

## School of Biology

### Head of School

Professor G Taylor

### Taught Programmes

#### Postgraduate Certificate:

Sustainable Aquaculture (Vertebrates)

Sustainable Aquaculture (Invertebrates)

#### Postgraduate Diploma:

Sustainable Aquaculture

#### M.Sc.:

Sustainable Aquaculture

#### M.Res.:

Ecosystem-Based Management of Marine Systems

Environmental Biology (*not available 2013/14*)

Environmental Biology Conversion for Mathematical, Physical and Molecular Sciences (*not available 2013/14*)

Marine Mammal Science

### Programme Requirements

#### **Ecosystem-Based Management of Marine Systems**

##### *Taught Element:*

35 credits: BL5303 and BL5304

at least 45 credits : (BL5301 or BL5008), (BL5111 or BL5021), ID5011, MT5753, BL5321

at least 40 credits: BL5302, BL5322, BL5323, BL5324, BL5124

**M.Res.:** 120 credits from the Taught Element, plus BL5399 (60-credit Research Project module)

#### **Environmental Biology** (*not available 2013/14*)

##### *Taught Element:*

90 - 95 credits from compulsory modules:

BL5015, BL5016, BL5018, BL5020, BL5021, (ID5011 or ID5012), MT5753

and

30 credits from optional modules: BL5009, BL5011, BL5012, BL5013, BL5123, BL5124, MT5751

**M.Res.:** 120 - 125 credits from the Taught Element, plus BL5019 (60-credit Research Project module)

## Biology - Postgraduate 2013/14 - August 2013

### **Environmental Biology Conversion for Mathematical, Physical and Molecular Sciences** *(not available 2013/14)*

#### *Taught Element:*

90 - 95 credits from compulsory modules: BL5008, BL5015, BL5016, BL5018, BL5020, (ID5011 or ID5012), MT5753 and

30 credits from optional modules: BL5009, BL5011, BL5012, BL5013, BL5123, BL5124, MT5751, MT5754, MT5755

**M.Res.:** 120 – 125 credits from the Taught Element, plus BL5019 (60-credit Research Project module)

### **Marine Mammal Science**

#### *Taught Element:*

100 credits from compulsory modules: BL5103, BL5104, BL5111, BL5112, BL5201, BL5202, MT5753 and

20 credits from optional modules: BL5011, BL5121, BL5122, BL5123, BL5124, BL5125, MT5751

**M.Res.:** 120 credits from the Taught Element, plus BL5199 (60-credit Research Project module)

### **Sustainable Aquaculture**

#### **Postgraduate Certificate:**

Sustainable Aquaculture (vertebrates) BL4801, BL4804, BL5807, BL5809 and 2 of BL5802, BL5804, BL5805

#### **Postgraduate Certificate:**

Sustainable Aquaculture (invertebrates) BL4801, BL4803, BL5806, BL5808 and 2 of BL5802, BL5804 and BL5805.

#### **Postgraduate Diploma:**

120 credits from BL4801, BL4802 or (BL4803 and BL4804), BL5801 or (BL5806 and BL5807), BL5802, BL5803 or (BL5808 and BL5809), BL5804, BL5805 and two of (BL5821, BL5822, BL5823, BL5824, BL5825)

**M.Sc.:** 120 credits as for the Postgraduate Diploma plus BL5899.

*For all Masters degrees there are exit awards available that allow suitably-qualified candidates to receive a Postgraduate Certificate or Postgraduate Diploma.*

## Biology (BL) Modules

BL5011 Conservation Biology				
<b>SCOTCAT Credits:</b>	10	SCQF Level 11	<b>Semester:</b>	1
<b>Planned timetable:</b>	To be arranged.			
This module will cover the measurement of biodiversity, the meaning of biodiversity, factors determining extinction risk for local populations, and the effect of spatial variation on biodiversity. Practical sessions will include an introduction to diversity measurement (including sampling issues, computer packages and interpretation of output), population viability analysis, and the use of "environmental futures" to guide research strategies.				
<b>Programme module type:</b>	Optional for M.Res. in Environmental Biology and M.Res. in Environmental Biology Conversion for Mathematical, Physical and Molecular Sciences and M.Res. in Marine Mammal Science Postgraduate Taught Programmes.			
<b>Anti-requisite(s):</b>	BL5321			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 5 lectures each week for 2 weeks, 1 tutorial, 1 practical class and 1 workshop.			
<b>Assessment pattern:</b>	2-hour Written Examination = 60%, Coursework = 40%			
<b>Module Co-ordinator:</b>	Dr A Ojangan			

BL5103 Population Biology of Marine Mammals				
<b>SCOTCAT Credits:</b>	15	SCQF Level 11	<b>Semester:</b>	2
<b>Planned timetable:</b>	To be arranged.			
The module reviews the fundamental concepts of population dynamics (growth, density dependence, stability, population structure) and how these are interpreted in the light of the various life-history strategies adapted by different species of marine mammals. It then examines topics in population genetics, trophic interactions and spatial dynamics. The module also covers practical issues involved in population viability analysis and anticipated future developments in integrative modelling approaches.				
<b>Programme module type:</b>	Compulsory for M.Res. in Marine Mammal Science			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 4 lectures, 1 seminar and 1 practical class each week for 3 weeks.			
<b>Assessment pattern:</b>	1.5-hour Written Examination = 50%, Coursework = 50%			
<b>Module Co-ordinator:</b>	Dr S Heinrich			

## Biology - Postgraduate 2013/14 - August 2013

BL5104 Conservation and Management of Marine Mammals				
<b>SCOTCAT Credits:</b>	15	SCQF Level 11	<b>Semester:</b>	2
<b>Planned timetable:</b>	To be arranged.			
<p>From the heated debates surrounding whaling to calls for seal culls to protect commercial fish stocks, issues pertaining to marine mammals feature regularly in the public domain and often polarise public opinion. Finding ways to address human-marine mammal conflicts and advise on mitigation have become important tasks for many marine mammal scientists. Through a series of lectures, seminars, debates and workshops, students will explore human-marine mammal interactions to better understand the underlying factors. They will learn to critically evaluate current conservation and management issues and will explore ways in which sound science can contribute to alleviate existing and future conflicts.</p>				
<b>Programme module type:</b>	Compulsory for M.Res. in Marine Mammal Science			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 3 lectures and 2 seminars each week for 4 weeks.			
<b>Assessment pattern:</b>	1.5-hour Written Examination = 50%, Coursework = 50%			
<b>Module Co-ordinator:</b>	Dr S Heinrich			

