junior or senior classification or instructor approval.

331. ALTERNATE DIVING TECHNOLOGY. (2-2). Credit 3. Illustrates the realities of operating in the scientific, public safety, and military diving disciplines; practice real world training scenarios involving multiple aspects of each of the three fields. Prerequisites: Must have a recreational scuba diver’s physical examination. Must be certified as a NAUI Advanced or NAUI Rescue Diver or equivalent. Divers Alert Network (DAN) diving accident insurance or equivalent. Junior or senior classification or instructor approval.

333. VIKING ARCHAEOLOGY AND NORSE MYTHOLOGY. (3-0). Credit 3. Overview of Viking Age (ca. 800 to 1100 C.E.) in Northern Europe; topics include Norse seafaring, world-view, society, archaeology, religion and cosmology as known from the archaeological and literary record. Prerequisite: Junior or senior classification or approval of instructor.

345. TEXAS MARITIME CULTURE AND HISTORY. (3-0). Credit 3. The coastal peoples, maritime history and culture of the Texas Gulf Coast ranging from pre-historic times to the present day; geography’s influence on exploration, resources utilization, development and inland access; Texas ports historic and modern; shipwreck sites and historical texts; La Salle's La Belle, Texas Navy, Mexican War logistics; Civil War Naval actions, Texas Fisheries, tourism and recreation. Prerequisite: Junior or senior classification.

350. A HISTORY OF WOODEN SHIP CONSTRUCTION. (3-0). Credit 3. This course is designed to give undergraduate students an overview of ship construction and possible cultural factors that may influence how a shipwright builds a vessel. Prerequisites: Junior or senior classification and ANTH 316 or ANTH 318.

352. MARITIME CRAFTSMANSHIP. (3-0). Credit 3. An exploration of various crafts, skills and aesthetic/design used in and supporting the maritime world; hands-on activities and practical experience of various skills and processes, using traditional tools required to put a ship to sea; from carpentry to rope-making, sewing canvas sails to making blocks. Prerequisites: Junior or senior classification and approval of instructor.

354. ANCIENT EGYPTIAN SEAFARING. (3-0). Credit 3. Archaeology, iconography and written records of ancient Egypt as they relate to local and international trade by land, river and sea, beginning in Neolithic times (c. 5000 B.C.) to the end of the New Kingdom (c. 1069 B.C.). Prerequisites: ANTH 316; junior or senior classification or approval of instructor.

357. DIVING LEADERSHIP - DIVEMASTER. (2-2). Credit 3. Examines divemaster level dive knowledge, dive leadership theory and application, presentations skills, physical diving skills, logistics/planning, and operational execution; develops a multi-environment capable diving leader. Prerequisites: Must have a recreational scuba diver’s physical examination. Must be certified as a NAUI Master Scuba Diver and a NAUI Scuba Rescue Diver or their equivalent. Divers with evidence of equivalent training experience must pass the NAUI Master Scuba Diver and NAUI Scuba Rescue Diver written exams with minimum scores of 80% on each. Documentation of diving experience with a minimum of 60 logged dives (dives shall be varied in environment, depth and experience). Water skills and ability equivalent to that of a NAUI Assistant Instructor. Current certifications in First Aid, CPR and Emergency Oxygen Administration. Divers Alert Network (DAN) diving accident insurance (or equivalent). Junior or senior classification or instructor approval.

371. ARCHAEOLOGY OF THE PACIFIC. (3-0). Credit 3. Overview of the archaeology, history and cultures of the Pacific Rim; emphasizing the cultures of Polynesia, Melanesia, and Micronesia. Prerequisite: Junior or senior classification or approval of instructor.

411. INTERNATIONAL MARITIME CULTURE. (3-0). Credit 3. Strategies used in the exploitation of marine, coastal, and island habitats throughout human evolutionary history and the variety and complexity of adaptations in such environments. Classes will be devoted to lectures