The vast majority of animals are invertebrates - they do not have backbones. This module surveys the major invertebrate groups, emphasizing the diversity of body plans while demonstrating how the common functional requirements such as feeding, reproduction, respiration and excretion are achieved. The module starts with the simplest animals such as sponges and jellyfish, and considers how these primitive animals may have arisen from non-animal ancestors. It continues with a description of the several groups of worms, and the molluscs and arthropods. The last major group discussed are the echinoderms, which are close invertebrate relatives to vertebrate animals such as ourselves. The economic, social, and scientific impact that invertebrates have on human society is identified. The evolutionary relations between the various groups is the common thread that binds this diversity into a coherent story. A series of practical exercises reinforces and complements the lecture component of this module.
Contents:

- Cover
- Contents
- Timetable
- Reading List
- Assessment
- Who To Ask
- Contributing Staff
- Learning Outcomes
- Acquired Skills
- Policies
## BL2304: Timetable

### Legend (not all modules have every event type):

<table>
<thead>
<tr>
<th>lecture</th>
<th>tutorial</th>
<th>workshop</th>
<th>practical</th>
<th>other</th>
</tr>
</thead>
</table>

### Semester 1: Week 1

<table>
<thead>
<tr>
<th>DATE &amp; TIME</th>
<th>VENUE</th>
<th>STAFF</th>
<th>EVENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday 14-09-2020</td>
<td>Online Teams</td>
<td>Dr Iain Matthews</td>
<td>Lecture L1: Course introduction</td>
</tr>
<tr>
<td>11:00 to 12:00</td>
<td></td>
<td></td>
<td>2020-1_BL2304_L1</td>
</tr>
<tr>
<td>Tuesday 15-09-2020</td>
<td>Online Panopto</td>
<td>Dr Miquel Barbosa</td>
<td>Lecture L2: Invertebrate biodiversity I</td>
</tr>
<tr>
<td>11:00 to 12:00</td>
<td></td>
<td></td>
<td>2020-1_BL2304_L2</td>
</tr>
<tr>
<td>Wednesday 16-09-20</td>
<td>Online Panopto</td>
<td>Dr Miquel Barbosa</td>
<td>Lecture L3: Invertebrate biodiversity II</td>
</tr>
<tr>
<td>11:00 to 12:00</td>
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<td>2020-1_BL2304_L3</td>
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### Semester 1: Week 2

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<tr>
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<th>VENUE</th>
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<th>EVENT</th>
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</thead>
<tbody>
<tr>
<td>Monday 21-09-2020</td>
<td>Online Panopto</td>
<td>Dr Miquel Barbosa</td>
<td>Lecture L4: Invertebrate biodiversity III</td>
</tr>
<tr>
<td>11:00 to 12:00</td>
<td></td>
<td></td>
<td>2020-1_BL2304_L4</td>
</tr>
<tr>
<td>Tuesday 22-09-2020</td>
<td>Offsite Outdoors - in person</td>
<td>Dr Miquel Barbosa</td>
<td>Tutorial T1: Sampling methods for invertebrates with in-person session</td>
</tr>
<tr>
<td>11:00 to 12:00</td>
<td></td>
<td></td>
<td>2020-1_BL2304_T1</td>
</tr>
<tr>
<td>Thursday 24-09-2020</td>
<td>Offsite Field Sampling</td>
<td>Dr Miquel Barbosa</td>
<td>Practical P1: Field Sampling for invertebrates</td>
</tr>
<tr>
<td>14:00 to 17:00</td>
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<td></td>
<td>2020-1_BL2304_P1</td>
</tr>
<tr>
<td>Friday 25-09-2020</td>
<td>Offsite Field Sampling</td>
<td>Dr Miquel Barbosa</td>
<td>Practical P2: Field Sampling for invertebrates</td>
</tr>
<tr>
<td>14:00 to 17:00</td>
<td></td>
<td></td>
<td>2020-1_BL2304_P2</td>
</tr>
<tr>
<td>DATE &amp; TIME</td>
<td>VENUE</td>
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</tr>
<tr>
<td>Monday 12-10-2020 11:00 to 12:00</td>
<td>Online Panopto</td>
<td>Dr Julie Oswald</td>
<td>Lecture L8: Annelids I 2020-1_BL2304_L8</td>
</tr>
<tr>
<td>Tuesday 13-10-2020 11:00 to 12:00</td>
<td>Online Panopto</td>
<td>Dr Julie Oswald</td>
<td>Lecture L9: Annelids II 2020-1_BL2304_L9</td>
</tr>
<tr>
<td>Wednesday 14-10-2020 11:00 to 12:00</td>
<td>Online Teams</td>
<td>Dr Julie Oswald</td>
<td>Tutorial T4: Annelids III Live online tutorial session 2020-1_BL2304_T4</td>
</tr>
</tbody>
</table>

