OCES4103 Fisheries and Aquaculture (3-credits)
Spring 2024-25

Monday and Wednesday 09:00 – 10:20 am Venue: Classroom CYTG003

1. Course Coordinators and Instructors

- Prof. Cynthia YAU, room 5436 (L25/26), cynthiastyau@ust.hk
- Prof. Masayuki USHIO, CYT-2013 (L35/36), ushio@ust.hk

  Contact hours: by appointment

2. Course Description

This course will introduce the diversity and biology of fisheries resources including finfish and shellfish species, common fishing methods employed around the world, fisheries management science, and aquaculture from both global and local perspectives. Current practices, theories, new techniques and future directions in fisheries science will be covered to provide a broad understanding of the subject.

3. Intended Learning Outcomes (ILOs)

After taking this course, students are expected to be able to:

1. Describe the status, operation and management of capture fisheries production
2. Explain the biology of fished resources and how this knowledge is essential for fisheries management
3. Explain aquaculture production and appraise its economic importance
4. Elaborate on marine community dynamics
5. Implement basic fish population modelling
6. Explain the principles of emerging fish monitoring tools

4. Format and Learning Activities

- Lectures – two lectures (3 hrs) per week
- Laboratory Practical
- Field Trip
- Group Mini Project

5. Course Assessment Scheme

Final Examination (60%)
Participation and Assignments (40%)

Assessment Task	Contribution to Overall Course (%)	Due Date
Laboratory Practical Report	12	17/03/2025
Field Trip Report	8	TBC (2 weeks after field trip date)
Group Mini-Project Oral Presentation	20	30/04/2025
Final Examination	60	Arranged by ARO

6. Major References

"State of the World's Fisheries and Aquaculture 2024", FAO (2024)

"Fisheries Biology, Assessment and Management" 2nd edition (2008) by Michael King

Supplementary references and reading materials will also be made available on Canvas

7. Mapping of Course ILOs to Assessment Tasks

Assessed Task	Mapped ILOs	Explanations
Laboratory Practical Report	ILO 2	This task assesses the students' knowledge about the diversity of commercial fishery resources, including different types of finfish and shellfish species. First-hand training in the collection of standard morphometric/meristic fishery data is evaluated, such as length-frequency and length-weight relationships, condition factors, and maturity stages, thus appraising the students' ability to connect the theory from lectures with the practical logistics of how fishery data are collected and the biology of various exploited species.
Field Trip Report	ILO 1, ILO 2, ILO 3	This task assesses the students' appreciation of the history and methods used in capture fisheries (ILO 1), the variety of captured or cultured species of commercial importance in the past versus the present (ILO 2), and the importance of fisheries to the development of Hong Kong (ILO 3).
Group Mini Project Oral Presentation	ILO 4, ILO 5, ILO 6	This task assesses the students' understanding of the principles of emerging fish monitoring tools (ILO 6) through practical experience with fish eDNA analysis. It also evaluates their ability to summarize and discuss scientific results and communicate them effectively in a scientific format, which requires the understanding of marine community dynamics (ILO 4) and fish population modeling (ILO 5).
Final Examination	ILO 1, ILO 2, ILO 3, ILO 4, ILO 5, ILO 6	This task assesses the students' overall understanding of the scale and methods of capture fisheries production (ILO 1), the biology of fishery resources and how such information relates to stock assessment and management of fished species (ILO 2), and the role of mariculture in meeting the ever-increasing global demands for seafood (ILO 3). This task also assesses the students' ability to explain marine community dynamics (ILO 4) and fish population modeling (ILO 5) and relate this knowledge to emerging fish monitoring tools (ILO 6).

8. Final Grade Descriptors

Grade	Short Description	Elaboration on Subject Grading Description
A	Excellent Performance	Students demonstrate a thorough understanding of fishery biology, the state of fisheries production globally and locally, methods employed in capture fisheries and mariculture, principles of fish population dynamics and stock assessment, and the innovative molecular tools that are being applied in fisheries management. They exhibit exceptional levels of critical thinking and can connect theoretical knowledge with hands-on practical ability. They can effectively communicate their knowledge through the various assessed tasks, are proactive showing strong participation and leadership roles.

