OCEN - OCEAN ENGINEERING

OCEN 630 Dynamics of Ocean Vehicles
Credits 3. 3 Lecture Hours.
Dynamics and stability of motion of immersed and floating structures and ocean vehicles; maneuverability and control; behavior of ocean vehicles and stationary platforms in waves. Design considerations leading to motion reduction; applications to surface vessels, submersibles and drilling rigs.
Prerequisites: CVEN 311/EVEN 311, MEEN 459 or equivalent, or approval of instructor.

OCEN 671 Ocean Wave Mechanics
Credits 3. 3 Lecture Hours.
Wave theory and applications to engineering problems; linear and non-linear theories of regular gravity waves; wave properties and transformation in shoaling water; spectral analysis of irregular waves; forecasting, hindcasting and theoretical spectra.
Prerequisite: CVEN 311/EVEN 311 or equivalent.

OCEN 672 Coastal Engineering
Credits 3. 3 Lecture Hours.
Effects of waves on coastal structures; design of seawalls, breakwaters, jetties, harbors, ship channels and pipelines; intentional and accidental discharge of pollutants; diffusion and spreading; oil spill containment and collection.
Prerequisite: OCEN 671.

OCEN 673 Nonlinear Hydrodynamic Problems in Ocean Engineering
Credits 3. 3 Lecture Hours.
Nonlinear hydrodynamic problems involved with the complex offshore structures in high sea environment; nonlinear waves application of Volterra model to weakly nonlinear systems; generation of nonlinear model waves; nonlinear hydrodynamic interaction between waves and structure; dynamic analysis of nonlinear response of integrated offshore structures.
Prerequisites: OCEN 671 and OCEN 678.

OCEN 674 Ports and Harbors
Credits 3. 3 Lecture Hours.
Basic port planning including site selection, environmental factors and economic conditions; design of wharves, quays, jetties, breakwaters, terminals, navigational channels and fenders; harbor sedimentation and maintenance dredging; design of fishing, small craft and recreation boat harbors.
Prerequisite: Approval of instructor.

OCEN 675 Nonlinear Wave Dynamics
Credits 3. 3 Lecture Hours.
Nonlinear wave-wave interactions in steep ocean waves significantly affect wave properties and long-term wave evolution. Strong and weak wave interactions and their respective effects on waves are studied, using various perturbation methods. Applications are shown through using Hybrid Wave Models to analyze wave measurements and predict wave loads on structures.
Prerequisite: OCEN 671.

OCEN 676 Dynamics of Offshore Structures
Credits 3. 3 Lecture Hours.
Review of concepts of linear structural dynamic analysis for time and frequency domain simulations, functional design of off-shore platforms, pipelines, floating structures and moorings; environmental loading problems; hydrodynamic phenomena including wind and current interaction, vortex shedding and wave forces; structure-fluid interaction models.
Prerequisites: OCEN 671 or approval of the instructor.

OCEN 677 Environmental Fluid Mechanics
Credits 3. 3 Lecture Hours.
Introduction to fluid and mass transport in naturally occurring flows; topics include molecular and turbulent diffusion; dispersion; river, estuary, and ocean mixing; dissolution boundary layers; tidal mixing; offshore wastewater outfalls; introduction to environmental quality numerical modeling.
Prerequisite: CVEN 311/EVEN 311 or equivalent.

OCEN 678 Fluid Dynamics for Ocean and Environmental Engineering
Credits 3. 3 Lecture Hours.
General conservation laws; Navier-Stokes equations; steady and unsteady Bernoulli’s equation; potential flow theory and basics of panel methods; laminar and turbulent boundary layer; dispersion and diffusion processes in laminar and turbulent flow; flow past a body of any shape.
Prerequisite: CVEN 311/EVEN 311 or equivalent.

OCEN 681 Seminar
Credit 1. 2 Lab Hours.
Reports and discussion of current research and selected published technical articles.

OCEN 682 Coastal Sediment Processes
Credits 3. 3 Lecture Hours.
Sediment properties and size distribution, fluvial sediment transport equations, movement of material by the sea, review of pertinent wave theories, littoral drift, inlet stability, coastal protection structures, similarity in sediment transport, movable bed models, sediment tracing, Aeolian sand transport, case studies.
Prerequisite: OCEN 671 or approval of instructor.

OCEN 683 Estuary Hydrodynamics
Credits 3. 3 Lecture Hours.
Development of applicable equations for tidal dynamics applied to real estuaries; technology for determination of mean velocities, circulation patterns, water depths, turbulent dispersion patterns, etc. for solution of environmental problems in estuaries; physical and mathematical models.
Prerequisites: OCEN 678 or approval of instructor.

OCEN 685 Directed Studies
Credits 1 to 12. 1 to 12 Other Hours.
Special topics not within scope of thesis research and not covered by other formal courses.

OCEN 688 Marine Dredging
Credits 3. 3 Lecture Hours.
Dredge pump selection; pump and system characteristics; cavitation; types of dredges; continental shelf and deep-ocean dredging; head loss in horizontal and vertical pipes for two and three-phase flow; design of disposal methods for dredged material; environmental effects of dredging.
Prerequisite: Approval of instructor.
OCEN 689 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of ocean engineering. May be repeated for credit.

OCEN 691 Research
Credits 1 to 23. 1 to 23 Other Hours.
Research for thesis or dissertation.