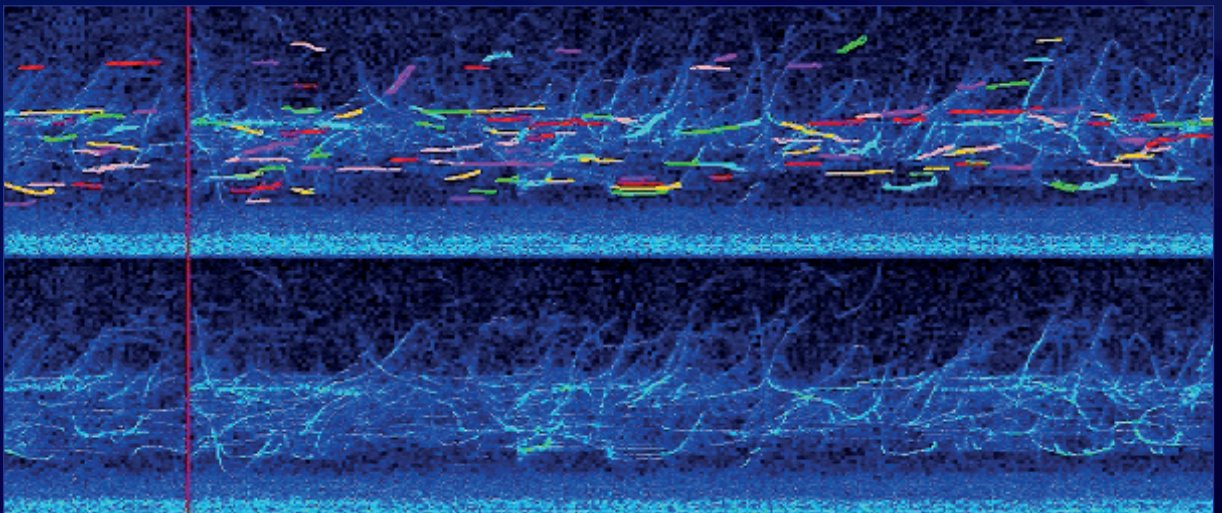


Underwater Acoustic & Passive Acoustic Monitoring Training

Courses for 2014



Seiche Underwater Acoustic Courses

These courses were initiated by the late Professor Rodney Coates, who specialised in R&D and postgraduate education in Underwater Acoustics. Foundation and Advanced Acoustic Courses are available.

Passive Acoustic Monitoring Courses

Seiche are also able to provide in house training to qualified MMOs and PAM operators in the specifics of operating PAM systems and current legislation. The use of a trained operator is critical to the efficient operation of a survey.

Bespoke Training

Seiche can also provide bespoke training for clients at their own facilities.

Seiche Measurements Limited

Training course are delivered by Seiche Measurements Limited (Seiche). Seiche was formed in 1996 to undertake underwater acoustics research projects, the company was involved in the early stages of Passive Acoustic Monitoring (PAM) development. Seiche is the leading worldwide supplier of PAM equipment to the oil and gas industry. The company has 17 years of experience with underwater acoustic products and over 70,000 days of deployment across all systems. All products are designed and manufactured in house at the company's own facility. Seiche will also provide bespoke solutions to customer requirements.

Seiche specialises in the design, development and manufacture of underwater acoustic and visual mitigation systems.

The company has facilities in the UK and the USA.

