Master of Science Sustainable Aquaculture

Programme Requirements

Sustainable Aquaculture - MSc
BL5899 (60 credits) **and** BL4801 (10 credits) **and** (BL4802 (20 credits) **or** (BL4803 (10 credits) **and** BL4804 (10 credits))) **and** (BL5801 (20 credits) **or** (BL5806 (10 credits) **and** BL5807 (10 credits))) **and** BL5802 (10 credits) **and** (BL5803 (20 credits) **or** (BL5808 (10 credits) **and** BL5809 (10 credits))) **and** BL5804 (10 credits) **and** BL5805 (10 credits) **and** 20 credits from Module List: BL5821 - BL5825

Compulsory modules:

BL4801 Aquaculture and Fisheries				
SCOTCAT Credits:	10	SCQF Level 10	**Semester:**	Distance learning
Planned timetable:	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.				
Programme module type:	Compulsory for all Sustainable Aquaculture Postgraduate Programmes. Optional as a stand alone module.			
Learning and teaching methods and delivery:	**Weekly contact**: Distance Learning : 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
Assessment pattern:	2-hour Written Examination = 60%, Coursework = 40%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

BL5802 Management, Husbandry and Sustainability				
SCOTCAT Credits:	10	SCQF Level 11	**Semester:**	Distance learning
Planned timetable:	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.				
Programme module type:	Compulsory for Sustainable Aquaculture Postgraduate Diploma and MSc Programmes. Optional for both Sustainable Aquaculture Postgraduate Certificates. Optional as a stand alone module.			
Learning and teaching methods and delivery:	**Weekly contact**: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
Assessment pattern:	2-hour Written Examination = 40%, Coursework = 60%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

BL5804 Markets, Products, Processing and Food Safety

SCOTCAT Credits:	10	SCQF Level 11	**Semester:**	Distance learning
Planned timetable:	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.				
Programme module type:	Compulsory for Sustainable Aquaculture Postgraduate Diploma and MSc Programmes. Optional for both Sustainable Aquaculture Postgraduate Certificates. Optional as a stand alone module.			
Learning and teaching methods and delivery:	**Weekly contact**: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
Assessment pattern:	2-hour Written Examination = 40%, Coursework = 60%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

BL5805 Local and Global Impacts of Aquaculture

SCOTCAT Credits:	10	SCQF Level 11	**Semester:**	Distance learning
Planned timetable:	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.				
Programme module type:	Compulsory for Sustainable Aquaculture Postgraduate Diploma and MSc Programmes. Optional for both Sustainable Aquaculture Postgraduate Certificates. Optional as a stand alone module.			
Learning and teaching methods and delivery:	**Weekly contact**: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
Assessment pattern:	2-hour Written Examination = 40%, Coursework = 60%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

BL5899 Sustainable Aquaculture Research Dissertation

SCOTCAT Credits:	60	SCQF Level 11	**Semester:**	Whole Year
Planned timetable:	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.				
Programme module type:	Compulsory for Postgraduate MSc in Sustainable Aquaculture. Optional as a stand alone module.			
Learning and teaching methods and delivery:	**Weekly contact**: Individual supervision			
Assessment pattern:	Dissertation of up to 15,000 words = 100%			
Module coordinator:	Dr N Hazon			

Either:

BL4802 Biology for Aquaculture				
SCOTCAT Credits:	20	SCQF Level 10	**Semester:**	Distance learning
Planned timetable:	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.				
Programme module type:	Either BL4802 or (BL4803 and BL4804) is compulsory for Sustainable Aquaculture Postgraduate Diploma and MSc Programmes. Optional as a stand alone module.			
Anti-requisite(s):	BL4803 and BL4804			
Learning and teaching methods and delivery:	**Weekly contact**: Distance learning: 2 x 2-hour lecture (x 10 weeks) and 1 x 3-hour tutorial (x 10 weeks)			
Assessment pattern:	2-hour Written Examination = 60%, Coursework = 40%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

