

Underwater Environmental Noise Short Course





Presented by: The Centre for Marine Science and Technology, Curtin University

Dates: Thursday 23rd and Friday 24th November 2017 (the two days following Acoustics 2017)

Venue: Pan Pacific Hotel, 207 Adelaide Terrace, Perth, WA, 6000

This course is intended to provide an overview of underwater acoustics and its application to the assessment of the impacts of anthropogenic underwater noise on marine animals. It will be suitable for: regulators, environmental consultants, company environmental officers, acoustic consultants, PhD students, academics, etc.

Presenters:

	Dr Christine Erbe, Director CMST - marine soundscapes, physical marine acoustics, environmental regulation
	Assoc. Prof. Rob McCauley - use of sound by marine animals and effects of underwater sound on marine animals.
	Dr Alec Duncan - physical marine acoustics, modelling of underwater sound levels.
	Dr Klaus Lucke - sensory physiology, auditory studies of marine mammals and fish, environmental management & policies

Registration fees (AUD, inc. GST):

	2 days	1 day
Standard (before October 30)	\$560	\$330
Standard (on or after October 30)	\$660	\$396
Full-time postgraduate student (before October 30)	\$280	\$165
Full-time postgraduate student (on or after October 30)	\$330	\$198

To register:

Follow the registration link at: www.acoustics2017.com

Enquiries:

info@cmst.curtin.edu.au

+61 8 9266 3569

Syllabus and Indicative Program (still subject to change):**Day 1: Thursday 23rd November**

0900 - 0930	Introduction	<ul style="list-style-type: none"> • Introductions • Biological/environmental context • Regulatory context
0930 - 1030	Acoustics basics	<ul style="list-style-type: none"> • The physical nature of sound • Pressure, particle velocity, intensity • Period, frequency, amplitude, root mean square, peak, peak to peak. • Specific acoustic impedance of a medium. • Measures of sound for impulsive sources – sound exposure • Example calculations
1030 - 1050	Coffee break	
1050 - 1230	More acoustics basics	<ul style="list-style-type: none"> • The decibel • Sound pressure levels • Sound exposure level • Source level • Transmission loss (including simple spreading loss laws and absorption) • Received level <ul style="list-style-type: none"> • Receive/transmit sensitivity of transducers • Spectra and spectral units • Example calculations
1230-1330	Lunch	
1330-1500	Acoustic propagation	<ul style="list-style-type: none"> • Refraction • Reflection <ul style="list-style-type: none"> ○ reflection coefficients ○ reflection loss • Transmission • Ray acoustics • Ducting • A brief introduction to wave acoustic effects • The need for computer modelling

		<ul style="list-style-type: none"> • Example calculations
1500-1520	Coffee break	
1530-1700	Anthropogenic sound sources	<ul style="list-style-type: none"> • Characteristics of different anthropogenic sound sources: <ul style="list-style-type: none"> ○ seismic airgun arrays, ○ pile driving, ○ ships, ○ drilling noise • Computer modelling of sound sources • Example calculations
1700-1730	Recap of important points	

Day 2: Friday 24th November

0900 -1100	Field trip/equipment demo (possibly Elizabeth Quay)	<ul style="list-style-type: none"> • Hydrophones, preamps and recording systems • Underwater noise loggers • Calibration • Active systems: echo sounders, imaging sonar, sidescan.
1100 - 1140	Travel back to Curtin	
1140-1230	Lunch	
1230-1330	Recap on field equipment	<ul style="list-style-type: none"> • Summary of equipment used and how it works. • Data visualisation through spectrograms, including demonstration of CHORUS
1330-1500	Effects of underwater sound on marine animals - mechanisms	<ul style="list-style-type: none"> • Reiteration of what sounds is, wrt biological impacts - ie. how can it cause impacts? • Nature of noise source • Types and mechanisms of noise impact: <ul style="list-style-type: none"> ○ direct lethal effects ○ physiological impacts & hearing damage ○ delayed lethal impacts ○ behavioural responses ○ masking of sounds of interest by noise ○ indirect impacts • Individual vs. population level effects, PCAD/PCod models. • Ecological scale of impact - scale & time - is it significant? • Adaptations to noise

1500-1520	Coffee break	
1520-1600	Measurement and examples of effects of underwater sound on marine animals - examples	<ul style="list-style-type: none"> • Measurements of sensitivities of animals to underwater sound. • Examples of impacts <ul style="list-style-type: none"> ○ plankton ○ squid ○ fish ○ sea turtles ○ scallops ○ lobsters ○ whales
1600-1730	Environmental regulation and assessment	<ul style="list-style-type: none"> • Environmental assessment process • Summary of national and international regulations • Sources of information on relevant thresholds • Modelling for environmental assessments