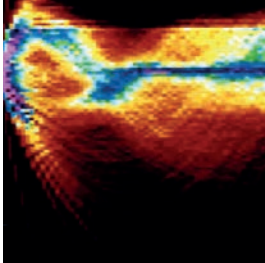


Course Bookings

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Underwater Acoustic Foundation Course:

The Principles of Underwater Acoustics



Key Information

Course dates:
28th - 30th April 2014

Venue:
Bath University
United Kingdom

Cost: £1100 excluding VAT
and accommodation

*This course contains
13 x 1 hour tuition sessions &
8 x 1 hour tutorial/discussion
sessions*

Sample of Modules Include:

- Introduction to acoustics and underwater sound
- Key quantities, units and Dimensions
- Sound Speed, Reflection, Refraction,
- Acoustic 'Ohms Law'
- Ocean Environment
- Decibels (dB)
- Acoustic Transducers
- Hydrophones
- Transducer Arrays / Beam Patterns
- Acoustic Profiling and Mapping
- Bandwidth, Risetime and Spatial Resolution
- Ray Trace Propagation modelling
- Ambient noise and Reverberation
- The Sonar Equations
- Reflection & Transmission Loss at Boundary
- Seismic Sources
- Processing spectral analysis
- Map orientated processing
- Introduction to why this is an environmental issue
- Environmental Impact Assessment
- Vessel Noise
- Seismic Sources
- Impulsive sources

About This Course

This course is designed to stand alone and will provide a foundation knowledge in Underwater Acoustics. The mathematical content of the course is modest; University-level mathematics is NOT essential. Course content will be readily accessible to delegates with backgrounds ranging across the breadth of the scientific spectrum. Thus the course has considerable significance as preparatory material for delegates from the Life Sciences wishing to focus on the advanced module on monitoring marine wildlife.

By the same token, this module provides a wealth of information not presented in mainstream University programmes in Engineering, Physics and Mathematics. It is therefore of great value to delegates with such backgrounds wishing to attend the advanced acoustics module.

By the end of the module, delegates will be have an excellent grounding in the mechanisms of sound propagation in the ocean, the impact of noise and reverberation produced by the ocean environment and the basic structure and performance of SONAR equipment.

Who Should Attend This Course

This course is seen as being of value to industrial delegates with career objectives in the engineering development of SONAR equipments for Naval, environmental and scientific purposes, including contracting and research. It is relevant to Navy personnel involved in the commissioning of new SONAR equipments and in defence applications such as Antisubmarine Warfare, Mine hunting and Battlefield Tactics. Such delegates may also find the course on Advanced Underwater Acoustics particularly beneficial, although it is not necessary for both to be taken within any one week.

The course will also be highly relevant to delegates with backgrounds in Fisheries, Environmental Science and Marine Biology, particularly if it is taken as the precursor to the advanced module on Acoustic Monitoring of Marine Wildlife to those working in the Offshore Industry.

Underwater Acoustic Advanced Course:

Oil-Industry & Navy Underwater Acoustics



Key Information

Course date:
1st - 2nd May 2014

Venue:
Bath University
United Kingdom

Cost: £900 excluding VAT
and accommodation

*This course contains
14 x 1 hour tuition sessions*

Sample of Modules Include:

- Fundamentals of Sonar
- Signal processing and displays
- Acoustic Beams and Beam Forming
- Sonar Target Recognition and Target Echo Strength
- Introduction to Environmental and Man-made Noise in the ocean
- Environmental Impact Assessment
- Introduction to Marine Seismic imaging
- Marine Seismic Data Processing
- Vessel Radiated Noise
- Shallow Water Measurements and calculations
- Impacts of Noise on Marine Life
- Mitigation of the effects of sound on marine life
- Acoustic Instruments
- Acoustic Navigation & positioning
- Acoustic Communications
- Passive Acoustic Monitoring
- Explosive, Concussive, vibrational sources

About This Course

This course provides an authoritative account of advanced topics in underwater acoustics and is a natural follow-on course from the Basic Underwater Acoustics Course. Delegates should have a basic understanding of calculus and of the use of complex numbers although involved mathematical treatments are avoided.

Attendance of the Basic Underwater Acoustics Course would undoubtedly be of great value to many delegates since it fills in a wealth of detail on the physics of underwater sound which, will not have been a feature of mainstream Undergraduate or Postgraduate syllabi in Science and Technology degrees.