OR:

BL4803 Biology for Aquaculture - Invertebrates				
SCOTCAT Credits:	10	SCQF Level 10	**Semester:**	Distance learning
Planned timetable:	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.				
Programme module type:	Compulsory for Postgraduate Certificate in Sustainable Aquaculture (invertebrates). Either BL4802 or (BL4803 and BL4804) is compulsory for Sustainable Aquaculture Postgraduate Diploma and MSc Programmes Optional as a stand alone module.			
Anti-requisite(s):	BL4802			
Learning and teaching methods and delivery:	**Weekly contact**: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
Assessment pattern:	2-hour Written Examination = 60%, Coursework = 40%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

AND:

BL4804 Biology for Aquaculture - Vertebrates				
SCOTCAT Credits:	10	SCQF Level 10	**Semester:**	Distance learning
Planned timetable:	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.				
Programme module type:	Compulsory for Postgraduate Certificate in Sustainable Aquaculture (vertebrates) Either BL4802 or (BL4803 and BL4804) is compulsory for Sustainable Aquaculture Postgraduate Diploma and MSc Programmes Optional as a stand alone module.			
Anti-requisite(s):	BL4802			
Learning and teaching methods and delivery:	**Weekly contact**: 4 hours of lectures (x 5 weeks), and 3 hours of tutorials (x 3 weeks).			
Assessment pattern:	2-hour Written Examination = 60%, Coursework = 40%			
Module coordinator:	Dr N Hazon			

Either:

BL5801 Nutrition for Aquaculture				
SCOTCAT Credits:	20	SCQF Level 11	**Semester:**	Distance learning
Planned timetable:	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.				
Programme module type:	Either BL5801 or (BL5806 and BL5807) is compulsory for Sustainable Aquaculture Postgraduate Diploma and MSc Programmes. Optional as a stand alone module.			
Anti-requisite(s):	BL5806 and BL5807			
Learning and teaching methods and delivery:	**Weekly contact**: Distance learning: 2 x 2-hour lecture (x 10 weeks) and 1 x 3-hour tutorial (x 10 weeks)			
Assessment pattern:	2-hour Written Examination = 40%, Coursework = 60%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

OR:

BL5806 Nutrition - Invertebrates				
SCOTCAT Credits:	10	SCQF Level 11	**Semester:**	Distance learning
Planned timetable:	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.				
Programme module type:	Compulsory for Postgraduate Certificate in Sustainable Aquaculture (Invertebrates). Either BL5801 or (BL5806 and BL5807) is compulsory for Sustainable Aquaculture Postgraduate Diploma and MSc Programmes Optional as a stand alone module.			
Anti-requisite(s):	BL5801			
Learning and teaching methods and delivery:	**Weekly contact**: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
Assessment pattern:	2-hour Written Examination = 60%, Coursework = 40%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

AND:

BL5807 Nutrition - Vertebrates				
SCOTCAT Credits:	10	SCQF Level 11	**Semester:**	Distance learning
Planned timetable:	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.				
Programme module type:	Compulsory for Postgraduate Certificate in Sustainable Aquaculture (Vertebrates). Either BL5801 or (BL5806 and BL5807) is compulsory for Sustainable Aquaculture Postgraduate Diploma and MSc Programmes Optional as a stand alone module.			
Anti-requisite(s):	BL5801			
Learning and teaching methods and delivery:	**Weekly contact**: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
Assessment pattern:	2-hour Written Examination = 60%, Coursework = 40%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

Either:

BL5803 Health and Disease				
SCOTCAT Credits:	20	SCQF Level 11	**Semester:**	Distance learning
Planned timetable:	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.				
Programme module type:	Either BL5803 or (BL5808 and BL5809) is compulsory for Sustainable Aquaculture Postgraduate Diploma and MSc Programmes. Optional as a stand alone module.			
Anti-requisite(s):	BL5808 and BL5809			
Learning and teaching methods and delivery:	**Weekly contact**: Distance learning: 2 x 2-hour lecture (x 10 weeks) and 1 x 3-hour tutorial (x 10 weeks)			
Assessment pattern:	2-hour Written Examination = 40%, Coursework = 60%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

