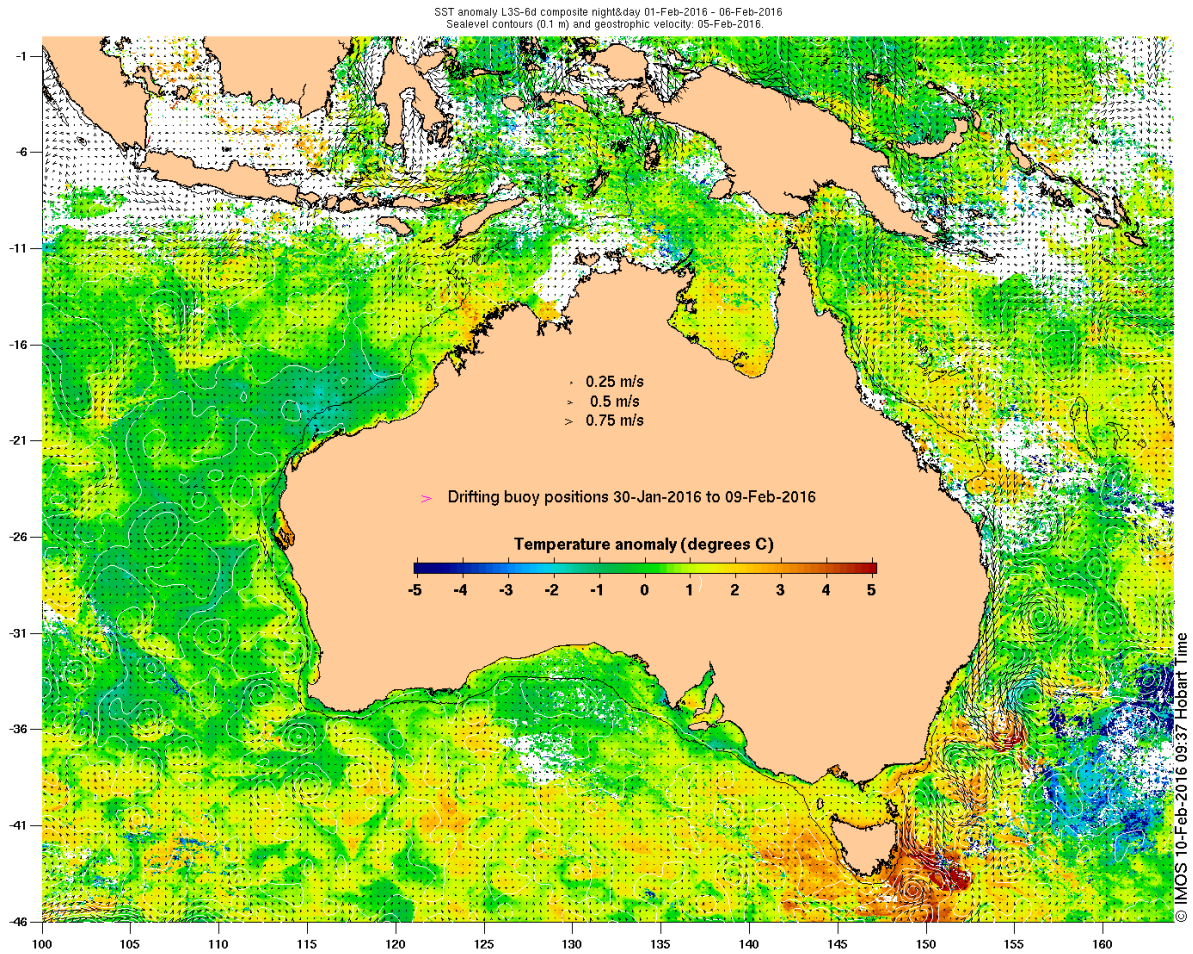


Topics in Australian Marine Science

Course handbook



Semester 1, 2022



Table of Contents

1	Introduction	1
2	Integrated Marine Observing System (IMOS)	1
3	Learning outcomes	1
4	Study commitment	2
5	TAMS Course Schedule	4
6	Assessments	5
7	Plagiarism and referencing	6
8	Additional Reading	6
9	Learning support	7
10	Special needs	7
11	How to get to SIMS and where to park	7
12	SIMS IT	7
13	Course coordinator	8

