

EOC 4307C Underwater Acoustics
Course Syllabus

1. **Course number and name:** EOC 4307C Underwater Acoustics
2. **Credits and contact hours:** 3 credits / Two 80 minute lectures each week
3. **Instructor's or course coordinator's name:** Dr. Pierre-Philippe Beaujean
4. **Text book, title, author, and year:**
W.S. Burdic, *Underwater Acoustic System Analysis* (Peninsula, Los Altos, CA, 2002)
5. **Specific course information:**
 - (a) Brief description of the content of the course (catalog description):
Sonar equations, underwater sound propagation, sonar system performance and design.
 - (b) Prerequisites: EOC 3306 (Acoustics for Ocean Engineers) (with a grade of C or above) or permission of instructor.
 - (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 basic and applied knowledge of underwater sound generation, propagation and reception as required in the design of underwater acoustic systems and experiments.
 - (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 understanding of the theory of sound generation, propagation, and reception in the ocean. (a,e,k/1,2,6)
 2. An appreciation for the various sources of ambient noise in the sea. (a,e,k/1,2,6)
 3. An understanding of the sonar equation and basic signal processing concepts essential to sonar system design. (a,e,k/1,2,6)
 4. The ability to design basic sonar systems and basic ocean acoustic experiments. (a,e,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:**
 - Acoustics waves in a homogeneous medium.
 - Reflection, transmission, and refraction.
 - Acoustic sources.
 - Sound transmission in the ocean.
 - Fourier methods.
 - Fundamentals of sonar signal processing.
 - Ambient noise in the ocean.
 - The sonar equation.