UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Management of Aquatic Resources: Fisheries

2627-2-F7504Q020

Aims

The course examines key aspects and critical issues of aquatic resources management. Specifically, the course examines fishery and aquaculture productive systems focusing on ecosystem-based management approaches and innovative solutions to make both sectors more sustainable in a context of anthropogenic driven changes.

Knowledge and Understanding
The course will enable students to acquire theoretical and experimental skills related to the abiotic and biotic characteristics of ecosystems, interactions between organisms and between them and the physical environment, and ecosystem functioning in contexts related to fishing and aquaculture activities. Students will acquire basic knowledge of the ecological principles that govern ecosystem responses to human action (fishing and aquaculture) in order to propose analyses, monitoring protocols, and solutions to alleviate anthropogenic pressure, adopt mitigation measures, and guide adaptation to change. Students will acquire specialized scientific language.
Ability to apply knowledge and understanding
The student will acquire application skills in analyzing ecological processes, including those related to anthropogenic changes caused by fishing and aquaculture.
Making judgments
The student will acquire the ability to evaluate and interpret experimental data; assess the state of the environment and the effects of anthropogenic activities caused by fishing and aquaculture.
Communication Skills
The course will enable students to acquire appropriate communication skills and tools for presenting the results of ecological studies and for transmitting and disseminating information on topics related to the course content.
Learning Skills
The course will enable students to acquire adequate skills for independent development of additional skills, including: consulting bibliographical material, consulting databases and other online information, and developing basic knowledge tools for continuous knowledge updating.

Contents

The course will facilitate the understanding of the broad biological, social and economic aspects of fisheries science and the interplay between them with an overall ecological emphasis, by applying lessons learned and incorporation of emerging methods and data sources.

Detailed program

The course will specifically provide specific knowledge on:

Marine fisheries ecology: production processes – An introduction on how physical and biological processes drive the production of fishes; how species abundance changes in space and time.

Fishing gears and farming techniques - The scale, social and economic significance of global fishery and aquaculture; the species that are caught and farmed; fishing and farming strategies.

Stock assessment, ecosystem modelling, spatial planning - How make basic quantitative assessment of single and multispecies fisheries; estimate of needed parameters for assessment; the effects of uncertainty on the outputs.

Fish life histories and distribution - Functional and life-history traits of both fished and farmed species that make them vulnerable to fishing mortality and anthropogenic driven changes (e.g. climate change).

Fishing and farming effects on ecosystems - The impacts of fishing and farming on ecosystems; non-target species and habitats; mitigation measures and innovative solutions.

Evidence-based management and conservation options - The objectives of fishery and aquaculture management; factors that motivate and limit the fishing and farming activities, fishers/farmers behaviours; economic, social and biological reasons of overexploitation and extensive farming; how scientific advices can support the decision-making process and policy.

Prerequisites

None

Teaching form

21 two-hour e-learning lectures, Delivered Didactics

Textbook and teaching resource

Lesson slides (power point presentations)

Textbooks:

Jennings, S., Kaiser, M., & Reynolds, J. D. (2009). Marine fisheries ecology. John Wiley & Sons.

Kaiser, Michel J., et al. “Marine ecology: processes, systems, and impacts”. Oxford University Press, 2020 (3th Edition).

Andersen, K. H. (2019). Fish ecology, evolution, and exploitation: a new theoretical synthesis. Princeton University Press.

Suggested readings from:

Levin, Simon A., et al., eds. The Princeton guide to ecology. Princeton University Press, 2012.

Semester

First semester

Assessment method

Oral examination: 3 questions related to the scientific themes addressed in class, of which:
a) one topic selected by the student;
b) one question to assess the knowledge on the related topics to test the availability of the student to link topics;
c) one question related to the a specific practical aspects of the themes addressed in class with specific attention to practical solutions, tool and methods proposed in among those shown in class and in the slides: the student my offer practical example if required.

During the exam, the teacher will evaluate the knowledge of the relevant information provided in the course, the ability to correlate the information obtained from different sources and themes and the capacity to explain clearly and with an appropriate terminology the themes of the course.
An incorrect answer or failure to answer question 1) will result in failure to pass the exam.
At the end of the oral exam, the examination board awards a grade out of thirty.

During the exam, the professor will evaluate the knowledge of the relevant information provided in class, the ability to correlate information obtained from different sources and topics, and the ability to explain the course themes clearly and using appropriate terminology.

The following grading scale is applied in relation to the following parameters:

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Conceptual knowledge and understanding

Ability to apply knowledge and understanding

Communication and argumentative skills

Learning, self-assessment, and self-regulation skills
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Grade < 18

Knowledge and Understanding: The student only partially identifies the characteristics of the concepts. Connections between concepts are fragmentary and poorly supported by theoretical knowledge.
Ability to apply knowledge and understanding: The student identifies only a few relevant elements in a phenomenon, without being able to integrate them into a comprehensive analysis.
Communication and argumentative skills: In the oral exam, the student develops a basic argument, lacking logical articulation and characterized by numerous expository inaccuracies.
Learning, self-assessment, and self-regulation skills: The student is able to reconstruct only a few aspects of their learning path and professional development.

Grade 18-22
Knowledge and Understanding: The student recognizes and recalls most of the conceptual characteristics and manages to provide a relatively coherent explanation, albeit with some inaccuracies. Theoretical references are present but not always rigorous.
Ability to apply knowledge and understanding: The student is able to recognize a significant number of elements and provide a partial explanation, while highlighting some gaps in the analysis.
Communication and argumentative skills: In the oral exam, the student constructs a basic argument, equipped with a minimum structure but with some inaccuracies.
Learning, self-assessment, and self-regulation skills: The student demonstrates a basic awareness of their learning path, managing to trace essential connections between educational experiences, albeit with some inaccuracies.

Grade 23-27
Knowledge and Understanding: The student demonstrates an in-depth understanding of the conceptual characteristics. In the oral exam, explanations are well-articulated and supported by an appropriate use of theoretical references.
Ability to apply knowledge and understanding: The student accurately identifies the essential elements of a phenomenon. The application of knowledge occurs with methodological rigor that is not always solid.
Communication and argumentative skills: In the oral exam, the student develops a coherent and well-organized argument, demonstrating a good mastery of the language and a solid logical-argumentative structure. Communication is clear and effective.
Learning, self-assessment, and self-regulation skills: The student analyzes their learning path in a clear and structured manner, highlighting significant relationships between the different evolutionary stages and demonstrating a good capacity for critical reflection.

Grade 28-30
Knowledge and Understanding: The student demonstrates a complete mastery of the concepts, articulating complex connections and providing exhaustive explanations. Theoretical references are used with relevance and rigor.
Ability to apply knowledge and understanding: The student demonstrates an advanced capacity to analyze a phenomenon, exhaustively identifying and interpreting all the salient elements. The application of knowledge occurs with methodological rigor, supported by a solid and articulated argument.
Communication and argumentative skills: In the oral exam, the student elaborates a solid and well-articulated argument, with a rigorous logical framework and a high level of textual coherence. The discourse is fluent and well-structured.
Learning, self-assessment, and self-regulation skills: The student demonstrates an advanced capacity for self-reflection, elaborating an articulated and in-depth analysis of their learning path and professional development. The connections between educational experiences and theoretical concepts are clear, coherent, and rigorous.

Office hours

On appointment, by e-mail request.

Sustainable Development Goals

CLIMATE ACTION | LIFE BELOW WATER