School of Environmental and Life Sciences

MARI3500: Sustainable Fisheries and Aquaculture

Callaghan and Ourimbah
Semester 1 - 2025

THE UNIVERSITY OF NEWCASTLE AUSTRALIA

COURSE OUTLINE

www.newcastle.edu.au
CRICOS Provider 00109J

OVERVIEW

Course Description

Wild-harvest fisheries and aquaculture activities are the world's largest source of protein, representing primary nourishment for over 3 billion people. This protein comes from the fishes, elasmobranchs, crustaceans, molluscs and algae that are targeted by not only commercial, recreational and Indigenous fisheries, but are also grown by aquaculture activities. MARI3500 analyses the critical factors influencing the distribution and abundance of targeted species, central to understanding their fisheries exploitation. These factors include an appraisal of the life history stages, population structure, habitat usage and feeding relationships of these targeted species. This information, along with husbandry methods, is also critical to the success of aquaculture activities. Students will evaluate techniques used in fisheries science and assess human impacts on, and management of, wild-harvest fisheries. Emerging trends, involving potential shifts from wild-harvest extraction to aquaculture production and whole-of-ecosystem management will be discussed. The course comprises integrated learning sessions, wet and computer laboratories, off-site visits and workshops, with the field study and off-campus workshop conducted in the mid-semester break. By the end of the course, students will be equipped with the necessary skills to prepare for entry to coastal-focussed research and industry careers.

Academic Progress Requirements

Nil

Requisites

Course Replacement:
You cannot enrol if you have successfully completed any of the following course(s):
MARI2500

Assumed Knowledge

A course in first year biology, a second year course in biology and/or ecology, STAT1020 or STAT1070, MARI1000.

Contact Hours

Callaghan
Computer Lab *
Face to Face On Campus
3 hour(s) per week(s) for 2 week(s) starting Week 7

Field Study *
Face to Face Off Campus
15 hour(s) per term for 1 term starting Week 1

Integrated Learning Session
Online
24 hour(s) per term starting Week 1

Laboratory *
Face to Face On Campus
4 hour(s) per week(s) for 1 week(s) starting Week 6

Practical *
Face to Face Off Campus
3 hour(s) per week(s) for 1 week(s) starting Week 12

Workshop *
Face to Face On Campus
2 hour(s) per week(s) for 2 week(s) starting Week 1

Ourimbah
Computer Lab *
Face to Face On Campus
3 hour(s) per week(s) for 2 week(s) starting Week 7

Field Study *
Face to Face Off Campus
15 hour(s) per term for 1 term starting Week 1

Integrated Learning Session
Online
24 hour(s) per term starting Week 1

Laboratory *
Face to Face On Campus
4 hour(s) per week(s) for 1 week(s) starting Week 6

Practical *
Face to Face Off Campus
3 hour(s) per week(s) for 1 week(s) starting Week 12

Workshop *
Face to Face On Campus
2 hour(s) per week(s) for 2 week(s) starting Week 1

* This contact type has a compulsory requirement.

Unit Weighting 10

Workload Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

CONTACTS

Course Coordinator

Callaghan and Ourimbah
Dr Margaret Platell
Margaret.Platell@newcastle.edu.au
(02) 4349 4809
Consultation: Email is the best way to get in touch with me.

Teaching Staff Other teaching staff will be advised on the course Canvas site.

School Office

School of Environmental and Life Sciences
Room C228 Chemistry Building
Callaghan
CESE-SELS@newcastle.edu.au
+61 2 4921 5080
9am-5pm (Mon-Fri)

School of Environmental and Life Sciences
SO-104 / SO-105 Science Offices
OURIMBAH
CESE-SELS@newcastle.edu.au
+61 2 4921 5080
9am-5pm (Mon-Fri)

SYLLABUS

Course Content

1. Global perspectives of wild-harvest fisheries and aquaculture
2. Wild-harvest techniques, fishery measures, environmental factors
3. Fisheries biology – reproduction, age and growth, feeding
4. Fishing - stock, exploitation and socioeconomic models
5. Aquaculture – types, impacts, projections
6. Management, for single species and ecosystems

Course Learning Outcomes

On successful completion of this course, students will be able to:

1. Critically appraise fisheries and aquaculture biology and life history characteristics for fishes, crustaceans, molluscs and algae

2. Apply contemporary techniques to obtain, synthesise, and interpret biological and ecological data

3. Analyse fishing and aquaculture methods and develop arguments around their impacts

4. Synthesise and compare management methods used for fisheries and aquaculture activities

5. Effectively communicate scientific information, to a range of audiences, through digital presentations, focussed tasks and online discussions

Course Materials

Other Resources:

- Useful links to support your learning are provided within the Course Canvas site.

