

BL3308 Methods in Aquatic Biology

(BL3308 online module handbook version 145)

Credits: 20

Semester: 1

Module Organiser

Dr Iain Matthews

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Pre-requisite Modules:

Before taking this module
you must pass BL2300

Anti-requisite Modules:

Post-requisite Modules:

Additional Module

Information:

[Please check MMS regularly
for additional module
information](#)



The study of aquatic environments and organisms requires a wide variety of tools. This module introduces many of the tools used to study freshwater and marine environments and the organisms that inhabit these diverse habitats. Research methods covered include conductivity-temperature-pressure sensors, expendable bathythermographs, remote observational platforms (satellites, drones, ocean gliders, etc), passive and active acoustics, animal borne sensors, and methods for population abundance assessment and behavioural observations. This module involves a residential field trip to a field station in the Scottish Highlands.

[BL3308View content for BL3308 \(2023/4\) in the Module Management System \(MMS\)](#)

[View the current Biology Online Module Catalogue for BL3308](#)

[BL3308View BL3308 \(2023/4\) in the University of St Andrews Module Catalogue](#)

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BL3308: Timetable

Legend (not all modules have every event type):

lecture	tutorial	workshop	practical	other
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Semester 1: Week 1

DATE & TIME	VENUE	STAFF	EVENT
Monday 11-09-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Dr Iain Matthews -	Lecture L1: Introduction 2023-4_BL3308_L1 Welcome to BL3308. This lecture will introduce the module and provide an overview of the themes to be covered, including details of the assessment.
Tuesday 12-09-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Dr Iain Matthews -	Lecture L2: Lotic systems I: The abiotic environment in rivers and streams 2023-4_BL3308_L2 Lotic systems (flowing freshwater habitats including rivers and streams) are unique and globally rare habitats accounting for less than 0.001% of the hydrosphere. This lecture will introduce lotic systems focusing on identifying their defining characteristics and discussing some of their key abiotic factors, in particular looking at the overwhelming importance of flow.
Wednesday 13-09-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Dr Andrew Blight -	Lecture L3: Dynamics of aquatic systems: drag and stress 2023-4_BL3308_L3 This lecture will examine the challenges faced by organisms living in an aqueous and flowing environment. It will explore viscosity, velocity gradients, the principle of continuity, life in flow and the forces of drag.

Semester 1: Week 2

DATE & TIME	VENUE	STAFF	EVENT
Monday 18-09-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Dr Iain Matthews -	Lecture L4: Lotic systems II: Adaptation in rivers and streams 2023-4_BL3308_L4 Following on from the discussion of the abiotic factors, we will look firstly at the movement of carbon in lotic systems and discuss the river continuum concept as a framework for testing hypotheses about the distribution of functional groupings of freshwater macroinvertebrates along the length of rivers and streams. We will also look at adaptations to the challenges of life in flow.
Tuesday 19-09-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Dr Iain Matthews -	Lecture L5: Lentic Systems I: The abiotic environment in lakes and ponds 2023-4_BL3308_L5
Wednesday 20-09-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Dr Iain Matthews -	Lecture L6: Lentic Systems II: Adaptation in lakes and ponds 2023-4_BL3308_L6

Semester 1: Week 3

DATE & TIME	VENUE	STAFF	EVENT
Monday 25-09-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Dr Iain Matthews -	Lecture L7: Freshwater indicator species and pollution monitoring 2023-4_BL3308_L7
Tuesday 26-09-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Prof David M. Paterson -	Lecture L8: The landscape of marine research in Scotland 2023-4_BL3308_L8

Wednesday 27-09-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Dr Andrew Blight -	Lecture L9: Seafloor mapping I <small>2023-4_BL3308_L9</small> These lectures will examine some of the techniques used in current research to explore and map the shallow continental shelf seas. They will explore how sonar and sampling techniques are used to characterise biological habitats and ecosystems. We will examine case studies where these techniques are used to monitor sustainable use and/or restoration of these habitats.
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Semester 1: Week 4

DATE & TIME	VENUE	STAFF	EVENT
Monday 02-10-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Dr Andrew Blight -	Lecture L10: Seafloor mapping II <small>2023-4_BL3308_L10</small> These lectures will examine some of the techniques used in current research to explore and map the shallow continental shelf seas. They will explore how sonar and sampling techniques are used to characterise biological habitats and ecosystems. We will examine case studies where these techniques are used to monitor sustainable use and/or restoration of these habitats.
Tuesday 03-10-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Dr Andrew Blight -	Lecture L11: Coastal sediments I <small>2023-4_BL3308_L11</small> These lectures will examine some of the novel techniques used in current research to explore and characterise the properties of coastal sediment ecosystems. We will explore the key features of estuarine and other soft sediment habitats and how research has broadened our understanding of these critical ecosystems and the services they provide.
Wednesday 04-10-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Dr Andrew Blight -	Lecture L12: Coastal sediments II <small>2023-4_BL3308_L12</small> These lectures will examine some of the novel techniques used in current research to explore and characterise the properties of coastal sediment ecosystems. We will explore the key features of estuarine and other soft sediment habitats and how research has broadened our understanding of these critical ecosystems and the services they provide.

