

Marine Acoustics 103

INTRODUCTION TO MARINE ACOUSTICS

Course Code 07474

Units

Lecturer Mr Alec Duncan, Dr Rob McCauley, Prof. Alexander Gavrilov

Provider Curtin University of Technology

Mode of Delivery

On-line

Prerequisites/Assumed Knowledge

Ability to use spreadsheets for data analysis and display. Year 12 mathematics would be an advantage.

Aim/Learning Objectives

To provide students with an understanding of the general principles of sound production, propagation and reception underwater, and to describe how these principles are applied by humans and marine animals. This unit is designed to serve as an introduction to the topic for those with little or no previous experience with underwater acoustics and uses only a basic level of mathematics.

Content

Introductory Material: Basic concepts of sound propagation; measurement units and terminology.

Transduction: Devices for generating and receiving sound in water.

Noise in the ocean: Ambient noise generation mechanisms and characteristics.

Ray acoustics: Reflection and refraction of sound; attenuation due to spreading and absorption.

Deep-water propagation: Typical vertical sound speed profiles and their effects on acoustic propagation; the SOFAR channel and ultra long range sound propagation.

Wave acoustics: Conditions under which ray theory breaks down; acoustic propagation in a waveguide; modes and modal interference patterns.

Marine bioacoustics: Sound production and reception by marine animals; use of sound by marine animals.

Environmental effects of man-made sound: Characteristics of man-made sounds in the ocean and their impacts on marine animals.

Applications: Defence; environmental assessment; marine resource estimation; commercial applications.

Assessment

Assessment is by three assignments, which are worth 20%, 40% and 40% of the final mark.

Resources

There is no specific text for this unit, however the following books are useful references:

L E Kinsler et. al. "Fundamentals of Acoustics", Wiley, 1982.

C S Clay and H Medwin, "Acoustical Oceanography: Principles and Applications", Wiley, 1977.

H Medwin and C S Clay, "Fundamentals of Acoustical Oceanography", Academic Press, 1998.

R Urick, "Principles of underwater sound for engineers", 3rd Edition, Peninsula Publishing, 1983.