UNIVERSITY OF GOTHENBURG

DEPARTMENT OF BIOLOGICAL AND ENVIRONMENTAL SCIENCES

NBEM301, Transdisciplinary approaches to sustainable marine aquaculture, 4 credits

Transdisciplinära metoder för utveckling av hållbart vattenbruk, 4 högskolepoäng

Third-cycle level / Forskarnivå

Confirmation

This syllabus was confirmed by the Department of Biological and Environmental Sciences on 2020-01-28, and was last revised on 2025-12-02. The revised course syllabus is valid from Spring semester 2026.

Responsible Department

Department of Biological and Environmental Sciences, Faculty of Science and Technology

Participating Department/s

Department of Business Administration
Department of Earth Sciences
Department of Law
Department of Marine Sciences
Department of Political Science
HDK-Valand - Academy of Art and Design

Entry requirements

Students must be admitted to third cycle education. Students with PhD subjects related to the course will be given priority.

Learning outcomes

After completion of the course the Ph.D. student is expected to:

Knowledge and understanding

- describe transdisciplinary methods for early stakeholder involvement.

- have gained increased understanding on “The Triple Helix model”, participatory design, co-creation and prototyping as ways to unify stakeholder collaboration.
- describe the concepts of carrying capacities.
- describe ecological, economic and social perspectives of the main global aquaculture systems.

Competence and skills

- be able to independently and critically analyze and synthesize knowledge on a specific topic from the scientific literature

Judgement and approach

- critically evaluate different aquaculture techniques and solutions to environmental problems in the perspective of sustainable mariculture.

The course is sustainability-focused, which means that at least one of the course's learning outcomes clearly shows that the course content meets at least one of the University of Gothenburg’s stipulated criteria for sustainablity labelling. Content of this kind also constitutes the course's main focus.

Course content

A main focus of the course is to present and discuss transdisciplinary methodologies as well as discuss their implementation on the development of sustainable marine aquaculture. The students will study the principles of carrying capacities, from ecological, economic and social perspectives and relate these to design, engineering, management and governance of the world’s major aquaculture farming systems (ex. crustacean, bivalves, algae and fish). The course will further document the history, status and future of these as integrated parts of the seafood ecosystems. The process of marine spatial planning, an arena for negotiating conflicts among stakeholders and user interests, will be studied. Methods and tools for predictive modeling using ecological data, state-of-the-art statistical methods and GIS will be presented and combined with approaches for integrating information collected by stakeholders. The students will be introduced to “The Triple Helix model”, a useful approach for integrating academic, public and industry partners. The course will also cover participatory design processes and understanding of co-creation and prototyping as ways to unify stakeholder collaboration.

The course is a collaboration between SWEMARC at University of Gothenburg and Ecological Aquaculture Foundation LLC. Biddeford, Maine, USA.

The course is a hybrid course constituting three weeks of on line studies and one week on site in Sweden. The onsite part includes lectures; study visits; student oral presentations; and intesive group studies in collaborative team projects. Each student, individually or in a smaller group, is expected to perform a literature review which should be summarized in a report and presented in a popular scientific way either orally or written i.e., on the form of a brochure, pamphlet or poster. Seminars will also be held to put the lectures in perspective and to combine the information from different sections into a more general context as well as providing an opportunity to discuss issues in more detail.

Study trips to aquaculture sites and entrepreneurs along the west coast of Sweden and will

deepen the theoretical aspects of the lectures, allowing the course participants to get a more thorough understanding of the possibilities, obstacles as well as pros and cons with the discussed methodologies and systems.

Types of instruction

All course activities during the intensive on-site part of the course are compulsory. Each student should perform a project, preferably in a smaller group, and present the result in the form of a short report and a popular scientific communication. The study groups, which should choose their own project work, will be formed at the start of the course and discussions and supervision will assure progress of the project during the on-site part of the course. Students will be provided with all materials generated in the course and are expected to deliver a report regarding a sustainable aquaculture system with focus on socio-economic, ecological aspects and/or transdisciplinary approaches to aquaculture at the end of the on-line part of the course.

Language of instruction

The course is given in English

Grades

The grade Pass (G) or Fail (U) is given in this course.

Types of assessment

The examination is based on the written report and the popular scientific communication, feed back will be given by the examiners and students are required to deliver revised versions for final acceptance. In addition, presence during the on-site week and active participation in lectures and seminars is required to obtain the grade Pass. Active participation means that the student should be prepared and able to discuss subjects addressed in the lectures based on the recommended literature.

A Ph.D. student who has failed a test twice has the right to change examiners, if it is possible. A written application should be sent to the Department.

In case the course has been discontinued or major changes have been made, a Ph.D student should be guaranteed at least three examination occasions (including the ordinary examination occasion) during a time of at least one year from the last time the course was given.

Course evaluation

Course evaluation is carried out together with the Ph.D. students at the end of the course, and is followed by an individual, anonymous electronic survey.