Semester 1: Week 5

DATE & TIME	VENUE	STAFF	EVENT
Tuesday 10-10-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Dr James Cant -	Lecture L13: Coral reef survey techniques <small>2023-4_BL3308_L13</small>
Wednesday 11-10-2023 10:00 to 11:00	Online Panpoto	-	Lecture L14: Connectivity on coral reefs <small>2023-4_BL3308_L14</small> Prof. Mike Kingsford (JCU)

Semester 1: Week 7

DATE & TIME	VENUE	STAFF	EVENT
Monday 23-10-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Dr Debbie Russell -	Lecture L15: Observation platforms <small>2023-4_BL3308_L15</small>
Tuesday 24-10-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Prof Sascha Hooker -	Lecture L16: Tagging I <small>2023-4_BL3308_L16</small>
Wednesday 25-10-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Prof Sascha Hooker -	Lecture L17: Tagging II <small>2023-4_BL3308_L17</small>

Semester 1: Week 8

DATE & TIME	VENUE	STAFF	EVENT
Monday 30-10-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Dr Lars Boehme -	Lecture L18: Remote sensing - Animal-borne instruments 2023-4_BL3308_L18
Tuesday 31-10-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Dr Lars Boehme -	Lecture L19: Remote sensing - Polar Marine Research 2023-4_BL3308_L19
Wednesday 01-11-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Dr Lars Boehme -	Lecture L20: Remote sensing - Climate Change and its prediction 2023-4_BL3308_L20

Semester 1: Week 9

DATE & TIME	VENUE	STAFF	EVENT
Monday 06-11-2023 10:00 to 11:00	Bute Building Lecture Theatre D	cnr4 -	Lecture L21: Active acoustics I - Measuring voltage to estimate biomass: an introduction to active acoustics 2023-4_BL3308_L21 Born out of SONAR technology, scientific echosounding has been used since the 1940s to make detections of aquatic mid-trophic level organisms such as zooplankton, fish, squid and jellyfish. Echosounders project sound into the water-column and record backscattered soundwaves produced by organisms. This lecture will introduce the theory of underwater sound scattering and review modern-day instrumentation, data collection and data processing methods.
Friday 10-11-2023 09:00 to 23:59	Offsite FSC Millport	Dr Andrew Blight -	Other O1: Residential field course 2023-4_BL3308_O1 Marine field trip to FSC Millport
Saturday 11-11-2023 00:00 to 23:59	Offsite FSC Millport	Dr Andrew Blight -	Other O2: Residential field course 2023-4_BL3308_O2 Marine field trip to FSC Millport
Sunday 12-11-2023 00:00 to 17:00	Offsite FSC Millport	Dr Andrew Blight -	Other O3: Residential field course 2023-4_BL3308_O3 Marine field trip to FSC Millport

Semester 1: Week 10

DATE & TIME	VENUE	STAFF	EVENT
Tuesday 14-11-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Prof Dave Ferrier -	Lecture L22: Aquaria in research 2023-4_BL3308_L22
Wednesday 15-11-2023 10:00 to 11:00	Scottish Oceans Institute SOI Building	Prof Dave Ferrier -	Lecture L23: Tour of SOI aquaria 2023-4_BL3308_L23
Wednesday 15-11-2023 10:00 to 11:00	Bute Building Lecture Theatre D	cnr4 -	Lecture L24: Active acoustics II - From isolated targets to basin-scale scattered layers: counting fish using sound 2023-4_BL3308_L24 Echosounders can detect a myriad of biological structures in the water-column, from fine-scale highly dynamic formations such as swarms and schools, to large mixed-species assemblages known as scattering layers that can span entire ocean basins. Echosounder detections, along with net and trawl samples, can be used to estimate species abundance and biomass and study species distribution patterns and behaviour. This lecture provides a detailed description of how echosounder observations from fish can be used to estimate biomass.
Friday 17-11-2023 09:00 to 23:59	Offsite Loch Lomond	Dr Iain Matthews -	Other O4: Residential field course 2023-4_BL3308_O4 Freshwater field trip to Loch Lomond