B	Good Performance	Students exhibit a good comprehension of fisheries and aquaculture and can communicate their knowledge adequately. They demonstrate competent critical and analytical skills relating to fisheries and conservation issues. They are generally consistent in connecting the course material to real-world applications but may miss providing more nuanced or in-depth explanations about fisheries production, population monitoring tools, or management issues. Although they show good participation they may not take up leadership roles.
C	Satisfactory Performance	Students demonstrate a satisfactory grasp of the fundamental concepts of fisheries and aquaculture. They can provide basic explanations about fisheries production and population assessments and management but cannot provide in-depth critical analyses of how the biology and ecology of fisheries resources relate to their management and sustainability. These students show a reasonable understanding of fisheries science but may not exhibit a strong enthusiasm to learn more or be fully engaged with the topics.
D	Marginal Pass	Students show a minimal understanding of fisheries resources and fisheries/aquaculture production and management. They may grasp only basic concepts about the biology and ecology of exploited fishery species but cannot fully grasp how this relates to their capture or culture, and they have difficulty communicating their knowledge of methodologies or management measures. They show only a minimal level of interest and engagement in the course.
F	Fail	Students have not met the minimum requirements for the course. They show a lack of understanding of the basic principles of capture fisheries and aquaculture and cannot identify the types of exploited species, describe their biology and ecology, how they are exploited, and how their populations are assessed or managed. They demonstrate failure to engage with the course content, laboratory exercise, or field trip assignments, and fail to contribute significantly to the group mini project.

9. Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission.

10. Course AI Policy

The use of Generative AI may be used for the assignments in this course with the understanding that although it may help in the writing of reports in terms of English language, the assignments are very topic specific and time sensitive (e.g. the field trip report, which will depend on what is observed on the day). Any use of GenAI in the course assignments must be declared.
GenAI is not permitted in the Final Examination.

11. Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to Academic Integrity – HKUST – Academic Registry for the University's definition of plagiarism and ways to avoid cheating and plagiarism.

12. OCES 4103 Tentative Schedule

Mon & Wed 9:00 – 10:20 am Venue: CYTG003

Wk	Date	Topic & Format	Instructor
1	03 Feb (Mon)	Course Introduction; Importance of Fisheries	Yau & Ushio
	05 Feb (Wed)	Status of World Fisheries Production	Yau
2	10 Feb (Mon)	Hong Kong's Capture Fisheries	Yau
	12 Feb (Wed)	Fishing Gears and Methods I	Yau
3	17 Feb (Mon)	Fishing Gears and Methods II	Yau
	19 Feb (Wed)	Biology of Fishery Resources I: Finfish	Yau
4	24 Feb (Mon)	Biology of Fishery Resources II: Shellfish	Yau
	26 Feb (Wed)	Fishery Stock Assessment I: Stock and Size Relationships	Yau
5	03 Mar (Mon)	Fish & Shellfish Lab Practical (in CYT UG002)	Yau
	05 Mar (Wed)	Fishery Stock Assessment II: Growth and Age Determination	Yau
6	10 Mar (Mon)	Introduction to Marine Aquaculture (Mariculture) I	Yau
	12 Mar (Wed)	Introduction to Marine Aquaculture (Mariculture) II	Yau
	15 Mar (Sat)	Field Trip - Lamma Fisherfolk's Village (TBC)	Yau
7	*17 Mar (Mon)*	*No Class – compensation for Field Trip*	
	19 Mar (Wed)	Advanced Topics in Ecology and Fisheries I: Body Size	Ushio
8	24 Mar (Mon)	Advanced Topics in Ecology and Fisheries II: Population Variability	Ushio
	26 Mar (Wed)	Advanced Topics in Ecology and Fisheries III: Restocking	Ushio
9	31 Mar (Mon)	Introduction to Environmental DNA (eDNA) Analysis	Ushio
	02 Apr (Wed)	*Mid-Term Break – No Class*	
	07 Apr (Mon)	Water Sampling for eDNA Analysis (eDNA Mini Project)	Ushio
	09 Apr (Wed)	Introduction to R and RStudio	Ushio
10	14 Apr (Mon)	Ecological Community Analysis I (Population modeling)	Ushio
	16 Apr (Wed)	Ecological Community Analysis II (Data analysis)	Ushio
11	*21 Apr (Mon)*	*Public Holiday – No Class*	
	23 Apr (Wed)	Detection of Fish Species from eDNA Data	Ushio
12	28 Apr (Mon)	Community Ecology Analysis of eDNA Data	Ushio
	30 Apr (Wed)	Oral Presentation for the eDNA Mini Project	Ushio
13	*05 May (Mon)*	*Public Holiday – No Class*	
	07 May (Wed)	Course Review	Ushio

TBC – To be confirmed