Aims and Objectives

The Advanced Underwater Acoustics course is intended to give depth of coverage in topics of concern to those involved in the development and use of military, civil and oil-industry acoustic and seismic systems. It is intended that delegates will - at the end of the two days - have an excellent appreciation of the mainstream advanced sonar engineering tools which are employed by and devised for naval, geotechnical and marine civil engineers, and those involved in oil and gas field exploitation. Delegates will emerge from the course with a clear understanding of the impact their activities have on the natural world and, indeed, other users of the underwater acoustic spectrum. They will acquire a detailed knowledge of the impact of high- power, high- energy and/or frequency agile underwater sound sources. Emphasis will be placed on the important issue of measurement and calculations in shelf-sea waters, where range is long by comparison with water depth and both are often small by comparison with wavelength. Emphasis will be on practical methods of overcoming the problems of having to acquire and process data in such difficult circumstances.

Structure

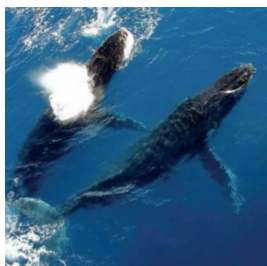
The Basic Underwater Acoustics Course is very strongly recommended as a prerequisite for this advanced course.

Who Should Attend This Course

This module will be particularly suitable for delegates working in Industry who are concerned with responding to specifications to tender for commercial and military projects. Navy personnel involved in writing such specifications will find the course valuable in assisting them to provide realistic and achievable targets for contractors. Government defence research personnel embarking on work in this area will find the course of benefit in upgrading a broad-based degree in engineering, mathematics or physics. Workers in the Offshore Survey Industry will find the material highly relevant to the understanding of signal transmission into and within marine sediments structures.

Underwater Acoustic Advanced Course:

Acoustics and the Marine Environment



Key Information

Course date:
1st - 2nd May 2014

Venue:
Bath University
United Kingdom

Cost: £900 excluding VAT
and accommodation

*This course contains
14 x 1 hour tuition sessions*

Sample of Modules Include:

- Introduction to Environmental and Man-made Noise in the ocean
- Environmental Impact Assessment
Hearing response of Marine Wildlife
- Marine Seismic Sources
- Biological Sources of sound
- Vessel Radiated Noise
- Shallow Water Measurements & Calculations
- Impacts of Noise on Marine Life
- Mitigation of the effects of sound on marine life
- The Scientific Echosounder
- Fish shoals & Acoustic Scattering
- Abundance Estimation using Acoustics
- Passive Acoustic Monitoring
- Explosive, Concussive, vibrational sources

About This Course

There has been much concern during recent years over the impact of both seismic survey and the testing of high power military sonars on whales and dolphins. Observation shows, however, that high-power sound sources produce not inconsiderable interaction with a much broader spectrum of marine life than just the cetaceans. In this advanced course we examine, dispassionately and without prejudice, the way in which marine wildlife may be affected by high power sound. We also discuss the ways in which acoustics might be employed to the benefit of marine animal populations in the devising of effective passive monitoring and disturbance avoidance strategies.

Structure

The Basic Underwater Acoustics Course is very strongly recommended as a prerequisite for this advanced course.

Objectives

The first objective of this course is to develop clear, quantitative, scientific understanding of the issues involved in the impact of high-power acoustics on marine wildlife. The second objective is to provide an understanding of the instrumentation and use of passive acoustics as a preferred tool for marine wildlife monitoring and identification.

Who Should Attend This Course

This course has obvious relevance for environmentalists in general and shipboard wildlife monitors in particular. It has equal relevance for those concerned with the engineering development of civil and military sonars and the field use of such equipments. It will also be of importance to those in the Offshore Industry concerned with the planning and conduct of acoustic surveys. Finally, it will have great value to those concerned with public relations in the context of military activities and seismic survey activities.