Saturday 18-11-2023 00:00 to 23:59	Offsite Loch Lomond	Dr Iain Matthews -	Other O5: Residential field course 2023-4_BL3308_O5 Freshwater field trip to Loch Lomond
Sunday 19-11-2023 00:00 to 17:00	Offsite Loch Lomond	Dr Iain Matthews -	Other O6: Residential field course 2023-4_BL3308_O6 Freshwater field trip to Loch Lomond

Semester 1: Week 11

DATE & TIME	VENUE	STAFF	EVENT
Monday 20-11-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Dr Julie Oswald -	Lecture L25: Passive acoustics I - Eavesdropping on the oceans 2023-4_BL3308_L25 In this lecture we will talk about methods used to monitor sounds in the oceans and what we can learn using these methods. We will discuss passive acoustic methods such as towed hydrophone arrays, seafloor-mounted recorders and animal borne tags.
Monday 20-11-2023 14:00 to 17:00	Bute Building Lecture Theatre D	Dr Iain Matthews -	Other O7: Student seminar talks 2023-4_BL3308_O7
Tuesday 21-11-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Dr Julie Oswald -	Lecture L26: Passive acoustics II - Analysing passive acoustic data 2023-4_BL3308_L26 In this lecture we will talk about ways to analyse passive acoustic data to address different types of environmental and biological questions.
Wednesday 22-11-2023 10:00 to 11:00	Bute Building Lecture Theatre D	Dr Iain Matthews -	Lecture L27: Salmon management and conservation in Scotland 2023-4_BL3308_L27 Dr Nora Hanson (Marine Scotland)
Thursday 23-11-2023 14:00 to 17:00	Bute Building Lecture Theatre D	Dr Iain Matthews -	Other O8: Student seminar talks 2023-4_BL3308_O8
Friday 24-11-2023 14:00 to 17:00	Bute Building Lecture Theatre D	Dr Iain Matthews -	Other O9: Student seminar talks 2023-4_BL3308_O9

BL3308: Reading List

[BL3308Click for BL3308 reading list](#)

BL3308: Assessment

Written Exam = 50%, Coursework = 50%

[BL3308View coursework assessment details for BL3308 \(2023/4\) in MMS](#)

The following related information applies to all Biology modules:

School of Biology Marking Criteria:	See JH booklet info (st-andrews.ac.uk)
Late submission of continuous assessment work:	All late submissions of coursework that do not require electronic submission should be made via the Biology Teaching Office, Level 2, BMS Building, North Haugh.
Exam details:	See School of Biology UG Handbook JH booklet info (st-andrews.ac.uk) : All Biology exams will be conducted online for 2022-23.
Exam timetable:	See Timetables - Exams - University of St Andrews (st-andrews.ac.uk)
Expected attendance:	See JH booklet info (st-andrews.ac.uk) for detailed attendance requirements.
Good Academic Practice & Avoiding Academic Misconduct:	See JH booklet info (st-andrews.ac.uk)
University Student Handbook:	University Student Handbook
School and University regulations in the School and University Undergraduate Handbook relating to absence reporting, penalties and rules for late submission of work, extensions for coursework, return of coursework, S-coding, good academic practice and Academic Alerts.:	JH booklet info (st-andrews.ac.uk) University Student Handbook

Who to ask

(Information in this section applies to all Biology Modules)

Before contacting staff, students should check the content of the Biology Undergraduate Handbook, the module handbook and specific task instructions.

Questions about

General teaching matters
Rescheduled or cancelled events
Lecture or practical content
Completing assessed practical assignments
Completing assessments
Marking on continuous assessment
Marking on exams
Rearranging practical days
Absence and/or extensions
Difficulties with academic progress which impact more than one module:
Overall performance, progress or future directions:
Disability:
For advice and support on any issue e.g. academic, financial, international, personal or health matters, or if you are unsure of who to go to for help:

University assistance with urgent matters out of office hours:

