Course number and title

ORE 609 Hydrodynamics of Fluid-Body Interaction

2. Credits and contact hours
   Two 1.25-hour sessions per week

3. Instructor's or course coordinator's name
   Deniz Gedikli

4. Textbook, title, author, and year
   Textbooks: Lecture Notes by Deniz Gedikli
   Reference books:
   a. Faltinsen: Sea Loads on Ships and Offshore Structures.
   b. Lewis: Principles of Naval Architecture.
   c. Newman: Marine Hydrodynamics
   d. Sumer and Fredsoe: Hydrodynamics around cylindrical structuctures
   e. Chakrabarti: The Theory and Practice of Hydrodynamics and Vibration

5. Specific course information
   a. Course content: Hydrodynamics of ships, coastal and offshore structures. Wave forces by potential theory and by Morison's equation. Method of source distribution for potential flow problems. Flows with prescribed body motion, fixed and freely floating bodies.
   a. Prerequisites or co-requisites: ORE 607
   b. Designation: Elective

6. Specific goals for the course
   a. Student Outcomes: (2) Core Program. (3) Option Area. (4) Communication.
   b. The student will be able to:
      i. Understand the theoretical and experimental principles of fluid-body interaction problems in the oceans
      ii. Understand the principles of viscous and ideal flow and be able to apply principles to problem solving that involves rigid body movements in the oceans, and
      iii. Understand the diffraction, radiation and motions of floating and submerged bodies in deterministic and irregular wave

7. Brief list of topics to be covered
   a. Introduction and review of definitions
   b. Vector Calculus and Dimensional Analysis
   c. Viscous-Fluid Flow
   d. Ideal-Fluid Flow
   e. Vortex Laws, Added Mass and Water Waves
   f. Wave Diffraction and Forces
   g. Flows with prescribed body motion and freely-floating bodies
   h. Irregular-sea analysis with the purpose of applying force and motion transfer functions in random waves
   i. General flow instability and vortex formation