BL5111 Quantitative Methods for Biology				
<b>SCOTCAT Credits:</b>	10	SCQF Level 11	<b>Semester:</b>	1
<b>Planned timetable:</b>	To be arranged.			
<p>This module provides the basic numerical and computational skills necessary for visualising and summarising data sets. It is designed as a primer for more advanced courses in statistical modeling and also as an introduction to the computer language R. The examples and computer practicals are motivated from the ecological literature.</p>				
<b>Programme module type:</b>	Compulsory for M.Res. in Marine Mammal Science Optional for M.Res in Ecosystem-based Management of Marine Systems			
<b>Anti-requisite(s):</b>	BL5021			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 5 lectures and 2 practical classes each week for 2 weeks, tutorials and 1 seminar.			
<b>Assessment pattern:</b>	1.5-hour Written Examination = 50%, Coursework = 50%			
<b>Module Co-ordinator:</b>	Dr S Smout			

BL5112 Research Methods in Marine Mammal Science				
<b>SCOTCAT Credits:</b>	10	SCQF Level 11	<b>Semester:</b>	Whole Year
<b>Planned timetable:</b>	To be arranged.			
<p>This module will provide an overview of the wide range of methodologies applied in the field of marine mammal science. Lectures will introduce different techniques for sampling individual animals, animal behaviour, abundance and distribution. Students will learn to plan research activities and apply different technical approaches to data collection, processing and analysis. During the optional field trip students will put into practice many of the theoretical aspects and techniques discussed in class.</p>				
<b>Programme module type:</b>	Compulsory for M.Res. in Marine Mammal Science			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 4 x 2-hour lectures each week for 3 weeks, 1 x 2-hour tutorial each week for 3 weeks and an optional 8-day field trip.			
<b>Assessment pattern:</b>	Coursework = 100%			
<b>Module Co-ordinator:</b>	Dr S Heinrich			

BL5121 Current Issues in Marine Mammal Behaviour				
<b>SCOTCAT Credits:</b>	10	SCQF Level 11	<b>Semester:</b>	2
<b>Planned timetable:</b>	To be arranged.			
<p>Marine mammals are often seen as highly intelligent and complex in their behaviour. This module will investigate such claims by discussing current views and recent advances in the study of marine mammal social behaviour. Each student will present one topic to the class and lead the discussion on it. Topics covered will include brain evolution, dolphin signature whistles, referential communication, cetacean culture, equivalence classes, cooperation and concept formation.</p>				
<b>Programme module type:</b>	Optional for M.Res. in Marine Mammal Science			
<b>Pre-requisite(s):</b>	BL5201			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 1 lecture and 9 seminars spread over 2 weeks.			
<b>Assessment pattern:</b>	1.5-hour Written Examination = 50%, Coursework = 50%			
<b>Module Co-ordinator:</b>	Dr V Janik			

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BL5122 Current Issues in Biologging				
<b>SCOTCAT Credits:</b>	10	SCQF Level 11	<b>Semester:</b>	2
<b>Planned timetable:</b>	To be arranged.			
<p>This module will present an introduction to marine mammal biologging science: the theory and practice of logging and relaying physical and biological data using animal-attached tags. Lectures will cover the technology currently available for measuring animal movements, investigating behaviour, ecology and physiology, some of the problems associated with tag design in terms of how data is stored and transmitted, and problems associated with data analysis and data display.</p>				
<b>Programme module type:</b>	Optional for M.Res. in Marine Mammal Science			
<b>Pre-requisite(s):</b>	BL5201			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 3 lectures, 1 seminar and 1 practical class each week for 2 weeks.			
<b>Assessment pattern:</b>	1.5-hour Written Examination = 50%, Coursework = 50%			
<b>Module Co-ordinator:</b>	Dr S Hooker			

BL5124 Predator Ecology in Polar Ecosystems - a Field Course in Antarctica				
<b>SCOTCAT Credits:</b>	10	SCQF Level 11	<b>Semester:</b>	2
<b>Planned timetable:</b>	2 weeks, full-time			
<p>This module offers MRes students the unique opportunity to gain theoretical and practical experience in polar ecology with special emphasis on top predators (cetaceans, pinnipeds, sea birds), ecosystem functionality and management of Antarctic marine living resources. Students will participate in a two-week vessel-based expedition to Antarctica during the austral summer. This field trip involves travelling to southern Argentina, conducting at-sea surveys during transit to/ from the Antarctic Peninsula, participating in shore-based activities, and exploring Antarctic coastal waters from small boats. Through a series of specialist lectures, student-led seminars, on-board practicals, field excursions and dedicated observational studies students will gain in-depth understanding and critical awareness of the current scientific, conservation and management challenges of the Antarctic ecoregion. Upon return to St Andrews students will complete a specialist case study on a selected topic which will culminate in the presentation of a report in journal format.</p>				
<b>Programme module type:</b>	Optional for M.Res. in Ecosystem-Based Management of Marine Systems M.Res. in Environmental Biology and M.Res. in Marine Mammal Science.			
<b>Pre-requisite(s):</b>	Undergraduate degree in relevant Biological disciplines and/or admittance to St Andrews M.Res. Programmes, Medical certificate documenting fit for travel to remote Antarctica			
<b>Anti-requisite(s):</b>	BL4301			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> Lectures, seminars and practicals for 2 weeks			
<b>Assessment pattern:</b>	Coursework = 100%			
<b>Module Co-ordinator:</b>	Dr S Heinrich			