Required Reading:

- All course materials, including online lectures, videos, information, links to external resources, field work, laboratory and workshop exercises are provided on the Course Canvas site.

COMPULSORY REQUIREMENTS

In order to pass this course, each student must complete ALL of the following compulsory requirements:

Contact Hour Requirements:

- Computer Lab Attend 80% of sessions
- Field Study Attend 80% and do induction
- Workshop Attend 80% of sessions
- Practical Attend 80% of sessions
- Laboratory Attend 80% and do induction

Course Assessment Requirements:

-

Compulsory Placement and WHS Requirements:

-

SCHEDULE

Week	Week Begins	Topic	Learning Activity	Assessment Due
1	24 Feb	1. Significance of fisheries and aquaculture 2. Fishery and aquaculture	Online learning	

		operations		
2	3 Mar	1. Sectoral differences in fisheries and aquaculture 2. Fishing gear and technology	Workshop 1: Features of fishing and aquaculture (2h, on campus) Online learning	
3	10 Mar	1. Reproduction and early life cycle stages of fish 2. Fish movements	Online learning	
4	17 Mar	1. Age and growth of fish 2. Recruitment of fish	Online learning	
5	24 Mar	1. Feeding 2. Food webs	Wet Lab: Flathead dissections, microscope use and biological drawings and provision of biological data for computer lab in Week 7 (4 h, on campus): Online learning	Digital Presentation (20%) due 11:59 pm on Friday, 28th March Based on Weeks 1-5
6	31 Mar	1. Data for fisheries 2. Data for aquaculture	Online learning	
7	7 Apr	1. Management of fisheries and aquaculture 2. Case histories for selected species	Computer Lab 1: Reproductive and feeding patterns in flathead (3 h, on campus) Online learning	
Recess				
Recess				
8	28 Apr	1. Socioeconomic drivers of fishery and aquaculture 2. Seafood supply chain and handling	Computer Lab 2: Age and growth of sand flathead (3 h, on campus) Online learning	
9	5 May	1. Population changes & Density dependence 2. Responses to fishing by target species	Online learning	Practical Tasks (30%) due 11:59 pm on Friday, 9th May Based on Weeks 3-8 and Mid Term Break
10	12 May	1. Fishery models 2. Overfishing & Biological reference points	Workshop 2: Fishery management (2h, on campus) Online learning	
11	19 May	1. Responses to fishing and aquaculture by ecosystems 2. Emerging threats		
12	26 May	1. Habitat and fishery/aquaculture relationships 2. Course wrapup	Workshop 3: Industry participation, habitat management and looking to the future (3 h, off campus)	Evaluation Task (25%) due at 11:59 pm on Friday, 30th May Based on Weeks 9-11
13	2 Jun			Online Negotiations (25%) runs between 9 am Tuesday 3rd June to 11:59 pm on Friday, 6th June Based on Weeks 1-12
Exams				
Exams				

ASSESSMENTS

This course has 4 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Digital presentation	11:59 pm on Friday 28th March (Week 5)	Individual	20%	1, 3, 4, 5
2	Evaluation task	11:59 pm on Friday 30th May (end of Week 12)	Individual	25%	1, 3, 4, 5
3	Practical and computer-based workshop and practical tasks	11 59 pm on Friday, 9th May (end of Week 9)	Individual	30%	1, 2, 4
4	Online negotiations	11:59 pm on Friday, 6th June	Group	25%	3, 4, 5

Late Submissions The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

Assessment 1 - Digital presentation

Assessment Type Professional Task

Purpose To assess how you use digital means to draw together and present, in a highly informative and efficient manner, an up-to-date and complete assessment of the sustainability of a commercially-harvested Australian edible species of fish, elasmobranch, mollusc or crustacean, recognising all forms of production for this species.
This Digital Presentation will develop your critical research, analytical and presentation skills and can easily become part of your professional portfolio.

Description You will visit a local seafood store (or website), and from the produce displayed, select a single species of fish, elasmobranch, mollusc or crustacean that is produced by wild-harvest methods. You will then research key information to develop an up-to-date and complete argument around its sustainability, recognising the full range of issues and impacts, and also taking into account any aquaculture production of that species, either for stock enhancement or consumption. The full implications of the sustainability of your selected species will include its Latin and marketed names, distinguishing features, key biological and ecological features, fishing methods and catch sizes for relevant fisheries and aquaculture production (where appropriate). Finally, you will synthesise this information to develop an audio-visual presentation, such that an educated, but not necessarily well-informed, person will be engaged and ultimately far better informed.
Further guidelines, some resources and a marking rubric are provided on the course Canvas site.

