

MARI 302 Biology and Behaviour of Marine Vertebrates

Semester 1- 18 points

Course Co-ordinator

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Course outline

Arguably, the most fascinating and sophisticated animals on the planet are vertebrates! In this course we consider those which have made their living in the sea; starting with fish, marine reptiles, seabirds, and ending with marine mammals. For each group we focus first on biodiversity, explore the physiological, ecological and behavioural solutions they have evolved, and discuss the conservation issues they face in the modern world. We take time to explore the oddities; for example fish that use electrical pulses to navigate, or have parasitic males whose only function is to fertilise females, sea snakes whose venom is as deadly as that of all but the most dangerous land snakes, seabirds that fly underwater, and whales which make the loudest, and most complicated acoustic signals in the animal kingdom.

Learning outcomes

The key learning outcomes of MARI 302 are to provide students with an understanding of the diversity of marine vertebrates and of their adaptations to their environment.

Specifically, we seek students to gain an understanding of:

- diversity, form and function in marine vertebrate taxa
- feeding and reproductive biology
- physiological and behavioural adaptations to a marine environment
- diversity and ecology of New Zealand marine vertebrates
- management and conservation issues facing marine vertebrates both internationally and in New Zealand.

In addition, we expect students will improve their written and oral communication skills, gain confidence in solving problems, and increase their ability to work collaboratively.

Course structure

Lectures (2 x 50 min per week) – presentations by a variety of experts in their field covering all the material you will be expected to learn during the course. **Attendance at all lectures is strongly recommended** – it is unlikely you will be able to learn all the required material and concepts from textbooks and lecture hand-outs alone. **Remember, the lecturers set the exam questions.** Only by attending lectures will you know what might be in the exams! Furthermore, interactions with lecturers give you the opportunity to ask questions and clarify issues which you don't fully understand.

Practicals (1 x 3 hr per week) – a selection of practical exercises designed to give you hands-on experience of research on marine vertebrates. Each practical will have an accompanying write-up exercise which should be completed and submitted in your lab book on the specified date.

Fieldtrip – early in the semester we will be running a fieldtrip on the university's research vessel, *Polaris II*, giving you the opportunity to experience methods of commercial fishing. See Blackboard and information in class for further details.

Lab books - at a minimum your lab book should contain all the information relating to the practical sessions, including the write-up from each session. You can add as much additional information as you like to make your lab book a really useful resource. For example, you might add interesting scientific papers that you have read, links to useful web pages, or extra diagrams or photos from the practical sessions. **The fishing trip is optional, but if you complete it, the mark can replace the lowest mark of your other labs.**

Special requirements

You will need a lab coat for the practicals. New lab coats are available from the Visitor's Centre (next to St David lecture theatre) or can be purchased second hand. Sharp lead pencils and an eraser are also required. Gumboots and wet weather gear will be handy for the fieldtrip.

There's no textbook. Via Blackboard, we'll direct you to reading to support the lectures and practicals.

Assessment

Biochronology lab report (10%)

Research poster on seabird biology (10%)

Lab book (30%)

Final exam (50%)

Your lab report and lab book should be handed in as hard copies to the Marine Science Department. A penalty of 5% per working day applies to work that is handed in late.

If for any reason you cannot meet a deadline, please contact the Course Coordinator, Will Rayment, as soon as possible, to discuss your situation. Extensions may be negotiated in the event of illness (with accompanying medical certificate) or bereavement, but only before the hand-in date.

Workload – most weeks you will be expected to spend 2 hours in lectures, 2-3 hours at the practical, and 4-6 hours completing practical sheets and in self-directed reading and learning. We suggest that you read all the practical handouts (available on Blackboard) before attending the practical sessions, and spend time each week reviewing the new material you have learned. You should put in extra time for revision before the final exam.

Course material

Lecture hand-outs, practical sheets and course announcements will be posted on Blackboard. **Ensure that you check Blackboard regularly to keep up to date with course information.**

Examples of final exam papers are available on the University of Otago Library website <http://www.otago.ac.nz/library/exams/> and will be posted on Blackboard.

| | Lectures | Lecturer | Practicals |
|----|--|--------------------|--|
| | MARINE FISH | | |
| 1 | Introduction to the course, evolution of fish | Will Rayment | |
| 2 | Evolution and Physiological solutions | Steve Wing | 1 Biochronology and fish populations I |
| 3 | Reproductive strategies | Steve Wing | |
| 4 | Fish Form | Steve Wing | 1 Biochronology and fish populations II |
| 5 | Fisheries Ecosystems: global patterns | Steve Wing | |
| 6 | Fisheries Ecosystems: case studies | Steve Wing | 1 Biochronology and fish populations III |
| 7 | Fisheries and conservation | Steve Wing | |
| 8 | Sharks and rays; research in New Zealand | Rob Lewis | 2 Modern tools in vertebrate biology |
| | MARINE REPTILES | | |
| 9 | Sea snakes; ecology and conservation | Will Rayment | |
| 10 | Marine turtles; biology, ecology and behaviour | Steve Wing | 3 Sea snakes; ID and anatomy |
| 11 | Marine lizards & crocodiles | Will Rayment | |
| | SEABIRDS | | |
| 12 | Seabird morphology, diversity and adaptations | Martyn Kennedy | 4 Exam technique and practice |
| | <i>Easter & mid-semester break 7-16 April</i> | | |
| 13 | Seabird ecology & ecological role | Yolanda van Heezik | |
| 14 | Seabird extremes: biology and behaviour of penguins | Yolanda van Heezik | No practical; work on seabird posters |
| | <i>Anzac Day</i> | | |
| 15 | Seabird conservation | Graham Parker | Seabird Posters |
| 16 | Seabird extremes: albatrosses - life on the wing | Yolanda van Heezik | |
| | MARINE MAMMALS | | |
| 17 | Evolution of marine mammals | Felix Marx | 5 Fossil whales |
| 18 | Pinniped diversity, biology and behaviour | Will Rayment | |
| 19 | Baleen whales; ecology and behaviour | Will Rayment | 6 Photo-ID & capture-recapture |
| 20 | Toothed whales; ecology, behaviour, culture? | Marta Guerra/WR | |
| 21 | Sirenians; ecology and conservation | Will Rayment | 7 Humans as marine mammals |
| 22 | Adaptations to diving | Will Rayment | |
| 23 | Sonar and acoustic communication | Marta Guerra/WR | 8 Marine Mammal Sounds |
| 24 | Why is NZ sealion declining? | Bruce Robertson | |
| 25 | Extinction; the story of Baiji, Vaquita & Maui dolphins | Will Rayment | Group study session |