BL5125 Advanced Bioacoustics for Marine Mammal Science				
<b>SCOTCAT Credits:</b>	10	SCQF Level 11	<b>Semester:</b>	2
<b>Planned timetable:</b>	To be arranged.			
<p>Bioacoustics is an important topic in marine mammal science, because of the use the animals themselves make of sound, because it is often the most practical way to detect their presence, and because of the impacts anthropogenic sounds can have on acoustically sensitive species. This course provides an advanced survey of current topics, from understanding the physics of sound and how it is measured and analysed, through using sound to detect and monitor marine mammal presence, to the assessment and mitigation of anthropogenic noise impacts. There will be a strong emphasis on digital analysis and practical exercises designed to introduce students to the range of techniques and tools currently used in the field.</p>				
<b>Programme module type:</b>	Optional for Marine Mammal Science MRes.			
<b>Pre-requisite(s):</b>	Students should have had some background in either marine mammal biology or physics, and should have studied some kind of mathematics to SCQF Level 7 or equivalent.			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 3 hours of lectures, 12 hours of practical classes, 3 tutorials and 4 hours of fieldwork over a 2 week period.			
<b>Assessment pattern:</b>	Coursework = 100%			
<b>Module Co-ordinator:</b>	Dr L Rendell			

BL5199 Marine Mammal Science Research Project				
<b>SCOTCAT Credits:</b>	60	SCQF Level 11	<b>Semester:</b>	Whole Year
<b>Planned timetable:</b>	To be arranged.			
<p>The research project or dissertation will involve the study of a defined problem within the field of marine mammal science. Students will be required to collate and analyse data and discuss their results in the light of existing literature. In some cases, projects might also involve the design of experiments or the gathering of data. Each project will be written up in the form of a thesis.</p>				
<b>Programme module type:</b>	Compulsory for M.Res. in Marine Mammal Science.			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> To be arranged.			
<b>Assessment pattern:</b>	Research report or Thesis of up to 15,000 words (excluding bibliography) = 100%			
<b>Module Co-ordinator:</b>	Dr S Heinrich			

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BL5201 Biology of Marine Mammals				
<b>SCOTCAT Credits:</b>	10	SCQF Level 11	<b>Semester:</b>	1
<b>Planned timetable:</b>	To be arranged.			
<p>This module introduces the zoogeography of marine mammals and the morphological, physiological and behavioural adaptations which have enabled this diverse group to successfully colonise all of the world's oceans and some freshwater systems. Students will gain an understanding of the physiological and behavioural complexity underlying movement patterns, diving, foraging, reproduction, and social dynamics of marine mammals across different temporal and spatial scales. Lectures will focus on topical issues and selected examples illustrating and contrasting some of the strategies employed by different marine mammal groups.</p>				
<b>Programme module type:</b>	Compulsory for M.Res. in Marine Mammal Science			
<b>Pre-requisite(s):</b>	Undergraduate courses in behaviour, ecology, physiology, zoology or marine science			
<b>Required for:</b>	BL5121, BL5122			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 5 x 2-hour lectures over 3 weeks and 2 tutorials.			
<b>Assessment pattern:</b>	3-hour Examination = 100%			
<b>Module Co-ordinator:</b>	Dr S Heinrich			

BL5202 Case Studies in Marine Mammal Biology				
<b>SCOTCAT Credits:</b>	20	SCQF Level 11	<b>Semester:</b>	1
<b>Planned timetable:</b>	To be arranged.			
<p>Many of the most topical issues in marine mammal science revolve around ecology and behaviour. In this module, students will explore aspects of diving, foraging, reproduction and social behaviour of marine mammals in greater detail through a series of student-lead seminars, lab practicals and field excursions. Computer practicals will provide training in basic principles of GIS application and, passive acoustic techniques. Emphasis will be placed on current advances in understanding and research methods. The issues discussed here are often at the base of human-marine mammal conflicts, thus understanding the underlying ecological principles not only provides interesting insights into marine mammal biology but also yields consequences for marine mammal conservation and management.</p>				
<b>Programme module type:</b>	Compulsory for M.Res. in Marine Mammal Science			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 2 lectures, 5 seminars, 3-hour practicals for 8 weeks and 1 daylong field trips.			
<b>Assessment pattern:</b>	Coursework = 100%			
<b>Module Co-ordinator:</b>	Dr S Heinrich			



BL5301 Tropical Marine Systems				
<b>SCOTCAT Credits:</b>	20	SCQF Level 11	<b>Semester:</b>	1
<b>Planned timetable:</b>	To be arranged.			
<p>This module will provide students with an advanced and focused understanding of selected tropical marine systems and the management thereof in an holistic, whole-ecosystem context. It will be run as a field course in Australia, at James Cook University's Orpheus Island field station on the Great Barrier Reef. Together with BL5302 Cold Water Marine Systems, this module will provide the foundation from which detailed knowledge and skills to measure and interpret system data can develop, together with the use of tools for whole-system analysis and management.</p>				
<b>Programme module type:</b>	Optional for M.Res. in Ecosystem-Based Management of Marine Systems			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 15 lectures, 1 study visit (to The Great Barrier Reef Marine Park Authority), 1 mini-project and 1 practical over a 2-week residential period - prior to the start of the academic year.			
<b>Assessment pattern:</b>	3-hour Written Examination = 50%, Coursework = 50%			
<b>Module Co-ordinator:</b>	Prof A Brierley			