**Semester 1: Week 7**

<table>
<thead>
<tr>
<th>DATE &amp; TIME</th>
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<tbody>
<tr>
<td>Monday 26-10-2020 11:00 to 12:00</td>
<td>Online Teams</td>
<td>Dr Iain Matthews, Dr Verena Dietrich-Bischoff</td>
<td>Tutorial T5: Catch up and Q&amp;A Session Live online tutorial Session 2020-1_BL2304_T5</td>
</tr>
<tr>
<td>Tuesday 27-10-2020 11:00 to 12:00</td>
<td>Online Panopto</td>
<td>Dr Verena Dietrich-Bischoff</td>
<td>Lecture L10: Arthropods I 2020-1_BL2304_L10</td>
</tr>
<tr>
<td>Wednesday 28-10-2020 11:00 to 12:00</td>
<td>Online Panopto</td>
<td>Dr Verena Dietrich-Bischoff</td>
<td>Lecture L11: Arthropods II 2020-1_BL2304_L11</td>
</tr>
</tbody>
</table>

**Semester 1: Week 8**

<table>
<thead>
<tr>
<th>DATE &amp; TIME</th>
<th>VENUE</th>
<th>STAFF</th>
<th>EVENT</th>
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</thead>
<tbody>
<tr>
<td>Monday 02-11-2020 11:00 to 12:00</td>
<td>Online Panopto</td>
<td>Dr Verena Dietrich-Bischoff</td>
<td>Lecture L12: Arthropods III 2020-1_BL2304_L12</td>
</tr>
<tr>
<td>Tuesday 03-11-2020 11:00 to 12:00</td>
<td>Online Teams</td>
<td>Dr Verena Dietrich-Bischoff</td>
<td>Tutorial T6: Arthropods Live in-person tutorial session 2020-1_BL2304_T6</td>
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</tbody>
</table>

**Semester 1: Week 9**

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<thead>
<tr>
<th>DATE &amp; TIME</th>
<th>VENUE</th>
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</thead>
<tbody>
<tr>
<td>Monday 09-11-2020 11:00 to 12:00</td>
<td>Online Panopto</td>
<td>Dr Iain Matthews</td>
<td>Lecture L13: Molluscs I 2020-1_BL2304_L13</td>
</tr>
<tr>
<td>Tuesday 10-11-2020 11:00 to 12:00</td>
<td>Online Panopto</td>
<td>Dr Iain Matthews</td>
<td>Lecture L14: Molluscs II 2020-1_BL2304_L14</td>
</tr>
<tr>
<td>Wednesday 11-11-2020 11:00 to 12:00</td>
<td>Online Teams</td>
<td>Dr Iain Matthews, Dr Verena Dietrich-Bischoff</td>
<td>Tutorial T7: Molluscs III Live online tutorial session 2020-1_BL2304_T7</td>
</tr>
<tr>
<td>Thursday 12-11-2020 14:00 to 17:00</td>
<td>Medical and Biological Sciences Building Biology Teaching Labs</td>
<td>Dr James Price</td>
<td>Practical P5: Nematode Practical Attend on assigned lab day 2020-1_BL2304_P5</td>
</tr>
<tr>
<td>Friday 13-11-2020 14:00 to 17:00</td>
<td>Medical and Biological Sciences Building Biology Teaching Labs</td>
<td>Dr James Price</td>
<td>Practical P6: Nematode Practical Attend on assigned lab day 2020-1_BL2304_P6</td>
</tr>
</tbody>
</table>

**Semester 1: Week 10**

<table>
<thead>
<tr>
<th>DATE &amp; TIME</th>
<th>VENUE</th>
<th>STAFF</th>
<th>EVENT</th>
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</thead>
<tbody>
<tr>
<td>Monday 16-11-2020 11:00 to 12:00</td>
<td>Online Panopto</td>
<td>Dr Iain Matthews</td>
<td>Lecture L15: Echinoderm diversity 2020-1_BL2304_L15</td>
</tr>
<tr>
<td>Tuesday 17-11-2020 11:00 to 12:00</td>
<td>Online Panopto</td>
<td>Dr Iain Matthews</td>
<td>Lecture L16: Hemichordates(and some Lophophorates) 2020-1_BL2304_L16</td>
</tr>
<tr>
<td>Wednesday 18-11-2020 11:00 to 12:00</td>
<td>Online Panopto</td>
<td>Dr Iain Matthews</td>
<td>Lecture L17: Invertebrate chordates and vertebrate origins 2020-1_BL2304_L17</td>
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## Semester 1: Week 11

