

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. Seiffert
4. **Text book, title, author, and year:**
 1. *Introduction to Naval Architecture*, by Thomas Gillmer and Brue Johnson, Naval Institute Press, Annapolis. Maryland
 2. Instructor's Lecture Notes (posted on MyFAU/BlackBoard)

Recommended readings:

1. J. N. Newman, *Marine Hydrodynamics*, MIT Press, 1977

5. **Specific course information:**

- (a) Brief description of the content of the course (catalog description): The course deals with incompressible-fluid flow and its application to ocean engineering with emphasis on: fluid properties, hydrostatic forces, buoyancy and stability of floating bodies, buoyancy and stability of floating bodies, 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 4422 (Ocean Wave Mechanics) and EOC 3123 (Ocean Engineering Fluid Mechanics) (both 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. (e/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. (a/1)
 3. An ability to formulate creative design solutions in the area of fluid mechanics. (c/2)
 4. A basic knowledge of numerical algorithms and an ability to utilize software packages for the solution of complex flow problems.(k/1,2,6)
 5. Recognition of the need for, and an ability to engage in life-long learning. (i/7)
 6. Knowledge of contemporary issues. (j/4)

7. Brief list of topics to be covered:

- Categorization of marine vehicles
- Geometry of ships
- Irregular shapes and numerical methods
- Buoyancy and stability
- List and ballast, free-surface and density effects
- Stability at large angles of inclination
- Longitudinal stability, trim, and hydrostatic curves
- Dry docking and grounding
- Stability in damaged condition (or bilging)
- Dimensional analysis and similitude
- Drag and Lift; Ship resistance
- Dynamics of marine vehicles – directional stability and maneuverability
- Response of marine vehicles to surface waves – sea keeping
- Marine Propellers