GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2017-2018

Oceanography (C003873)

Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

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

Credits	Study time	Contact hrs
6.0	150 h	51.0 h

Course offerings and teaching methods in academic year 2020-2021

A (semester 1)	English	Gent	lecture	22.5 h
			fieldwork	5.0 h
			seminar	23.75 h

Lecturers in academic year 2020-2021

Vanreusel, Ann	WE11	lecturer-in-charge
Vanaverbeke, Jan	WE11	co-lecturer

Offered in the following programmes in 2020-2021	crdts	offering
International Master of Science in Marine Biological Resources (main subject Applied Marine Ecology and Conservation)	6	A
International Master of Science in Marine Biological Resources (main subject Global Ocean Change)	6	A
International Master of Science in Marine Biological Resources (main subject Management of Living Marine Resources)	6	A
International Master of Science in Marine Biological Resources (main subject Marine Environment Health)	6	A
International Master of Science in Marine Biological Resources (main subject Marine Food Production)	6	A
International Master of Science in Marine Biological Resources	6	A

Teaching languages

English

Keywords

Position of the course

This course is an overview of the marine environment and the different systems from which it is composed. It introduces to the main physical, geological, chemical processes and characteristics that are relevant to understand marine biology and functioning of marine ecosystems. Hence, it constitutes a pre-requirement for the next courses.

Keywords: Marine geology, geomorphology and sediments, chemical and physical properties of seawater, ocean circulation, physics interactions with biology, biogeochemical cycles, global change and anthropogenic impacts, regional oceanography

Contents

Seafloor characteristics such as topography and bathymetry but also substrate will be introduced together with the responsible geological and water column processes yielding to marine sedimentation.
The main physical processes responsible for the most important biological and chemical features and processes in oceans and seas will be described: link with climate/radiative budget, optical properties, temperature, salinity, density, water masses, stratification, mixing processes. Main mechanisms generating motion in the ocean. Thermohaline circulation. Barotropic and baroclinic conditions. Geostrophic currents. Wind driven circulation. Convergence and divergence. Dynamics of the coastal regions - coastal upwelling and associated features. Major ocean circulation systems. Waves and tides. Regional oceanography will describe the main features of oceanic basins: circulation (equatorial circulation, cyclonic and anticyclonic gyres...),

climate (ENSO, monsoon...), and particularly of Iberia. Examples of impacts of global and anthropogenic changes on oceanic circulation and mixing.
Chemical properties of seawater will be explained: salinity, sources and sinks of elements of major ions / conservative elements, nutrients, scavenged elements (riverine, volcanic and atmospheric supply, hydrothermal activity). Main important gases in the Ocean: oxygen and carbon dioxide, and interplay with biological processes. CO2, the carbonate system and alkalinity, marine carbon cycle biological, solubility and carbonate pumps. Marine biogeochemical cycles of macronutrients (N, P, Si), micronutrients and key role in biological processes, Redfield ratios. Examples of physics-biogeochemistry coupling (upwelling, OMZ...) and of impacts of global and anthropogenic changes on biogeochemistry and ecosystems will be introduced throughout the course (impact of dams, species migration, extension of OMZ, eutrophication, acidification, pollutants).

This course includes: (i) theoretical expositive lectures, with periods for student questioning and participation, lectured in rooms equipped with video-projector; (ii) practical laboratory sessions ; (iii) field work in the Ria Formosa coastal lagoon ; Learning support materials are made available, on a weekly basis, at the course tutorial web site.

Initial competences

General background on physics, biology, chemistry (B. Sc.)(list the competences students should have before starting the course, list in case required some advised pre-reading material to be up to date on the initial competences)

Final competences

1 To get insight in the main oceanographic processes and characteristics.
2 Ability to identify marine processes from oceanographic data, understanding of ocean circulation and its role on climate, biogeochemistry and ecology. Insights in main oceanographic processes including physical chemical and biological aspects.
3 To understand the complex interdependence of humans and the ocean.

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

Lecture, fieldwork, seminar

Learning materials and price

Learning support materials, including pdf versions of the materials presented during lectures, detailed protocols of laboratory sessions and other relevant material will be made available online at the course tutorial site. Laboratory working protocols will be available in advance, and students are required to read them prior to each lab session. Recommended basic references are available at the University Library or will be provided by the teaching staff. Specific references required for the laboratory sessions will be available in the lab. Oceanographic data will be provided for analysis and interpretation. Reading assignments will be recommended for each lecture.

References

Open University, 1998 - Seawater: its Composition, Properties and Behavior (volume 2); Ocean Circulation (volume 3); Waves, Tides and Shallow-Water Processes (volume 4), Oceanography Course Team, Oceanographic Series, 2nd edition, Butterworth Heinemann.

Millero, F. J., 2014. Chemical Oceanography. 4th Edition CRC Press, Boca Raton - Florida, 571 pp.
Mark Denny, 2008. How the Ocean works: An introduction to Oceanography. Princetown University Press.
Chester and Jickells, 2012. Marine Geochemistry. Willey

Course content-related study coaching

Evaluation methods

end-of-term evaluation and continuous assessment

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

Written examination

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

Written examination

Examination methods in case of permanent evaluation

Oral examination, assignment, report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible

Calculation of the examination mark

Course evaluation comprises tests, written assignment, oral presentation, reports and/or a final exam.
Course exam will be written, with the possibility of and oral discussion if a grade between 7.5 - 9.5 is obtained in a scale 0 – 20.
Course examination comprises two written tests and/or a final exam, with theoretical and practical components accounting for 60% and 30% of course evaluation, respectively. In the practical component 10% will be assigned to the written and oral presentation of a team work and 30% to the written test/exam. An average rating higher than 9.5 points in tests allows exam exemption, if in both tests the rate is 8 points, in a 0 – 20 scale.
Attendance to at least 75% of practical sessions (lab and field work) is required to be admitted to exam and approved.