Masters in
Ecosystem-Based Management of Marine Systems

Programme Requirements

Taught Element:

80 credits: BL5303, BL5304, BL5111, BL5113, ID5011

at least 40 credits: BL5305, BL5322, BL5323, (BL5124 or BL4249)

MSc:

120 credits from the Taught Element, plus BL5399 (60-credit Research Project module)

Compulsory modules - Semester 1:

BL5111 Quantitative Methods for Biology

SCOTCAT Credits:	10	SCQF Level 11	**Semester:**	1
Planned timetable:	To be arranged. (Weeks 1 - 7)			
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.				
Programme module type:	Compulsory for MSc in Marine Mammal Science and MSc in Ecosystem-based Management of Marine System Postgraduate Programmes			
Learning and teaching methods and delivery:	**Weekly contact**: To be arranged, 7 weeks long.			
Assessment pattern:	1.5-hour Written Examination = 50%, Coursework = 50%			
Module Co-ordinator:	Dr S Smout			

BL5113 Statistical Modelling of Biological Data

SCOTCAT Credits:	20	SCQF Level 11	**Semester:**	1
Planned timetable:	To be arranged. (Weeks 8 - 11)			
Statistical modelling is an indispensible tool for the analysis of scientific data. This advanced level module will introduce methods for fitting models to biological data, mainly using R software. Approaches will include multiple regression, GLMs, and GAMs. We will consider some of the difficulties that can occur in modelling biological data sets e.g. temporal autocorrelation, and will look at ways to check and test models. We will consider approaches to model selection. The course will also cover multivariate techniques such as cluster analysis.				
Programme module type:	Compulsory for MSc in Marine Mammal Science and MSc in Ecosystem-based Management of Marine Systems Postgraduate Programmes.			
Co-requisite(s):	BL5111		**Anti-requisite(s):**	MT5753
Learning and teaching methods and delivery:	**Weekly contact**: 4 x 1-hour lectures and 4 x 3-hour labs and 1 x 2-hour seminar. Four weeks in total.			
Assessment pattern:	Coursework = 100%			
Module Co-ordinator:	Dr S Smout			

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BL5304 Ecosystem-based Management of Marine Systems

SCOTCAT Credits:	15	SCQF Level 11	**Semester:**	1
Planned timetable:	To be arranged (Weeks 1 - 11)			
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.				
Programme module type:	Compulsory for MSc in Ecosystem-based Management of Marine Systems Postgraduate Programme.			
Learning and teaching methods and delivery:	**Weekly contact**: Lectures and Seminars.			
Assessment pattern:	Coursework = 100%			
Module Co-ordinator:	Prof A Brierley			

ID5011 Geographic Information Systems for Environmental Management

SCOTCAT Credits:	15	SCQF Level 11	**Semester:**	1
Planned timetable:	To be arranged (Weeks 1 - 5)			
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 & Geosciences but incorporates datasets and analysis techniques used in earth and environmental science, biology, archaeology, and mathematics.				
Programme module type:	Compulsory for Ecosystem-Based Management of Marine Systems, optional for Mathematics, Statistics, Managing Environmental Change, Management and Environmental History Taught Postgraduate Programmes.			
Pre-requisite(s):	A basic ability in computer skills (Basic word processing, spread sheet analysis)		**Anti-requisite(s):**	GE5005, ID5010, ID5012
Learning and teaching methods and delivery:	**Weekly contact**: Lectures, practicals and occasional tutorials.			
Assessment pattern:	Coursework = 50%, Short Project = 50%			
Module Co-ordinator:	Dr C R Bates			

Compulsory modules - Semester 2:

BL5303 Marine Systems Research Methods				
SCOTCAT Credits:	20	SCQF Level 11	**Semester:**	2
Planned timetable:	To be arranged.			
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. Costs of this EMMS module taught at SAMS are covered by course fees, and no additional costs will be incurred by students taking this module.				
Programme module type:	Compulsory for MSc in Ecosystem-Based Management of Marine Systems Postgraduate Programme.			
Learning and teaching methods and delivery:	**Weekly contact**: 7 lectures, 2 tutorials and 5 practicals in total.			
Assessment pattern:	Coursework = 100%			
Module Co-ordinator:	Dr T Nickell (SAMS)			

Compulsory module for MSc - Whole Year:

BL5399 Ecosystem-Based Management of Marine Resources Research Project				
SCOTCAT Credits:	60	SCQF Level 11	**Semester:**	Whole Year
Planned timetable:	To be arranged (June to mid-August)			
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.				
Programme module type:	Compulsory for MSc in Ecosystem-Based Management of Marine Systems Postgraduate Programme.			
Learning and teaching methods and delivery:	**Weekly contact**: To be arranged.			
Assessment pattern:	Research report or Thesis of up to 15,000 words (excluding bibliography) = 100%			
Module Co-ordinator:	Dr S Smout			