Weighting 20%

Length 3-5 minutes, not including any credits

Due Date 11:59 pm on Friday 28th March (Week 5)

Submission Method Online

Assessment Criteria You will be assessed on your ability to acquire and integrate critically important and sufficiently detailed information in a format that is both informative and engaging. This will be encapsulated within the marking rubric on the Course Canvas site.

Return Method Online

Feedback Provided Online - Within three weeks of submission. A completed marking rubric, with comments where appropriate.

Opportunity to Reattempt Students will not be given the opportunity to reattempt this assessment.

Assessment 2 - Evaluation task

Assessment Type Written Assignment

Purpose To assess your ability to assimilate, present visually and evaluate the production history, management tools and management outcomes for a wild-harvest species of fish, elasmobranch, crustacean or mollusc that has a complex/enduring management scenario

	(choices of appropriate species will be provided on Canvas). This written assessment meets the course objectives of knowledge acquisition, critical analysis and your scientific communication skills, with such a document (as for the Digital Presentation), easily becoming part of your professional portfolio.
Description	There are many species around the world (and in Australia) that have faced various management challenges, including overfishing, habitat loss, competing fisheries, market changes and impacts of climate change. You will select one such species (with help) and research and collate information for that species that clearly includes long-term production rates, how management agencies (and actions) have dealt with these various challenges, and the outcomes of any management changes. This information will be provided in the form of a professional scientific review, with its' focus a detailed visual summary of that production and management timeline, but with explanations and use of key references to support your evidence-based statements. This review will be in a fully professional format, being paragraph-driven, headings where appropriate, and containing a short introduction and conclusion, with recommendations for future management of this species. All evidence-based statements must be cited and full references provided in the reference list at the end. Further guidelines, starting resources and a marking rubric are provided on the course Canvas site.
Weighting	25%
Length	1 visual summary & 1200 words, excluding refs
Due Date	11:59 pm on Friday 30th May (end of Week 12)
Submission Method	Online
Assessment Criteria	You will be assessed on your ability to acquire, integrate, visually present and report critically important and sufficiently detailed information in the format of a professional scientific review with a key visual summary. This will be encapsulated within the marking rubric on the course Canvas site.
Return Method	Online
Feedback Provided	Online - Within three weeks of submission. A completed marking rubric, with comments where appropriate.
Opportunity to Reattempt	Students will not be given the opportunity to reattempt this assessment.

Assessment 3 - Practical and computer-based workshop and practical tasks

Assessment Type	Tutorial / Laboratory Exercises
Purpose	To assess how you demonstrate your competence in both acquiring and linking content from various elements of the laboratory and field sessions during semester and the mid-term break, to (1) provide insight into the examinations and analyses required for biological and ecological assessments (2) compare different types of production activities via industry visits, and (3) ultimately management considerations
Description	You will attend a range of face-to-face sessions, both on and off campus, to obtain information firsthand and to analyse, integrate and supply that information via series of short-answer questions, supported by diagrams and graphs where needed. These sessions include a wet lab on fish biology and ecology, computer labs on fish biological and ecological analyses and field exercises in the mid-term break. The field exercises include site visits to a field sampling site at Lake Macquarie, the Sydney Fish Market, and aquaculture (commercial and governmental) facilities at Port Stephens (cost of approx. $45 for the site visits and COVID-19/other urgent issues pending). Students will need to provide their own transport for field excursions, with car pooling suggested for Lake Macquarie (where you will be getting wet) and Port Stephens. For each of the face-to-face sessions, there will be documents provided requesting information to be provided, or direct questions to be answered, these will be submitted together as the Practical Tasks.
Weighting	30%
Length	Approx twenty (20) pp (including drawings)
Due Date	11 59 pm on Friday, 9th May (end of Week 9)
Submission Method	Online
Assessment Criteria	Completion of the Practical Tasks will allow you to demonstrate your development of key laboratory skills for fish; for analysing and interpreting biological and ecological data; collection of field data and observations of workplace capabilities in both wild-harvest and aquaculture facilities.
Return Method	Online

Feedback Provided	Online - Within three weeks of submission. Comments where appropriate.
Opportunity to Reattempt	Students will not be given the opportunity to reattempt this assessment.