The speakers will ensure that the level of engineering and mathematical treatment is acceptable to delegates whose background is not in the physical sciences.

Lecturers

Professor Victor Humphrey



Victor is a Professor of Acoustics in the Institute of Sound and Vibration Research at the University of Southampton. He has

over thirty years of research experience in both underwater acoustics and medical ultrasound.

His interests include numerical modelling of transducers and fields; parametric arrays and their applications in the laboratory and at sea; techniques of measuring the acoustic properties of materials; acoustic scattering from structures; nonlinear propagation in tissues and its use to improve imaging in medical ultrasonics.

Victor has a keen interest in applied acoustics and the potential for cross fertilisation of ideas between different fields of acoustics. He has a wide experience of conveying acoustic concepts to students from a wide range of backgrounds.

Dr Paul Lepper



Paul is the Senior Research Fellow in the School of Electronic, Electrical & Systems Engineering, Loughborough

University, UK. He is specializing in underwater acoustics, bioacoustics and underwater technologies. These include acoustic and optical underwater systems, sound field measurement, modelling and simulation. He is also working upon marine species hearing as well as the acoustic impact of noise on marine fauna.

Paul's research topics include measurement and characterization of underwater noise sources and the assessment of noise impact on marine fauna. These topics have included work to assess the construction noise from several offshore windfarm developments. They also involve investigation of various petroleum platforms and include projects looking at noise from small leisure craft.

Source characterization, sound field modelling and modelling marine species exposure are treated by Paul. He is also involved in projects to assess hearing abilities of marine mammals and the use of acoustic deterrents. Furthermore, he is involved in the development of various systems for long term noise field assessment and passive detection of marine species and the use of various propagation models for sound field assessment.

Dr Philippe Blondel



Philippe is a Senior Lecturer at the University of Bath. His research focuses on the physical understanding of acoustic remote

sensing and its uses in underwater environments. This research is based on the development of new experimental processing techniques, in conjunction with theoretical studies of high-frequency acoustic scattering.

Experiments are performed in the large tank facilities of the laboratory, in short sea trials, and in long deep-sea marine expeditions. Theoretical developments currently focus on models of high-frequency bistatic scattering (above 100 kHz) and monostatic backscattering (1 kHz to 500 kHz). The applications are varied and include: seabed mapping, tsunami studies habitat mapping (deep-sea coral reefs, Arctic ecosystems, continental margins), mine counter-measures (MCM), sea floor characterisation (TexAn software) and 3-D imaging of toxic waste in/on the seabed.

Dr Robert Laws



Robert works at Schlumberger's Research laboratory in Cambridge.

Schlumberger is a large oil field service company and, under the business name WesternGeco, is one of the leading seismic survey companies in the world. Robert is in the Geophysics Department which deals mainly in seismic imaging at sea and on land.

Currently he is working on marine seismic sources and acquisition systems. In the earlier part of his career in geophysics Robert worked in Oslo on seismic data processing and imaging. The recent areas of his research have been on the effect of the rough sea surface on the seismic image, the design of novel marine seismic sources and the understanding of signal and noise in the seismic image.

Robert serves on the technical steering committees of several research projects funded by the JIP (a consortium funded energy companies that sponsors independent research on the impact of sound on marine life) and he has a strong personal interest in the effect of marine seismic sources on the environment and the ways in which it can be mitigated.

Dr Paul Fernandes



Paul is MASTS Reader at the University of Aberdeen. His research is focused on commercial fisheries. These include the

biology and ecology of commercially exploited fish, their abundance and distribution and how they change as they are affected by factors such as fishing and climate change. He is responsible for the assessment of various stocks of fish around Scotland, such as haddock and anglerfish.

Paul's work involves fisheries acoustics, including the use of echosounders and other sonar equipment for studying marine life and measuring fish stock densities. For active SONAR acoustic instruments, Paul is particularly interested in methods for identifying objects which scatter sound of multiple frequencies according to their physical, physiological and behavioural characteristics. He is involved in the development of scattering models, and validating these with empirical data.