Optional modules:

BL5305 Professional Skills				
SCOTCAT Credits:	5	SCQF Level 11	**Semester:**	2
Planned timetable:	To be arranged.			
The module will comprise a series of interactive lectures and practical workshops covering project and time management, how to review, read and write a scientific paper, and how to promote your research to the public, as well as an excursion/workshop to meet and discuss the work of prospective employers, such as the MASTS/SNH marine seminar for graduate students. The course will include tutorials and interactive workshops, with a final assessment on project management.				
Programme module type:	Optional for MSc in Ecosystem-Based Management of Marine Systems			
Learning and teaching methods and delivery:	**Weekly contact**: 1 x 1-hour introductory lecture, 3 x 3-hour practical classes over the semesters.			
Assessment pattern:	Coursework = 100%			
Module Co-ordinator:	Dr S Heymans			

BL5322 Marine Management, Policy and Planning				
SCOTCAT Credits:	20	SCQF Level 11	**Semester:**	2
Planned timetable:	To be arranged.			
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. Costs of this EMMS module taught at SAMS are covered by course fees, and no additional costs will be incurred by students taking this module.				
Programme module type:	Optional for MSc in Ecosystem-Based Management of Marine Systems			
Learning and teaching methods and delivery:	**Weekly contact**: 13 lectures, 2 x half-day practical sessions and a 1-day workshop			
Assessment pattern:	Coursework = 100%			
Module Co-ordinator:	Dr C Fox (SAMS)			

BL5323 Advanced Modelling				
SCOTCAT Credits:	20	SCQF Level 11	**Semester:**	2
Planned timetable:	To be arranged.			
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. Costs of this EMMS module taught at SAMS are covered by course fees, and no additional costs will be incurred by students taking this module.				
Programme module type:	Optional for MSc in Ecosystem-Based Management of Marine Systems			
Learning and teaching methods and delivery:	**Weekly contact**: 12 lectures and 7 x 3-hour practical classes over 3 weeks.			
Assessment pattern:	Coursework = 100%			
Module Co-ordinator:	Dr S Heymans (SAMS)			

Either:

BL5124 Predator Ecology in Polar Ecosystems - a Field Course in Antarctica				
SCOTCAT Credits:	15	SCQF Level 11	**Semester:**	Whole Year
Planned timetable:	lectures in S1, field course in S2 including 3 weeks in southern Argentina and Antarctica)			
This module offers 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 vessel-based expedition to Antarctica during the austral summer and will also explore southern Argentina. 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, workshops, 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 manuscript for submission to a journal. Participating students will need to cover all logistic expenses via payment of a substantial expedition fee.				
Programme module type:	Optional for MSc in Ecosystem-Based Management of Marine Systems and in Marine Mammal Science Postgraduate Programmes.			
Pre-requisite(s):	Undergraduate degree in relevant Biological disciplines and/or admittance to St Andrews MSc Programmes, Medical certificate documenting fit for travel to remote Antarctica			
Anti-requisite(s):	BL4301			
Learning and teaching methods and delivery:	**Weekly contact**: 8 x 1.5-hour lectures in S1 and several tutorials plus full day field practicals during the expedition.			
Assessment pattern:	Coursework = 100 %			
Module Co-ordinator:	Dr S Heinrich			

OR:

BL4249 Scientific Diving				
SCOTCAT Credits:	15	SCQF Level 11	**Semester:**	2
Planned timetable:	Full Time 2-3 weeks in March/April			
This module will provide both theoretical and practical experience of the techniques used by scientific divers. The module is restricted to students who have an existing diving qualification (PADI Advanced Open Water Diver or BSAC Sports Diver or equivalent). Seminars during the field trip will cover diving safety, dive project planning, management, risk assessment and the theory behind underwater surveying techniques. Abroad, students will receive training in underwater marine identification, construction and deployment of underwater surveys and sampling techniques, gaining practical experience of recording, analysing and interpreting survey data. Then they conduct a mini-research project using suitable survey techniques and present their findings through a report and a presentation. There are additional costs attached to this module which the student will be expected to meet.				
Programme module type:	Optional for MSc in Ecosystem-Based Management of Marine Systems			
Pre-requisite(s):	Permission required, PADI Advanced Open Water Diver or BSAC Sports Diver (or equivalent)			
Learning and teaching methods and delivery:	**Weekly contact**: 8 hours per day for 2 weeks.			
Assessment pattern:	Coursework = 100%			
Module Co-ordinator:	Dr C Peddie			