BL5302 Cold Water Marine Systems				
<b>SCOTCAT Credits:</b>	20	SCQF Level 11	<b>Semester:</b>	2
<b>Planned timetable:</b>	To be arranged.			
<p>This module will build on BL5301 Tropical Marine Systems, but will focus on cold water ecosystems. Together these two modules will provide students with a broad understanding of globally-key marine systems. It will enable further detailed exploration of key systems, contrasting these to highlight significant environmental drivers. Important physical, chemical, biological and geological processes will be studied, alongside key biotic and abiotic interactions. Knowledge will be synthesised to provide students with a critical understanding of dynamic processes within and between systems. Together with BL5301 Tropical Marine Systems, this module will provide the foundation from which detailed knowledge and skills to measure and interpret systems data can develop, together with use of tools for whole system analysis and management. This module is taught at the Scottish Association for Marine Science facility at Oban, and focuses on systems with which SAMS has expertise.</p>				
<b>Programme module type:</b>	Optional for M.Res. in Ecosystem-Based Management of Marine Systems			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 20 lectures, and 1 practical each week over 3 weeks (i.e. 3 practicals total).			
<b>Assessment pattern:</b>	3-hour Written Examination = 50%, Coursework = 50%			
<b>Module Co-ordinator:</b>	Dr D Hughes (SAMS)			

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BL5303 Marine Systems Research Methods				
<b>SCOTCAT Credits:</b>	20	SCQF Level 11	<b>Semester:</b>	2
<b>Planned timetable:</b>	To be arranged.			
<p>The study of marine systems requires familiarity with a variety of methods of sampling the marine environment. These methods include use of the instruments and sampling devices used in physical, geological, biological, chemical and biogeochemical oceanography. The students will use these methods both on ship and in the laboratory, collecting data that they will analyze and disseminate. The module will also include development of scientific and proposal writing skills. This module is taught at the Scottish Association for Marine Science facility at Oban.</p>				
<b>Programme module type:</b>	Compulsory for M.Res. in Ecosystem-Based Management of Marine Systems			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 7 lectures, 2 tutorials and 5 practicals in total.			
<b>Assessment pattern:</b>	Coursework = 100%			
<b>Module Co-ordinator:</b>	Dr T Nickell (SAMS)			

BL5304 Ecosystem-based Management of Marine Systems				
<b>SCOTCAT Credits:</b>	15	SCQF Level 11	<b>Semester:</b>	1
<b>Planned timetable:</b>	To be arranged.			
<p>This module will introduce the concept of 'Ecosystem-based management', exploring its development from more simplistic, single-species approaches. Students will make case-studies in a workshop environment of iconic, managed ecosystems including the Southern Ocean and Australia's Great Barrier Reef.</p>				
<b>Programme module type:</b>	Compulsory for Ecosystem-based Management of Marine Systems Taught Postgraduate Programme			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> Lectures and Seminars.			
<b>Assessment pattern:</b>	Coursework = 100%			
<b>Module Co-ordinator:</b>	Prof A Brierley			
<b>Lecturer(s)/Tutor(s):</b>	Prof A Brierley			

<b>BL5321 Marine Biodiversity and Ecosystem Function</b>				
<b>SCOTCAT Credits:</b>	20	SCQF Level 11	<b>Semester:</b>	1
<b>Planned timetable:</b>	To be arranged.			
<p>This module will provide students with an advanced understanding of biodiversity issues in key marine systems. The current state of knowledge will be synthesised and the most recent theoretical approaches to the measurement of biodiversity, and the relationship between biodiversity and ecosystem function examined (the BEF debate). The concept of ecosystem services, over-yielding and habitat connectivity will be addressed. This will provide students with a modern overview of the dynamic interaction between biodiversity and system processes within and between systems.</p>				
<b>Programme module type:</b>	Optional for M.Res. in Ecosystem-Based Management of Marine Systems			
<b>Anti-requisite(s):</b>	BL5011			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 14 lectures and 2 practicals over 3 weeks.			
<b>Assessment pattern:</b>	3-hour Written Examination = 50%, Coursework = 50%			
<b>Module Co-ordinator:</b>	Dr R Aspden			

<b>BL5322 Marine Management, Policy and Planning</b>				
<b>SCOTCAT Credits:</b>	20	SCQF Level 11	<b>Semester:</b>	2
<b>Planned timetable:</b>	To be arranged.			
<p>This module provides students with a broad understanding of the issues surrounding the management of marine resources. Concepts of sustainability, coastal management and marine spatial planning will be explored from the perspective of a variety of stakeholders (e.g. nature conservation, oil/gas, fisheries and renewable energy). The module will identify key concepts underpinning sustainability and develop student awareness of the complex ecological, social, economic and political issues involved in marine management. Students will also develop an in-depth marine plan for a local area, gaining valuable experience of the approaches and problems of the emerging field of marine spatial planning. This module is taught at the Scottish Association for Marine Science facility at Oban .</p>				
<b>Programme module type:</b>	Optional for M.Res. in Ecosystem-Based Management of Marine Systems			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 17 lectures, 3 half-day practical sessions and a 1-day workshop			
<b>Assessment pattern:</b>	3-hour Written Examination = 50%, Coursework = 50%			
<b>Module Co-ordinator:</b>	Dr C Fox (SAMS)			

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BL5323 Advanced Modelling				
<b>SCOTCAT Credits:</b>	20	SCQF Level 11	<b>Semester:</b>	2
<b>Planned timetable:</b>	To be arranged.			
<p>Building on the basic concepts of modelling, and systems modelling taught at St Andrews, this module will teach, through lectures and linked practical sessions, an introduction to physical circulation models, individual and population-based spatial models and ecosystem modeling techniques. Additionally, coupled biophysical models will be taught. The module will give an overview of the different physical and biological models used in marine systems science, including the assumptions, parameters needed and some examples of these models, together with application of techniques and interpretation of outcomes. This module is taught at the Scottish Association for Marine Science facility at Oban.</p>				
<b>Programme module type:</b>	Optional for M.Res. in Ecosystem-Based Management of Marine Systems			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 9 lectures and 8 x 3-hour practical classes over 3 weeks.			
<b>Assessment pattern:</b>	Coursework = 100%			
<b>Module Co-ordinator:</b>	Dr S Heymans (SAMS)			