1 Introduction

Intense industrial development and urbanisation along Australia's coastline coupled with the challenges that arise from an ever changing and highly dynamic marine environment demand marine scientists work in a cross-disciplinary field. *Topics in Australian Marine Science* aims to respond to this demand by introducing you to current research undertaken in Australia in various disciplines of marine science and providing practical instruction in a range of tools that enable you to analyse a diversity of datasets that cover large temporal and spatial scales. It is a multi-institutional subject taught at the Sydney Institute of Marine Science (SIMS) with contributions from four partner universities (University of Technology, Sydney, University of NSW, University of Sydney and Macquarie University). Lectures and tutorials are taught by leading marine science researchers.

2 Integrated Marine Observing System (IMOS)

TAMS focuses on using a range of tools to analyse the diversity of datasets collected by marine scientists and made available via the Integrated Marine Observing System Ocean Portal. Topics will cover physical and biological oceanography, climate change, molecular ecology, aquaculture, marine biology and marine geosciences.

Since 2006, IMOS has been routinely operating a wide range of observing equipment throughout Australia's coastal and open oceans, making all of its data accessible to the marine and climate science community, other stakeholders and users, and international collaborators. IMOS is designed to be a fully integrated, national system, observing at ocean-basin and regional scales, and covering physical, chemical and biological variables. IMOS observations are guided by science planning undertaken collaboratively by the Australian marine and climate science community with input from government, industry and other stakeholders.

You will learn much more about IMOS, the data generated and the research undertaken during this course. More information can be found at <http://www.imos.org.au>

3 Learning outcomes

After completion of this course you should be able to adopt a critical thinking, evidence-based approach to key research questions in marine science and management. The acquired knowledge and skills will be directly transferable to the workplace and professional practice. The case-based problems developed for this course focus on the following learning outcomes:

1. *Understanding the diversity of IMOS data and instrumentation for data collection*
The IMOS national facility is collecting comprehensive biological data as well as complex physical and oceanographic data that give a real picture of the coast. By being exposed to the full range of IMOS data you will learn about the different instrumentation (remote sensing equipment, acoustic arrays, autonomous underwater vehicles, ocean gliders) that is used to measure marine systems.
2. *Formulate and test hypotheses within a scientific framework*
IMOS data is being used by researchers to answer important questions such as ocean and climate change and variability, major boundary currents, continental shelf processes and biological responses. You will be able to formulate your own hypotheses associated with these topics and decide on how much data is 'needed' to test it.
3. *Access and manage data, including those from large datasets*
The internet has made it possible to access large amounts of data covering extensive spatial scales. New skills are needed to access and manage those large data sets. You will learn how to access and manage large datasets using online tools and other software.
4. *Produce and present data visually*
You will learn how to effectively communicate your results through writing a scientific report on your findings.
5. *Evaluate and synthesise a variety of expert opinions within marine science*

4 Study commitment

As with all university subjects, TAMS comprises both face-to-face and other learning activities. During most weeks of the semester there is a three-hour practical class with an accompanying 1 hour seminar.

4.1 Practical classes

The practical classes will introduce you to the IMOS – Australia's Integrated Marine Observing System, a national infrastructure facility that collects marine data from Australia's coasts and oceans. These data are made publicly available and used by scientists to explore and monitor biological and oceanographic processes in the coastal and marine environment. In practical classes you will analyse and interpret remotely-sensed data from IMOS, which provides comprehensive information on the biological and physical processes of Australia's coastal and oceanic waters.

