1. **Course number and name:** EOC 3213 Materials I – Marine Topics

2. **Credits and contact hours:** 1 credit / one 50 minute lecture each week

3. **Instructor’s or course coordinator’s name:** Dr. R. Granata

4. **Text book, title, author, and year:**
   - Lecture notes provided by Dr. R. Granata

5. **Specific course information:**

   (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: Required

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 introduction to: atmospheric and submerged marine corrosion; corrosion prevention methods; cathodic protection; fracture and fracture control in marine environments; materials and devices for energy storage, primary/secondary batteries, fuel cells; and composite materials for marine 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. Basics of corrosion and the marine environment influence on corrosion. (a/1)\(^1\)
   2. Common classes and properties of marine materials. (a/1)\(^2\)
   3. Elementary materials selection for ocean engineering applications. (c\(^3\), h\(^4\)/2,4)
   4. Basic design for corrosion control. (c\(^5\)/2)
   5. Fracture and failure analysis (a\(^6\), c\(^7\)/1)

7. **Brief list of topics to be covered:**
   - Introduction to Corrosion - Forms of Corrosion and Faraday’s Law
   - Specific Engineering Materials
   - Basic Corrosion Control and Prevention including Design
   - Energy storage, batteries and composite materials
   - Introduction to Corrosion of Steel in Concrete and Its Prevention
   - Introduction to Fracture and Fracture Control

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\(^1\) Calculations of corrosion potentials, Faraday mass loss/gain and corrosion rates.

\(^2\) Understanding of marine materials degradation by material class.

\(^3\) Material selection based upon calculations and degradation process.
4 Understanding of consequences of engineering failures in the ocean environment.
5 Understanding design issues appropriate to materials selected for the marine environment.
6 Understanding fracture and failures with respect to load, cycles and specific environmental influences in marine applications.
7 Use available knowledge bases to fracture problems in the marine environment.