Paul is Chair of various groups of the International Council for the Exploration of the Sea where his interests are centred around the development of active acoustics and the introduction of new technologies to study the abundance and distribution of fish.

He has been a key developer of acoustic techniques deployed in Antarctic waters using the AUTOSUB vehicle (NOCs, Southampton), for obtaining biomass estimations under ice.



Bookings

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Training Course:

Passive Acoustic Monitoring

Course Modules

Day 1

- Sound In Water
- Marine Mammals
- Anthropogenic Noise in the Sea
- Effects of Anthropogenic Noise on Marine Mammals
- Local Mitigation Guidelines
- PAM Principles & the Role of the PAM Operator

Day 2

- PAM Hardware & Operations
- PAM Software
- PAMGuard Workshop

Day 3

- Practical



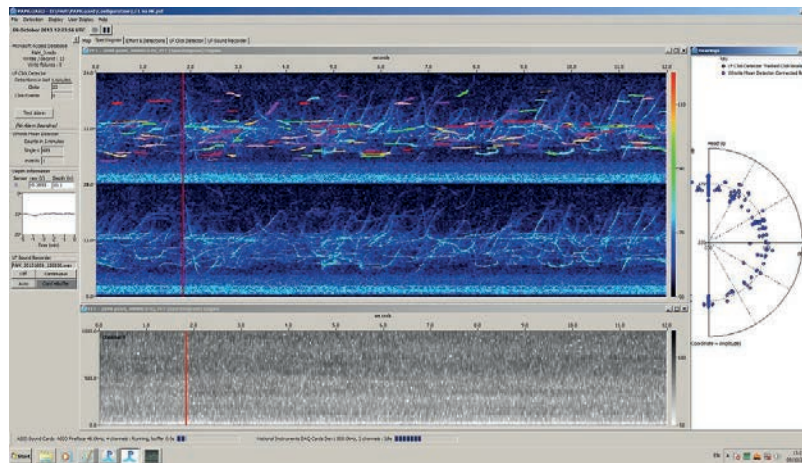
Key Information

Current course dates:
25th - 27th March 2014

Venue:
Portsmouth Langstone Hotel
United Kingdom

Cost: £375 excluding VAT and accommodation.

Check the website for future dates and venues.



About This Course

The aim of the Seiche PAM course is to provide a comprehensive training course for personnel who are interested in passive acoustic monitoring. The 3 day course is aimed at delegates with a scientific background, preferably in biology and marine sciences who have completed the JNCC marine mammal observer course.

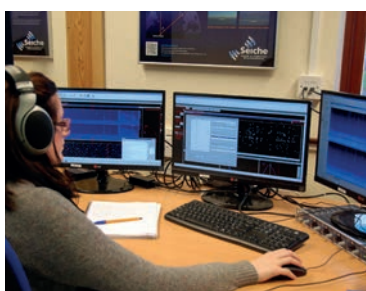
Structure

There are two days of classroom sessions with lectures on sound in water, marine mammal evolutionary biology and sound production, anthropogenic noise sources and their effect on marine mammals, PAM principles and the role of the PAM operator, Seiche PAM hardware with deployment and operations, PAM software and an introduction to PAMguard.

There are hands on sessions in the classroom with Seiche PAM equipment to reinforce the lectures and encourage the delegates to get to grips with the system, it's set up and operation and troubleshooting.

The final classroom session is an interactive PAMguard workshop where delegates work along with the instructor to build a functioning PAMguard data model. Simulated sources and recordings are used to show how the effective use of detectors enables PAM operators to detect and localise vocalising marine mammals.

Day three is a practical session on a vessel where delegates use what they have learned to take an active role in set up, deployment and operation of the Seiche PAM system at sea and run through troubleshooting scenarios.



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