4.2 Seminars

The seminar series is built around the most current research questions in Australian marine science. Scientists from a number of disciplines will present their research and the most important research questions in their field in a 1 hour seminar. Seminar topics cover physical and biological oceanography, climate change, molecular ecology, aquaculture, marine biology and marine geosciences.

5 TAMS Course Schedule

TAMS will run on Thursdays. A face to face class will run at SIMS. You will be able to zoom into the class if working remotely. A recording of the class will be made available.

Classes start on the 24th of February and the final exam will be on the 19th of May. Please note we have no class on the 31st of May. The week break may not align with the mid-semester break at your home University.

Classes will cover a range of modules based on the Integrated Marine Observing System including Physical Oceanography, Zooplankton, Animal Tracking, Autonomous Underwater vehicles and Benthic ecology.

TAMS Schedule		
	Workshops (9:30-12:30)	Seminar Series (1:30 – 2:30)
Week 1 (24/2/2022)	Course Overview; Introduction to R	NSW IMOS and microbes – Dr Justin Seymour
Week 2 (3/3/2022)	Introduction to the AODN Ocean Portal	SIMS tour
Week 3 (10/3/2022)	Physical Oceanography	Restoration Ecology – Dr Mel Bishop
Week 4 (17/3/2022)	Physical Oceanography	Ecotoxicology – Dr Katie Dafforn
Week 5 (24/3/2022)	Physical Oceanography	Physical Oceanography – Dr Ryan Holmes
Break (31/3/2022)	NO CLASS	NO CLASS
Week 6 (7/4/2022)	Zooplankton	Seahorse hotels – Dr David Harasti
Week 7 (14/4/2022)	Zooplankton	Research @ SIMS
Week 8 (21/4/2022)	Animal Tracking	Mud crabs, telemetry and oceanography – Dr Iain Suthers and Dan Hewitt UNSW
Week 9 (28/4/2022)	Animal Tracking	Coral Reef Ecology – Dr Thomas Fellows
Week 10 (5/5/2022)	Autonomous Underwater Vehicles/Benthic Ecology	Benthic Ecology – Dr Ezequiel Marzinelli
Week 11 (12/5/2022)	Autonomous Underwater Vehicles/Benthic Ecology	Drones for marine ecologists – Dr Jane Williamson
Week 12 (19/5/2022)	Exam	

6 Assessments

In order to complete this subject, you are required to perform satisfactorily in all assessment tasks.

Written assignments on practical modules	60%
Exam	40%

Assessment	Weighting	Due date
Introduction to R	10%	10th March 2022
Physical Oceanography a	10%	7th April 2022
Physical Oceanography b	10%	7th April 2022
Zooplankton	10%	21st April 2022
Animal tracking	10%	5th May 2022
AUV/Benthic Ecology a	5%	12th May 2022
AUV/Benthic Ecology b	5%	16th May 2022
Exam	40%	19th May 2022

6.1 Written assignments on Practical Modules (60%)

You are required to hand in written assignments based on the results of exercises completed as part of the practical modules. These will be submitted as an electronic report before the beginning of the practical class the week following the module's conclusion, or as instructed by the lecturer. Reports will include graphs and figures as well as interpretation of your results in the broader context of the topic. Most practical modules are worth 10%. Note: some of the modules may be assessed over multiple weeks and will be worth 20% (Physical Oceanography module). The results of the IMOS practical is not assessed.

6.2 Exam (40%)

The exam is worth 40% of your total mark. More details will be forthcoming closer to the date.

7 Plagiarism and referencing

Plagiarism is the presentation of thoughts and work of another as one's own.

Examples include:

- Copying thoughts or work of another without appropriate acknowledgement
- Paraphrasing another person's work with very minor changes
- Piecing together sections of the work of others into a new document

It is a serious misconduct to plagiarise. In cases of plagiarism the course coordinator reserves the right to impose the full degree of sanctions on students, which includes failure of the course.

To avoid plagiarizing, you should directly quote the source of material and paraphrase it in your own words.