<table>
<thead>
<tr>
<th>DATE &amp; TIME</th>
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<th>STAFF</th>
<th>EVENT</th>
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<tbody>
<tr>
<td>Monday 23-11-2020</td>
<td>Online Teams</td>
<td><strong>Dr Iain Matthews</strong>&lt;br&gt;Dr Verena Dietrich-Bischoff</td>
<td>Tutorial T8: <strong>End of Module Round Up</strong></td>
</tr>
<tr>
<td>11:00 to 12:00</td>
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<td></td>
</tr>
<tr>
<td>Thursday 26-11-2020</td>
<td>Online</td>
<td><strong>Dr Iain Matthews</strong>&lt;br&gt;Dr Verena Dietrich-Bischoff</td>
<td>Practical P7: <strong>Poster session</strong>&lt;br&gt;Attend on assigned lab day</td>
</tr>
<tr>
<td>14:00 to 17:00</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Friday 27-11-2020</td>
<td>Online</td>
<td><strong>Dr Iain Matthews</strong>&lt;br&gt;Dr Verena Dietrich-Bischoff</td>
<td>Practical P8: <strong>Poster session</strong>&lt;br&gt;Attend on assigned lab day</td>
</tr>
<tr>
<td>14:00 to 17:00</td>
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</table>
BL2304: Reading List

BL2304 Click for BL2304 reading list

BL2304: Assessment

2-hour Written Examination = 50%, Coursework = 50%

BL2304 View coursework assessment details for BL2304 (2020/1) in MMS

The following related information applies to all Biology modules:

School of Biology Marking Criteria: See School of Biology Undergraduate Handbook
Late submission of continuous assessment work: All late submissions of coursework that do not require electronic submission should be made via the late submissions box in the Biology Study Space, St Andrews New Technology Centre Building (beside the Teaching Office)

Exam details: See School of Biology Undergraduate Handbook
Exam timetable: see http://www.st-andrews.ac.uk/students/academic/examinations/examtimetables/current/

Expected attendance: See School of Biology Undergraduate Handbook for detailed attendance requirements.

Good Academic Practice & Avoiding Academic Misconduct: See School of Biology Undergraduate Handbook
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.: See School of Biology Undergraduate Handbook
University Student Handbook
Who to ask

(Information in this section applies to all Biology Modules)

Questions about different aspects of the module should be directed to different people:

**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:

**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 Ildiko Somorjai imls@st-andrews.ac.uk)
- The Demonstrator or Module Organiser (Dr Ildiko Somorjai imls@st-andrews.ac.uk)
- Module Organiser (Dr Ildiko Somorjai imls@st-andrews.ac.uk) and the Biology Teaching Office (bioteach@st-andrews.ac.uk)
- Module Organiser (Dr Ildiko Somorjai imls@st-andrews.ac.uk)
- James Price
- Module Organiser (Dr Ildiko Somorjai imls@st-andrews.ac.uk) and the Biology Teaching Office (bioteach@st-andrews.ac.uk)
- Year Coordinator
- Advisor of Studies
- Disability Coordinator (Dr Jacqueline Nairn jn37@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, The Biology Hive, New Technology Centre, University of St Andrews, North Haugh, St Andrews, Fife KY16 9SR

Email: bioteach@st-andrews.ac.uk

Tel: 01334 463602/3566
BL2304: Contributing Staff

Dr Miguel Barbosa  
Associate Lecturer (Education Focussed)  
mb334@st-andrews.ac.uk

Dr Verena Dietrich-Bischoff  
Lecturer (Education-Focused)  
vdb@st-andrews.ac.uk

Dr Dave Ferrier  
Reader in Biology and Deputy Director of the Scottish Oceans Institute  
dekf@st-andrews.ac.uk

Dr Iain Matthews  
Senior Teaching Fellow & Pro-Dean for the Faculty of Science  
imm7@st-andrews.ac.uk

Dr Julie Oswald  
Lecturer (Education Focused)  
jno@st-andrews.ac.uk

Dr James Price  
Associate Lecturer (Education Focused)  
jp203@st-andrews.ac.uk
BL2304: Learning Outcomes

Students completing module BL2304 successfully should be able to:

- Achieve an overview of animal phylogeny, including the origins of animals themselves, and the major divisions within the animal kingdom
- Appreciate the main methodologies and controversies associated with determining phylogenetic relationships
- Identify the defining features of the key invertebrate groups
- Appreciate how representatives from the key invertebrate groups carry out basic animal functions in similar or different ways
- Appreciate the economic, social, and scientific impact that invertebrates have on human society
BL2304: Acquired Skills

Practical Skills

- Field sampling methods (Invertebrates)
- Biological drawing and photography
- Compound Microscopy
- Fixing and preserving specimens
- Pipetting
- Species identification (Invertebrates)
- Stereomicroscopy

Transferable Skills

- Preparing group poster on given topic
- Q+A poster session
- "Short" practical write-up (e.g. completed worksheet)
- Handout (for presentation or poster)
- Summary
- Critically evaluating sources/information
- Finding information from museums
- Finding information on the web
- Finding literature
- Referencing
- Data analysis
- Data presentation
- Descriptive statistics
- Dilutions
- Produce graphs/figures
- Significant figures
- Lab or field notebook
- Generate class dataset
- Organising group work
- 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 Undergraduate Handbook (https://synergy.st-andrews.ac.uk/biocurrentstudent/files/2017/09/UndergraduateHandbook.pdf).
- 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 Undergraduate Handbook 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/