EOC 4124 SHIP HYDRODYNAMICS

ABET Course Syllabus

1. **Course number and name:** EOC 4124 Ship Hydrodynamics

2. **Credits and contact hours:** 3 credits / Two 80 minute lectures each week

3. **Instructor's or course coordinator's name:** Dr. Siddhartha Verma

4. **Text book, title, author, and year:**
   Introduction to Naval Architecture, by E.C. Tupper, Butterworth-Heinemann Publishing Company, 2013

5. **Specific course information:**
   (a) Brief description of the content of the course (catalog description): The course deals with the study of incompressible-fluid flow and its application to ocean engineering with emphasis on: fluid properties, hydrostatic forces, buoyancy and stability of floating bodies including metacentric height concepts, fluid dynamics, dimensional analysis, modeling, real flows in closed conduits and open channels, boundary-layers, lift and drag, turbo-machines, computational and experimental methods, resistance and propulsion of marine vehicles, and design problems.

   (b) Prerequisites: EOC 3123 Ocean Engineering Fluid Mechanics (with a grade of C or above).

   (c) indicate whether a required, elective, or selected elective course in the program: Elective

6. **Specific goals for the course:**
   (a) Specific outcomes of instruction (course specific objective): The objective of the course is to provide the students with a basic and applied knowledge of fluid mechanics as required in the design of efficient ocean vehicles.

   (b) Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course. The learning outcomes of the course (and related ABET Criterion 3) outcomes are:

      1. An ability to solve the wide range of problems in fluid mechanics that are encountered as a working ocean engineer. (1)
      2. A thorough knowledge of the basic principles of fluid mechanics to provide a basis for the solution of advanced problems as encountered in graduate school or as a working ocean engineer. (1)
      3. An ability to formulate creative design solutions in the area of fluid mechanics. (2)
      4. A basic knowledge of numerical algorithms and an ability to utilize software packages for the solution of complex flow problems. (6)
      5. Recognition of the need for, and an ability to engage in life-long learning. (7)
      6. Knowledge of contemporary issues. (4)

7. **Brief list of topics to be covered:**
   1. Categorization of marine vehicles
   2. Geometry of ships

3. Irregular shapes and numerical methods
4. Buoyancy and stability
5. List and ballast, free-surface and density effects
6. Stability at large angles of inclination
7. Longitudinal stability, trim, and hydrostatic curves
8. Dry docking and grounding
9. Stability in damaged condition (or bilging)
10. Dimensional analysis and similitude
11. Drag and Lift; Ship resistance
12. Marine Propellers (time permitting)