

EOC 4201C MARINE MATERIALS AND CORROSION
ABET Course Syllabus

1. **Course number and name:** EOC 4201C Marine Materials and Corrosion
2. **Credits and contact hours:** 3 credits / Two 80 minute lectures each week
3. **Instructor's or course coordinator's name:** Dr. R. Granata
4. **Text book, title, author, and year:** Readings and lecture notes made available on Canvas by the instructor.
5. **Specific course information:**
 - (a) Brief description of the content of the course (catalog description): The course deals with materials selection for marine applications. Atmospheric and submerged marine corrosion. Corrosion prevention and fracture and failure analysis. Materials and devices for energy storage, primary/secondary batteries, fuel cells and electrochemical capacitors. Composite materials, strengthening mechanisms.
 - (b) Prerequisites: EGN 3365 Engineering Materials I (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 understanding of materials selection for ocean engineering applications.
 - (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. Principles of corrosion and the marine environment as this effects corrosion. (a,e/1)
 2. Classes and properties of marine materials. (a,e/1)
 3. Materials selection for the ocean engineering applications.(a,e/1)
 4. Design for corrosion control.(a,e/1)
 5. Fracture and failure analysis.(a,e/1)
 6. Contemporary issues will be addressed via reading assignments and presentations of recent events and recent developments in science, engineering, and as these relate to the above topics (e.g. Cost of Corrosion as function of GDP, recent failures e.g. Minnesota Bridge Collapse) (j/4)
 7. Awareness of lifelong learning as it pertains to an Ocean engineer career development. For example, membership and active participation in engineering societies (including technical committees) as a way to keep with new advances and technologies. (i/7)
7. **Brief list of topics to be covered:**
 - Materials Science/Engineering - Marine Environment Perspective. Principles of Materials Selection and Failure Prevention.
 - Principles of Corrosion.
 - Corrosion Zones.
 - Corrosion Variables.
 - Forms of Corrosion.
 - Specific Engineering Materials.
 - Corrosion Control and Prevention.
 - Corrosion of Steel in Concrete and Its Prevention.

- Fracture and Fracture Control.