Contact

Biology Teaching Office (bioteach@st-andrews.ac.uk)
Check your University email
The lecturer who presented the material
The lecturer who set the assignment
Module Organiser ([Dr Iain Matthews imm7@st-andrews.ac.uk](mailto:DrIainMatthews@st-andrews.ac.uk))
The Demonstrator or Module Organiser ([Dr Iain Matthews imm7@st-andrews.ac.uk](mailto:DrIainMatthews@st-andrews.ac.uk))
Module Organiser ([Dr Iain Matthews imm7@st-andrews.ac.uk](mailto:DrIainMatthews@st-andrews.ac.uk))
Module Organiser ([Dr Iain Matthews imm7@st-andrews.ac.uk](mailto:DrIainMatthews@st-andrews.ac.uk))
Module Organiser ([Dr Iain Matthews imm7@st-andrews.ac.uk](mailto:DrIainMatthews@st-andrews.ac.uk))
and the Biology Teaching Office (bioteach@st-andrews.ac.uk)
Year Coordinator
See School of Biology UG Handbook for list: [JH booklet info \(st-andrews.ac.uk\)](http://www.st-andrews.ac.uk/jhbookletinfo)
Advisor of Studies
Disability Coordinator (biodisabilities@st-andrews.ac.uk)
Advice & Support Centre
Address: 79 North Street, St Andrews
Email: theasc@st-andrews.ac.uk
Web: <https://www.standrews.ac.uk/ask-a-question/>
Tel: 01334 462020
Tel: 01334 476161
Web: <https://www.st-andrews.ac.uk/students/advice/counselling/incrisis/>

Biology Teaching Office:

We are happy to hear from you about teaching matters. The School of Biology Teaching Office is open Monday to Friday 09.00 - 13.00 and 14.00 - 17.00. School of Biology staff will respond to your emails during these hours. Our team will provide a response to you within three working days.

Biology Teaching Office (Level 2), University of St Andrews, Biomolecular Sciences Building, North Haugh, St Andrews, Fife KY16 9ST

Email: bioteach@st-andrews.ac.uk

Tel: 01334 46 3602 or 3566

BL3308: Contributing Staff

Dr Iain Matthews (Module Organiser)	Senior Teaching Fellow & Pro-Dean for the Faculty of Science	IMM7@st-andrews.ac.uk
Dr Andrew Blight	Lecturer	AJB34@st-andrews.ac.uk
Dr Lars Boehme	Reader	LB284@st-andrews.ac.uk
Dr James Cant	Research Fellow	jic2@st-andrews.ac.uk
Prof Dave Ferrier	Reader in Biology and Deputy Director of the Scottish Oceans Institute	dekf@st-andrews.ac.uk
Prof Sascha Hooker	Professor	sh43@st-andrews.ac.uk
Dr Iain Matthews (Module Organiser)	Senior Teaching Fellow & Pro- Dean for the Faculty of Science	IMM7@st-andrews.ac.uk
Dr Julie Oswald	Senior Lecturer	jno@st-andrews.ac.uk
Prof David M. Paterson	Executive Director of MASTS: The Marine Alliance for Science and Technology for Scotland	dp1@st-andrews.ac.uk
Dr Debbie Russell	Principal Research Fellow	dr60@st-andrews.ac.uk

BL3308: Learning Outcomes

No details are currently available for Learning Outcomes

BL3308: Acquired Skills

Practical Skills

- Collecting animals and plants
- Field sampling methods (Botanics)
- Field sampling methods (Invertebrates)
- Field sampling methods (Vertebrates)
- Fieldwork safety awareness
- Sampling of sensitive sites / organisms
- Labelling specimens and managing collections
- Measuring structures using microscopes
- Species identification (Botany)
- Species identification (Invertebrates)
- Using dichotomous keys
- Sustainability related practical skills

Transferable Skills

- Group discussion - leading
- Group discussion - participating
- Short individual presentation on given topic (up to 15 min)
- Handout (for presentation or poster)
- Long essay (>2000 words)
- Critically evaluating sources/information
- Finding information on the web
- Finding literature
- Referencing
- Sourcing figures/tables
- Ethical considerations
- Generating questions
- Role play
- Biodiversity analysis
- Data analysis
- Data analysis (depending on project)
- Descriptive statistics
- Produce graphs/figures
- Significant figures
- Use Excel
- Use R or R Studio
- Lab or field notebook
- Critiquing experimental design
- Designing experiments
- Sustainability Related Skills
- Generate class dataset
- Managing a team
- Organising group work
- Working in large groups
- Working in pairs/small groups

Policies

(Information in this section applies to all Biology Modules)

- The procedures and regulations followed by the School of Biology are outlined in the [University Handbook](#) and in the School of Biology UG handbook [JH booklet info \(st-andrews.ac.uk\)](#)
- All coursework associated with the module must be completed and submitted by its due date.
- Specific School regulations relating to absence reporting, penalties and rules for late submission of work, extensions for coursework, return of coursework, S-coding, Good Academic Practice and Academic Alert are stated in the School of Biology UG handbook [JH booklet info \(st-andrews.ac.uk\)](#) and students are required to carefully read these regulations.
- Students are also referred to the University Handbook, available at: <http://www.st-andrews.ac.uk/studenthandbook/>