OR:

BL5808 Health and Disease - Invertebrates				
SCOTCAT Credits:	10	SCQF Level 11	**Semester:**	Distance learning
Planned timetable:	To be arranged.			
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.				
Programme module type:	Compulsory for Postgraduate Certificate in Sustainable Aquaculture (Invertebrates). Either BL5803 or (BL5808 and BL5809) is compulsory for Sustainable Aquaculture Postgraduate Diploma and MSc Programmes Optional as a stand alone module.			
Anti-requisite(s):	BL5803			
Learning and teaching methods and delivery:	**Weekly contact**: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
Assessment pattern:	2-hour Written Examination = 60%, Coursework = 40%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

AND:

BL5809 Health and Disease - Vertebrates				
SCOTCAT Credits:	10	SCQF Level 11	**Semester:**	Distance learning
Planned timetable:	To be arranged.			
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.				
Programme module type:	Compulsory for Postgraduate Certificate in Sustainable Aquaculture (Vertebrates). Either BL5803 or (BL5808 and BL5809) is compulsory for Sustainable Aquaculture Postgraduate Diploma and MSc Programmes Optional as a stand alone module.			
Anti-requisite(s):	BL5803			
Learning and teaching methods and delivery:	**Weekly contact**: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
Assessment pattern:	2-hour Written Examination = 60%, Coursework = 40%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

Optional modules:

BL5821 Breeding and Genetics				
SCOTCAT Credits:	10	SCQF Level 11	**Semester:**	Distance learning
Planned timetable:	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.				
Programme module type:	Optional for Sustainable Aquaculture Postgraduate Diploma and MSc Programmes. Optional as a stand alone module.			
Learning and teaching methods and delivery:	**Weekly contact**: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
Assessment pattern:	Coursework = 100%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David, Prof K Rana			

BL5822 Advanced Welfare and Ethics

SCOTCAT Credits:	10	SCQF Level 11	**Semester:**	Distance learning
Planned timetable:	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.				
Programme module type:	Optional for Sustainable Aquaculture Postgraduate Diploma and MSc Programmes. Optional as a stand alone module.			
Learning and teaching methods and delivery:	**Weekly contact**: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
Assessment pattern:	Coursework = 100%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

BL5823 Recirculation Aquaculture Systems

SCOTCAT Credits:	10	SCQF Level 11	**Semester:**	Distance learning
Planned timetable:	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.				
Programme module type:	Optional for Sustainable Aquaculture Postgraduate Diploma and MSc Programmes. Optional as a stand alone module.			
Learning and teaching methods and delivery:	**Weekly contact**: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
Assessment pattern:	Coursework = 100%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			

BL5824 Ornamental and Aquaria Production

SCOTCAT Credits:	10	SCQF Level 11	**Semester:**	Distance learning
Planned timetable:	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.				
Programme module type:	Optional for Sustainable Aquaculture Postgraduate Diploma and MSc Programmes. Optional as a stand alone module.			
Learning and teaching methods and delivery:	**Weekly contact**: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
Assessment pattern:	Coursework = 100%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David, Prof K Rana			

BL5825 Larval Rearing

SCOTCAT Credits:	10	SCQF Level 11	**Semester:**	Distance learning
Planned timetable:	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.				
Programme module type:	Optional for Sustainable Aquaculture Postgraduate Diploma and MSc Programmes. Optional as a stand alone module.			
Learning and teaching methods and delivery:	**Weekly contact**: 4 hours of lectures (x 5 weeks) and 3 hours of tutorials (x 3 weeks).			
Assessment pattern:	Coursework = 100%			
Module coordinator:	Dr N Hazon			
Module teaching staff:	Dr J A David			