BL5324 Impacts on Marine Ecosystems				
<b>SCOTCAT Credits:</b>	20	SCQF Level 11	<b>Semester:</b>	2
<b>Planned timetable:</b>	To be arranged.			
<p>Human activities are resulting in a number of physical, chemical, biological and social changes which impact on marine systems, from the organism to the ecosystem level. This elective module will explore the various impacts of these, focusing in particular on the research expertise of SAMS scientists. Physically-driven change will concentrate on Earth's changing climate, ocean acidification and marine sound whilst chemically driven processes will focus on biogeochemical cycles, eutrophication oil contamination and marine sediment waste. Biologically driven changes will range from aquaculture, to marine aliens and finally social change will address the impact of fisheries on the marine system. This module is taught at the Scottish Association for Marine Science facility at Oban .</p>				
<b>Programme module type:</b>	Optional for M.Res. in Ecosystem-Based Management of Marine Systems			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 12 lectures, 3 x 3-hour tutorials, and 3 practicals over the 3-week duration of the module.			
<b>Assessment pattern:</b>	3-hour Written Examination = 50%, Coursework = 50%			
<b>Module Co-ordinator:</b>	Dr K Last			

BL5399 Ecosystem-Based Management of Marine Resources Research Project				
<b>SCOTCAT Credits:</b>	60	SCQF Level 11	<b>Semester:</b>	Whole Year
<b>Planned timetable:</b>	To be arranged.			
The research project or dissertation will involve the study of a defined problem within the field of marine systems science. Students will be required to collate and analyze data and discuss their results in the light of existing literature. In some cases, projects might also involve the design of experiments or the gathering of data. Each project will be written up in the form of a thesis.				
<b>Programme module type:</b>	Compulsory for M.Res. in Ecosystem-Based Management of Marine Systems			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> To be arranged.			
<b>Assessment pattern:</b>	Research report or Thesis of up to 15,000 words (excluding bibliography) = 100%			
<b>Module Co-ordinator:</b>	Prof A Brierley			

BL4801 Aquaculture and Fisheries				
<b>SCOTCAT Credits:</b>	10	SCQF Level 10	<b>Semester:</b>	Distance
<b>Planned timetable:</b>	To be arranged.			
This module provides an introduction to the global importance of aquaculture with fisheries industries worldwide. The module will compare both aquaculture and fishing industries with terrestrial, agricultural sources of food production. The global markets for aquaculture, fisheries and agricultural products will be assessed. The environmental interactions of aquaculture will be discussed with relation to the definition of, and development of, sustainable aquaculture practices. The principles of developing sustainable aquaculture in different global environments/conditions will be discussed.				
<b>Programme module type:</b>	Compulsory for all Sustainable Aquaculture Taught Postgraduate Programmes			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> Distance Learning : 1 x 2-hour lecture and 1 x 2-hour tutorial each week for 5 weeks.			
<b>Assessment pattern:</b>	2-hour Written Examination = 60%, Coursework = 40%			
<b>Module Co-ordinator:</b>	Dr N Hazon			

## Biology - Postgraduate 2013/14 - August 2013

BL4802 Biology for Aquaculture				
<b>SCOTCAT Credits:</b>	20	SCQF Level 10	<b>Semester:</b>	Distance
<b>Planned timetable:</b>	To be arranged.			
This module provides an understanding of the fundamental biology of aquaculture species. This includes the anatomy and physiology of both invertebrate and vertebrate aquaculture species. The interaction of aquaculture species with the aquatic environment and the requirements for developing sustainable aquaculture will be assessed.				
<b>Programme module type:</b>	Either BL4802 or (BL4803 and BL4804) is compulsory for Sustainable Aquaculture Taught Postgraduate Diploma and M.Sc. Programmes			
<b>Anti-requisite(s):</b>	BL4803 and BL4804			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> Distance Learning: 1 x 2-hour lecture and 1 x 2-hour each week for 10 weeks.			
<b>Assessment pattern:</b>	2-hour Written Examination = 60%, Coursework = 40%			
<b>Module Co-ordinator:</b>	Dr N Hazon			

BL4803 Biology for Aquaculture - Invertebrates				
<b>SCOTCAT Credits:</b>	10	SCQF Level 10	<b>Semester:</b>	Distance
<b>Planned timetable:</b>	To be arranged.			
This module provides an understanding of the fundamental biology of invertebrate aquaculture species. This includes the anatomy and physiology of appropriate aquaculture species. The interaction of aquaculture species with the aquatic environment and the requirements for developing sustainable aquaculture will be assessed.				
<b>Programme module type:</b>	Compulsory for Postgraduate Certificate in Sustainable Aquaculture (invertebrates). Either BL4802 or (BL4803 and BL4804) is compulsory for Sustainable Aquaculture Taught Postgraduate Diploma and M.Sc. Programmes			
<b>Anti-requisite(s):</b>	BL4802			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 4 hours of lectures each week for 5 weeks, and 3 hours of tutorials each week for 2 weeks.			
<b>Assessment pattern:</b>	2-hour Written Examination = 60%, Coursework = 40%			
<b>Module Co-ordinator:</b>	Dr N Hazon			

BL4804 Biology for Aquaculture - Vertebrates				
<b>SCOTCAT Credits:</b>	10	SCQF Level 10	<b>Semester:</b>	Distance
<b>Academic year:</b>	2013/4			
<b>Availability restrictions:</b>	Not available to undergraduate students			
<b>Planned timetable:</b>	To be arranged.			
This module provides an understanding of the fundamental biology of vertebrate aquaculture species. This includes the anatomy and physiology of appropriate aquaculture species. The interaction of aquaculture species with the aquatic environment and the requirements for developing sustainable aquaculture will be assessed.				
<b>Programme module type:</b>	Compulsory for Postgraduate Certificate in Sustainable Aquaculture (vertebrates)  Either BL4802 or (BL4803 and BL4804) is compulsory for Sustainable Aquaculture Taught Postgraduate Diploma and M.Sc. Programmes			
<b>Anti-requisite(s):</b>	BL4802			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 4 hours of lectures each week for 5 weeks, and 3 hours of tutorials each week for 2 weeks.			
<b>Assessment pattern:</b>	2-hour Written Examination = 60%, Coursework = 40%			
<b>Module Co-ordinator:</b>	Dr N Hazon			