Some useful information on plagiarism can be found here:

http://sydney.edu.au/student_affairs/plagiarism/links.shtml

8 Additional Reading

Most weeks, we will provide journal articles for you to read which have direct relevance to your practical classes. In addition, you may wish to look for papers written by the lecturers or referenced in their seminars. If you have trouble accessing a particular paper please don't hesitate to email the course coordinator to see if they have access. Make sure you try through your university library first though. If you are not on campus, you will need to log-in but this should give you access to everything the university has access to. Some additional books you may find interesting (try the university library):

Biological Oceanography (2012) by Charles B. Miller and Patricia A. Wheeler

<http://au.wiley.com/WileyCDA/WileyTitle/productCd-EHEP002684.html>

Dynamics of Marine Ecosystems: Biological-Physical Interactions in the Oceans (3rd Ed) by Kenneth Mann and John Lazier

<http://au.wiley.com/WileyCDA/WileyTitle/productCd-1405111186.html>

Marine Ecology (2007) by Sean Connell and Bronwyn Gillanders

http://www.oup.com.au/titles/higher_ed/science/biological_sciences/9780195553024

9 Learning support

You should not hesitate to contact your course coordinator for help throughout semester. Course coordinator contact details are listed at the end of this handbook. You will be provided with advice and feedback on your assignment tasks throughout the semester. To complete your assignments you can access resources e.g. electronic journals, books and online databases at your home library using your university login and password.

In addition, the universities offer help with your study e.g. writing and study skills with a number of facilities, online and on campus. Please visit the following websites to find a list of services that your home university offers:

Macquarie University – <https://students.mq.edu.au/support>

University of New South Wales – www.lc.unsw.edu.au

University of Sydney – www.sydney.edu.au/stuserv/learning_centre/index.shtml

10 Special needs

If you have a disability or an ongoing medical condition and you would like to discuss whether you are eligible to access special services, you must contact the Disability / Special Needs Service at your home university **before** the course starts.

You can find the contact details for Disability Services at the four universities on the respective university websites.

11 How to get to SIMS and where to park

You can travel to SIMS by public transport or by car.

For the most up to date information on public transport please check <http://www.transportnsw.info/>

If you decide to drive to SIMS please ensure you arrive at class on time. A map of how to get to SIMS is available on the SIMS website www.sims.org.au

Parking is available at an hourly rate or if you have a valid national parks sticker you can park for free in designated areas.

Alternatively you can park up in Headland Park, Georges Heights and walk down through the bushtrack. See the course convenor if you need further information.

12 SIMS IT

12.1 Wireless Access

A special wireless network has been set up for TAMS.

SSID: TAMS

Password: tams2017

12.2 Computers

As we are working with large freely available datasets, the practical's will all be computer-based. We will be providing you with some software for use in some classes, and in others, the work will be web-based or spreadsheet based.

Before you come to class can you please do the following:

- Ensure you are running up-to-date software with all security patches installed.
- Please make sure you have Mozilla Firefox or Google Chrome installed, in addition to your default web browser. These browsers work much better with some of the web-based tools we will be using.
- You will need a word processor (Microsoft Word) to write your reports. If you do not have these, consider buying them. There are student versions available. Or else, free alternatives are OpenOffice or LibreOffice (although your lecturers may not be able to help you with using these alternatives so you will need to be proficient yourself).

12.3 Software Installation

Throughout this course, you will need to use a variety of software. We will provide all of this, but we need your assistance installing the software before the relevant class. So we can address any problems well in advance of the class, it would be best if you try and install the software in the first week or two of classes. I will be available to assist with the installation on Thursdays. Please don't come to class without the software installed or you will quickly fall behind.

Further information about software installation will be provided in a separate handout.

13 Course coordinator

Jessica Boomer is the course coordinator. Feel free to email me jessica.boomer@sims.org.au with any questions or concerns you have regarding the course. If you have specific questions about homework assignments, you are best to contact the lecturer directly. Their contact details are generally in the practical handouts each week. Alternatively, they all have websites so a simple web-search will find them.