GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2026-2027

Algae Culture (I000086)

Course size *(nominal values; actual values may depend on programme)*

Credits 3.0 **Study time 75 h**

Course offerings and teaching methods in academic year 2026-2027

A (semester 2)	English	Gent	practical
			lecture

Lecturers in academic year 2026-2027

Semmouri, Ilias	LA22	lecturer-in-charge
De Clerck, Olivier	WE11	co-lecturer

Offered in the following programmes in 2026-2027	**crdts**	**offering**
Master of Science in Aquaculture	3	A
Exchange Programme in Bioscience Engineering: Agricultural Sciences (master's level)	3	A

Teaching languages

English

Keywords

Aquaculture, microalgae, macroalgae, seaweeds, culture techniques, applications.

Position of the course

This course provides an overview of the principles and techniques used in the cultivation of microalgae and macroalgae (seaweeds). Microalgae are essential as live feed in the aquaculture of shellfish, crustaceans, and zooplankton, and are also studied for their potential applications in biofuel production and other biotechnological uses. The course covers cultured microalgal species, physical and chemical culture requirements, growth dynamics under different culture modes, production systems, and major technical, and economic constraints. The course also provides practical training in culture maintenance and quality control. The course also addresses cultivation methods and lifecycle control of macroalgae, which are widely used as food and as a renewable bioresource for the production of diverse compounds. In addition, the role of seaweeds in integrated multitrophic aquaculture systems is examined.

Contents

1. Microalgae
1.1. Importance and uses of microalgae
1.2. Characteristics of microalgae, species cultured
1.3. Culture requirements: physical, chemical
1.4. Types of cultures and growth dynamics (autotrophic versus heterotrophic)
1.5. Culture systems and procedures (including highly intensive microalgal cultures for biofuel)
1.6. Problems and constraints: nutritional, technical, economical
1.7. Practical classes on the maintenance and quality analysis of microalgal cultures

2. Macroalgae
2.1. Origin and importance of macroalgae
2.2. Characteristics of macroalgae, species cultured
2.3. Life cycle control of commercial seaweed species
2.4. Culture systems and procedures for green, brown and red algae

Initial competences

General biology, chemistry, biochemistry

Final competences

1 The student can explain the importance and main applications of microalgae and macroalgae in aquaculture, biotechnology, food production, and biobased industries.
2 The student can identify the major cultured taxa of microalgae and macroalgae and describe their key biological characteristics.
3 The student can describe the physical and chemical requirements necessary for successful algal cultivation.
4 The student can select and justify appropriate culture systems and procedures for specific microalgal or macroalgal applications.
5 The student can interpret and analyze algal growth curves and productivity data from different types of cultures.
6 The student can argue the suitability of different algal growth quantification methods and evaluate their accuracy, applicability, and limitations across culture systems.
7 The student can analyze how environmental parameters limit or enhance algal growth under different culture conditions, including intensive production systems.
8 The student can evaluate culture health and identify common contamination or production problems.
9 The student is able to take samples and conduct quality analyses of microalgal cultures using standard laboratory methods.
10 The student can explain and apply principles of lifecycle control in commercially important seaweed species.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Group work, Lecture, Practical

Extra information on the teaching methods

Theory lectures: Instructorled lectures based on PowerPoint presentations.
Practical classes / group work: Handson microalgal culturing experiments performed in small groups.

Study material

Type: Syllabus

Name: Practicum notes
Indicative price: Free or paid by faculty
Optional: no
Language : English
Number of Pages : 15
Available on Ufora : Yes
Online Available : No
Available in the Library : No
Available through Student Association : No

Type: Slides

Name: Theory - Algae Culture
Indicative price: Free or paid by faculty
Optional: no
Language : English
Number of Slides : 300
Oldest Usable Edition : NA
Available on Ufora : Yes
Online Available : No
Available in the Library : No
Available through Student Association : No

References

R. A. Andersen. *Algal Culturing Techniques.* Amsterdam: Elsevier Academic Press. (2005).
J.E.Bardach, J.H. Ryther & W.O.McLarney. *Aquaculture. The Farming and Husbandry of Freshwater and Marine Organisms.* Wiley-Interscience. (1972). 868 pp.

M. Borowitzka & L. Borowitzka (eds): *Micro-Algal Biotechnology.* Cambridge University Press (1988).
FAO manuel on the production and use of life food in aquaculture (FAO 361)

Course content-related study coaching

Study guidance upon request by email or on appointment.

Assessment moments

end-of-term and continuous assessment

Examination methods in case of periodic assessment during the first examination period

Written assessment with multiple-choice questions, Written assessment with open-ended questions

Examination methods in case of periodic assessment during the second examination period

Written assessment with multiple-choice questions, Written assessment with open-ended questions

Examination methods in case of permanent assessment

Participation, Written assessment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible

Extra information on the examination methods

Period aligned evaluation: theory: written closed book exam.
Non-period aligned evaluation: practical classes: participation and written report.

Calculation of the examination mark

The final grade is awarded out of 20 points and is composed as follows:
• 16 points for the written examination
• 4 points for a written examination related to the practical classes
Students who do not participate in the periodaligned and/or nonperiodaligned evaluation activities for this course unit may be failed by the examiner.
Attendance at the practical classes is mandatory. Students who do not attend the practical classes without a valid and documented reason must retake the course unit in the next academic year.