Assessment 4 - Online negotiations

Assessment Type	Online Learning Activity
Purpose	To assess your understanding of the full weekly content via a scenario described using a divisive written prompt, where you will undertake online discussions around that prompt and thus demonstrate your use of evidence-based arguments, understanding of different viewpoints and ability to develop, with your peers, a critical analysis of the scenario provided.
Description	You will participate in Online Negotiations at the end of the course (in place of the final exam). This assessment will assess your ability to provide an evidence-based argument of the full implications of a selected management scenario, based around a divisive discussion prompt on selected wild-harvest and/or aquaculture activities. Students in the class will be randomly allocated into small groups (5-6 students), with each group having its own discussion area on the course Canvas site. Online discussions will run over four days, with students contributing from the start (and at any time of the day) and to develop a more complex and complete understanding of the scenario. You will not know the prompt until the assessment opens Further guidelines, starting resources and a marking rubric are provided on the course Canvas site.
Weighting	25%
Length	3-4 posts of <250 words each (excluding sources)
Due Date	11:59 pm on Friday, 6th June
Submission Method	Online
Assessment Criteria	The Online Negotiations will assess your ability to synthesise an opinion based on knowledge and convey this clearly in a well-presented, articulate and professional manner and to demonstrate a critical approach to the subject matter. This will be encapsulated within the marking rubric on the course Canvas site.
Return Method	Online
Feedback Provided	Online - Upon the fully graded date. A completed marking rubric, with comments where appropriate.
Opportunity to Reattempt	Students will not be given the opportunity to reattempt this assessment.

ADDITIONAL INFORMATION

Grading Scheme

This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following

			disciplinary action.

Attendance

*Skills are those identified for the purposes of assessment task(s).
Attendance/participation will be recorded in the following components:

- Computer Lab (Method of recording: Marked roll provided by the Course Coordinator)
- Field Study (Method of recording: Marked roll provided by the Course Coordinator)
- Laboratory (Method of recording: Marked roll provided by the Course Coordinator)
- Workshop (Method of recording: Marked roll provided by the Course Coordinator)

Communication Methods

Communication methods used in this course include:

- Canvas Course Site: Students will receive communications via the posting of content or announcements on the Canvas course site.
- Email: Students will receive communications via their student email account.
- Face to Face: Communication will be provided via face to face meetings or supervision.

Course Evaluation

Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.

Learning Analytics

The University uses an evidence-based approach to enhancing student learning and delivering support. Our careful analysis of data through learning analytics informs decision making processes related to student learning, academic outcomes, and support services. Learning analytics may be used to identify targeted individual opportunities for additional support services or interventions.

Interviews on Assessment Items

An Interview may be conducted on any assessment item in this course, in accordance with the Interview on Assessment Items Procedure. The purpose of the interview is to verify the author of the material submitted in response to the assessment task and provide a quality assurance measure.

In the event the Course Coordinator is not satisfied that a student's oral responses are consistent with the work originally submitted, the matter will be referred to the Student Academic Conduct Officer, who will take appropriate action under the Student Conduct Rule.

Academic Integrity and Ethical Academic Conduct Policy

All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations.

Please refer to the Academic Integrity and Ethical Academic Conduct Policy

Adverse Circumstances

The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s).

Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where:

1. the assessment item is a major assessment item; or
2. the assessment item is a minor assessment item and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system;
3. you are requesting a change of placement; or
4. the course has a compulsory attendance requirement.

Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure.

Use of generative artificial intelligence in course assessments	It is critical that any work submitted for assessment is your own original work. Before using generative AI tools (such as ChatGPT, Perplexity, Microsoft Copilot, etc) in any assessable work you must ensure that such use is in line with the requirements for the course and expectations of your Course Coordinator Misuse of AI tools may be considered a breach of the University's Student Conduct Rule and could result in disciplinary action. Artificial Intelligence detection software may be used to review any work you submit. If you have used AI in any way other than has been expressly permitted by your course coordinator, you may be engaging in academic misconduct and be subject to penalties. For information, refer to: • Generative AI Tools • Academic Integrity
Important Policy Information	The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the policies and procedures at https://www.newcastle.edu.au/current-students/respect-at-uni/policies-and-procedures that support a safe and respectful environment at the University
Other Information	Students need to complete a Laboratory Safety Induction prior to undertaking the sessions in Week 5, and a Fieldwork Medical Questionnaire for the field sessions in the mid-semester break. Both the Laboratory Safety Induction and the Fieldwork Medical Questionnaire are available online.

This course outline was approved by the Head of School. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.
© 2025 The University of Newcastle, Australia