BL5801 Nutrition				
<b>SCOTCAT Credits:</b>	20	SCQF Level 11	<b>Semester:</b>	Distance
<b>Planned timetable:</b>	To be arranged.			
This module provides advanced knowledge of the anatomy, physiology and nutritional requirements of key fish and invertebrate species and a critical assessment of the sustainability of feed production technology. It will also assess and discuss the relationship between clinical nutrition and fish health, the role of microbiota in fish nutrition and the importance of nutrition in developing optimal animal welfare.				
<b>Programme module type:</b>	Either BL5801 or (BL5806 and BL5807) is compulsory for Sustainable Aquaculture Taught Postgraduate Diploma and M.Sc. Programmes			
<b>Anti-requisite(s):</b>	BL5806 and BL5807			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 1 lecture and 1 tutorial each week for 10 weeks.			
<b>Assessment pattern:</b>	2-hour Written Examination = 40%, Coursework = 60%			
<b>Module Co-ordinator:</b>	Dr S Wadsworth			

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<b>BL5802 Management, Husbandry and Sustainability</b>				
<b>SCOTCAT Credits:</b>	10	SCQF Level 11	<b>Semester:</b>	Distance
<b>Planned timetable:</b>	To be arranged.			
This module provides advanced knowledge of production management and business management of modern aquaculture practices. Environmental, social and economic sustainability of aquaculture depends on an understanding of the interactions of differing but complementary management structures.				
<b>Programme module type:</b>	Compulsory for Sustainable Aquaculture Taught Postgraduate Diploma and M.Sc. programmes Optional for both Sustainable Aquaculture Postgraduate Certificates.			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 1 lecture and 1 tutorial each week for 5 weeks.			
<b>Assessment pattern:</b>	2-hour Written Examination = 40%, Coursework = 60%			
<b>Module Co-ordinator:</b>	Dr P Southgate			

<b>BL5803 Health and Disease</b>				
<b>SCOTCAT Credits:</b>	20	SCQF Level 11	<b>Semester:</b>	Distance
<b>Planned timetable:</b>	To be arranged.			
This module provides advanced knowledge of the factors that influence disease processes in cultured fish and invertebrates including viral, bacterial, parasitic and non-infectious disease. The wide range of specific causes of disease and pathology in farmed species will be discussed and the importance of operations and management on the development and impact of disease in optimising fish welfare and developing sustainable and ethical aquaculture practices will be assessed critically.				
<b>Programme module type:</b>	Either BL5803 or (BL5808 and BL5809) is compulsory for Sustainable Aquaculture Taught Postgraduate Diploma and M.Sc. Programmes			
<b>Anti-requisite(s):</b>	BL5808 and BL5809			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 1 lecture and 1 tutorial each week for 10 weeks.			
<b>Assessment pattern:</b>	2-hour Written Examination = 40%, Coursework = 60%			
<b>Module Co-ordinator:</b>	Dr P Southgate			



BL5804 Markets, Products, Processing and Food Safety				
<b>SCOTCAT Credits:</b>	10	SCQF Level 11	<b>Semester:</b>	Distance
<b>Planned timetable:</b>	To be arranged.			
This module provides advanced knowledge of aquaculture markets, products, processing and food safety. Understanding the processes of ensuring the safety and quality of aquaculture products is central to establishing efficient and sustainable aquaculture practices.				
<b>Programme module type:</b>	Compulsory for Sustainable Aquaculture Taught Postgraduate Diploma and M.Sc. Programmes Optional for both Sustainable Aquaculture Postgraduate Certificates.			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 1 lecture and 1 tutorial each week for 5 weeks.			
<b>Assessment pattern:</b>	2-hour Written Examination = 40%, Coursework = 60%			
<b>Module Co-ordinator:</b>	Dr S Wadsworth			

BL5805 Local and Global Impacts of Aquaculture				
<b>SCOTCAT Credits:</b>	10	SCQF Level 11	<b>Semester:</b>	Distance
<b>Planned timetable:</b>	To be arranged.			
This module provides advanced knowledge of the environmental impact of aquaculture practices on both local and global scales. Understanding the environmental impact of aquaculture practices is central to improving and developing sustainable aquaculture.				
<b>Programme module type:</b>	Compulsory for Sustainable Aquaculture Taught Postgraduate Diploma and M.Sc. Programmes Optional for both Sustainable Aquaculture Postgraduate Certificates.			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 1 lecture and 1 tutorial each week for 5 weeks.			
<b>Assessment pattern:</b>	2-hour Written Examination = 40%, Coursework = 60%			
<b>Module Co-ordinator:</b>	Dr J A David			

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BL5806 Nutrition - Invertebrates				
<b>SCOTCAT Credits:</b>	20	SCQF Level 11	<b>Semester:</b>	Distance
<b>Planned timetable:</b>	To be arranged.			
This module provides advanced knowledge of the anatomy, physiology and nutritional requirements of key invertebrate species and a critical assessment of the sustainability of feed production technology. It will also assess and discuss the relationship between clinical nutrition and animal health and the importance of nutrition in developing optimal animal welfare.				
<b>Programme module type:</b>	Compulsory for Postgraduate Certificate in Sustainable Aquaculture (Invertebrates). Either BL5801 or (BL5806 and BL5807) is compulsory for Sustainable Aquaculture Taught Postgraduate Diploma and M.Sc. Programmes			
<b>Anti-requisite(s):</b>	BL5801			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 4 hours of lectures each week for 5 weeks, and 3 hours of tutorials each week for 2 weeks.			
<b>Assessment pattern:</b>	2-hour Written Examination = 60%, Coursework = 40%			
<b>Module Co-ordinator:</b>	Dr N Hazon			

BL5807 Nutrition - Vertebrates				
<b>SCOTCAT Credits:</b>	20	SCQF Level 11	<b>Semester:</b>	Distance
<b>Planned timetable:</b>	To be arranged.			
This module provides advanced knowledge of the anatomy, physiology and nutritional requirements of key vertebrate species and a critical assessment of the sustainability of feed production technology. It will also assess and discuss the relationship between clinical nutrition and animal health and the importance of nutrition in developing optimal animal welfare.				
<b>Programme module type:</b>	Compulsory for Postgraduate Certificate in Sustainable Aquaculture (Vertebrates). Either BL5801 or (BL5806 and BL5807) is compulsory for Sustainable Aquaculture Taught Postgraduate Diploma and M.Sc. Programmes			
<b>Anti-requisite(s):</b>	BL5801			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 4 hours of lectures each week for 5 weeks, and 3 hours of tutorials each week for 2 weeks.			
<b>Assessment pattern:</b>	2-hour Written Examination = 60%, Coursework = 40%			
<b>Module Co-ordinator:</b>	Dr N Hazon			

BL5808 Health and Disease - Invertebrates				
<b>SCOTCAT Credits:</b>	20	SCQF Level 11	<b>Semester:</b>	Distance
<b>Planned timetable:</b>	To be arranged.			
<p>This module provides advanced knowledge of the factors that influence disease processes in cultured invertebrate species including viral, bacterial, parasitic and non-infectious disease. The wide range of specific causes of disease and pathology in farmed species will be discussed and the importance of operations and management on the development and impact of disease in optimising welfare and developing sustainable and ethical aquaculture practices will be assessed critically.</p>				
<b>Programme module type:</b>	Compulsory for Postgraduate Certificate in Sustainable Aquaculture (Invertebrates). Either BL5803 or (BL5808 and BL5809) is compulsory for Sustainable Aquaculture Taught Postgraduate Diploma and M.Sc. Programmes			
<b>Anti-requisite(s):</b>	BL5803			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 4 hours of lectures each week for 5 weeks, and 3 hours of tutorials each week for 2 weeks.			
<b>Assessment pattern:</b>	2-hour Written Examination = 60%, Coursework = 40%			
<b>Module Co-ordinator:</b>	Dr N Hazon			

BL5809 Health and Disease - Vertebrates				
<b>SCOTCAT Credits:</b>	20	SCQF Level 11	<b>Semester:</b>	Distance
<b>Planned timetable:</b>	To be arranged.			
<p>This module provides advanced knowledge of the factors that influence disease processes in cultured fish species including viral, bacterial, parasitic and non-infectious disease. The wide range of specific causes of disease and pathology in farmed species will be discussed and the importance of operations and management on the development and impact of disease in optimising fish welfare and developing sustainable and ethical aquaculture practices will be assessed critically.</p>				
<b>Programme module type:</b>	Compulsory for Postgraduate Certificate in Sustainable Aquaculture (Vertebrates). Either BL5803 or (BL5808 and BL5809) is compulsory for Sustainable Aquaculture Taught Postgraduate Diploma and M.Sc. Programmes			
<b>Anti-requisite(s):</b>	BL5803			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 4 hours of lectures each week for 5 weeks, and 3 hours of tutorials each week for 2 weeks			
<b>Assessment pattern:</b>	2-hour Written Examination = 60%, Coursework = 40%			
<b>Module Co-ordinator:</b>	Dr N Hazon			

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BL5821 Breeding and Genetics				
<b>SCOTCAT Credits:</b>	10	SCQF Level 11	<b>Semester:</b>	Distance
<b>Planned timetable:</b>	To be arranged.			
This module provides advanced knowledge of selective breeding programmes and modern genetic techniques applied in aquaculture practices. Scientific and ethical issues raised by the application of genetic engineering will be examined with the context of developing sustainable aquaculture.				
<b>Programme module type:</b>	Optional for Sustainable Aquaculture Taught Postgraduate Diploma and M.Sc. Programmes			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 1 lecture and 1 tutorial each week for 5 weeks.			
<b>Assessment pattern:</b>	Coursework = 100%			
<b>Module Co-ordinator:</b>	Dr N Hazon			

BL5822 Advanced Welfare and Ethics				
<b>SCOTCAT Credits:</b>	10	SCQF Level 11	<b>Semester:</b>	Distance
<b>Planned timetable:</b>	To be arranged.			
This module provides advanced knowledge of the welfare and ethical issues raised by current aquaculture practices. Animal welfare is rapidly developing as a major ethical issue within all areas of food production including aquaculture. Future development of sustainable aquaculture must incorporate ethical practices, optimising animal welfare and as a consequence improving the final product.				
<b>Programme module type:</b>	Optional for Sustainable Aquaculture Taught Postgraduate Diploma and M.Sc. Programmes			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 1 lecture and 1 tutorial each week for 5 weeks.			
<b>Assessment pattern:</b>	Coursework = 100%			
<b>Module Co-ordinator:</b>	Dr P Southgate			

BL5823 Recirculation Aquaculture Systems				
<b>SCOTCAT Credits:</b>	10	SCQF Level 11	<b>Semester:</b>	Distance
<b>Planned timetable:</b>	To be arranged.			
This module provides advanced knowledge of the use of recirculating aquaculture systems in modern aquaculture practices. Recirculating aquaculture systems potentially provide environmentally sustainable aquaculture practices but must be assessed and viewed within the context of ethical, financial and social components of sustainability.				
<b>Programme module type:</b>	Optional for Sustainable Aquaculture Taught Postgraduate Diploma and M.Sc. Programmes			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 1 lecture and 1 tutorial each week for 5 weeks.			
<b>Assessment pattern:</b>	Coursework = 100%			
<b>Module Co-ordinator:</b>	Dr N Hazon			

BL5824 Ornamental and Aquaria Production				
<b>SCOTCAT Credits:</b>	10	SCQF Level 11	<b>Semester:</b>	Distance
<b>Planned timetable:</b>	To be arranged.			
This module provides advanced knowledge of animals produced by the ornamental and aquaria section of the aquaculture business. This sector of the aquaculture business has specific issues with relation to establishing sustainable aquaculture practices. In particular, the sustainability and ethical issues with reference to both captive breeding systems and wild caught fish supply will be examined and assessed for different trade sectors.				
<b>Programme module type:</b>	Optional for Sustainable Aquaculture Taught Postgraduate Diploma and M.Sc. Programmes			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 1 lecture and 1 tutorial each week for 5 weeks.			
<b>Assessment pattern:</b>	Coursework = 100%			
<b>Module Co-ordinator:</b>	Dr N Hazon			

BL5825 Larval Rearing				
<b>SCOTCAT Credits:</b>	10	SCQF Level 11	<b>Semester:</b>	Distance
<b>Planned timetable:</b>	To be arranged.			
This module provides advanced knowledge of the larval production techniques used in the aquaculture business. Larval production is often the rate limited step in development of new aquaculture species and presents particular ethical and sustainability issues with regard to current production techniques.				
<b>Programme module type:</b>	Optional for Sustainable Aquaculture Taught Postgraduate Diploma and M.Sc. Programmes			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 1 lecture and 1 tutorial each week for 5 weeks.			
<b>Assessment pattern:</b>	Coursework = 100%			
<b>Module Co-ordinator:</b>	Dr S Wadsworth			

BL5899 Sustainable Aquaculture Research Dissertation				
<b>SCOTCAT Credits:</b>	60	SCQF Level 11	<b>Semester:</b>	Whole Year
<b>Planned timetable:</b>	To be arranged.			
The research dissertation will involve the study of a defined problem within the field of Sustainable Aquaculture. Students will be required to collate and analyse data and to discuss their results in the light of existing literature. In some cases, projects might also involve the design of experiments or the gathering of data. Each project will be written up in the form of a thesis.				
<b>Programme module type:</b>	Compulsory for Postgraduate M.Sc. in Sustainable Aquaculture			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> Individual supervision			
<b>Assessment pattern:</b>	Dissertation of up to 15,000 words = 100%			
<b>Module Co-ordinator:</b>	Dr N Hazon			

ID5011 Geographic Information Systems for Environmental Management				
<b>SCOTCAT Credits:</b>	15	SCQF Level 11	<b>Semester:</b>	1
<b>Planned timetable:</b>	To be arranged.			
<p>This module provides an introduction to Geographic Information systems and their use in environmental problem solving. The module will be taught through a series of lectures, tutorials, laboratory classes and individual projects. The module will be assessed through class exercises and the final, short individual project. Students will be introduced to methods of acquiring, storing, analysing and displaying (2D and 3D) spatial digital data using the ArcGIS data package. An introduction to data manipulation and statistical techniques on a variety of environmental examples will be given. The module is taught within the School of Geography &amp; Geosciences but incorporates datasets and analysis techniques used in earth and environmental science, biology, archaeology, and mathematics.</p>				
<b>Programme module type:</b>	Optional for Ecosystem-Based Management of Marine Systems, Environmental Biology, Mathematics, Statistics, Management and Environmental History Taught Postgraduate Programmes.			
<b>Pre-requisite(s)</b>	A basic ability in computer skills (Basic word processing, spread sheet analysis)			
<b>Anti-requisite(s)</b>	GE5005, ID5010, ID5012			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> Lectures, practicals and occasional tutorials.			
<b>Assessment pattern:</b>	Coursework = 50%, Short Project = 50%			
<b>Module Co-ordinator:</b>	Dr C R Bates			

MT5751 Estimating Animal Abundance				
<b>SCOTCAT Credits:</b>	10	SCQF Level 11	<b>Semester:</b>	2
<b>Planned timetable:</b>	2.00 pm			
<p>The module will introduce students to the main types of survey method for wildlife populations. It will cover simple methods in some detail and provide students with a conceptual framework for building understanding of more advanced methods. By the end of the course, students will be able to identify an appropriate assessment method for a given population, be able to design a simple survey to assess the population, and perform simple analyses of survey data. Students will get experience in using the methods via computer practical sessions involving design and analyses of surveys conducted by computer simulation.</p>				
<b>Programme module type:</b>	Optional for all Postgraduate Taught Programmes within the School of Mathematics & Statistics, also for some Postgraduate programmes outwith the School.			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 7 hours of lectures and 5 hours of practical classes per week for 2 weeks.			
<b>Assessment pattern:</b>	2-hour Written Examination = 67%, Coursework = 33%			
<b>Module Co-ordinator:</b>	Dr E Rexstad			
<b>Lecturer(s)/Tutor(s):</b>	Dr E Rexstad			

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<b>MT5753 Statistical Modelling</b>				
<b>SCOTCAT Credits:</b>	20	SCQF Level 11	<b>Semester:</b>	1
<b>Planned timetable:</b>	2.00 pm			
<p>This module will introduce the main ideas of linear and generalised linear statistical modelling and will provide training in applied statistical modelling. The module structure is as follows: what statistical models are and what they are for; distributions, point and interval estimation and hypothesis testing; simple linear regression models for normal data; multiple regression; multiple regression with qualitative explanatory variables; less linear models for non-normal data; generalised linear models. Lectures will be built around the book 'An Introduction to Statistical Modelling' (Krzanowski, 1998), which closely matches what we believe to be an ideal course structure.</p>				
<b>Programme module type:</b>	<p>Compulsory for M.Res. in Environmental Biology and M.Res. in Environmental Biology Conversion for Mathematical, Physical and Molecular Sciences and M.Res. in Marine Mammal Science Postgraduate Taught Programmes.</p> <p>Optional for M.Res. in Ecosystem-Based Management of Marine Systems</p>			
<b>Required for:</b>	MT5755, MT5757			
<b>Learning and teaching methods and delivery:</b>	<b>Weekly contact:</b> 6 hours lectures, 1.5 hours tutorials and 6 hours practicals each week for 4 weeks.			
<b>Assessment pattern:</b>	2-hour Written Examination = 50%, Coursework = 50%			
<b>Module Co-ordinator:</b>	Dr M L MacKenzie			
<b>Lecturer(s)/Tutor(s):</b>	Dr M L MacKenzie, Miss L Scott-Hayward			