Department of Earth and Enironmental Sciences

GEON08, Quaternary Geology: Marine Geology and Environmental Change, 15 credits

Kvartärgeologi: Maringeologi och havsmiljöförändringar, 15 högskolepoäng

Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2020-05-14. The syllabus comes into effect 2020-05-14 and is valid from the spring semester 2021.

General information

The course is an elective second cycle component of a Master of Science degree in Geology or Environmental Sciences.

Language of instruction: English

Main field of study	*Specialisation*
Geology	A1N, Second cycle, has only first-cycle course/s as entry requirements
Environmental Science	A1N, Second cycle, has only first-cycle course/s as entry requirements

Learning outcomes

The general aim of the course is to give the students theoretical and practical knowledge and skills within marine geology in a wide sense. Together with knowledge obtained in other second cycle courses, this knowledge will form the basis for advanced understanding and execution of environment and climate reconstructions, partly during the last ice age cycles and partly in the perspective of historical, ongoing and future changes.

Knowledge and understanding

On completion of the course, the student shall be able to:

- account for the fundamental features of the large-scale circulation, dynamics and environmental evolution of the seas during the Quaternary
- explain the most important biogeochemical processes connected to the cycles of nutrients, carbon and oxygen in the sea, and describe how these vary in time and space
- account in detail for the processes that control the formation and distribution of marine sediments and different types of sedimentary environments, and how these have varied temporally and geographically during the Quaternary
- account at a general level for the formation and use of marine geological resources
- account at a general level for current environmental problems in the sea and their importance for marine ecosystem services
- explain and account for the most important geophysical methods that are used in marine mapping
- explain and account for the most important palaeoceanographic methods that are used for studies of the environmental and climatic development of the seas during the Quaternary
- account in detail for the development of the North Sea and the Baltic Sea during the Quaternary

Competence and skills

On completion of the course, the student shall be able to:

- communicate scientifically in writing and speaking in English and in a balanced way utilize scientific terminology associated with the topic
- apply some of the most important methods for analysis and dating of marine sediments, mainly grain-size analysis, microfossil analysis and paleomagnetism

Judgement and approach

On completion of the course, the student shall be able to:

- comprehend, critically assess and discuss scientific publications within the field, and based on this type of literature summarise current research questions
- reflect on the role of the seas in a sustainability perspective regarding human environmental impact and use of geological resources

Course content

The course consists of the following practical and theoretical components:

- Physical oceanography with a focus on the large-scale circulation and environmental evolution of the seas during the Quaternary
- Biogeochemical processes in different parts of the sea and how these have varied during the Quaternary
- Marine sediments, sedimentary processes and sedimentary environments
- Geological resources in the sea: formation processes, use and sustainability issues

- Sea-level changes during the Quaternary and in the future
- Radiometric methods and palaeomagnetism for dating of marine sediments
- Geophysical mapping techniques within marine geology
- Biological and chemical methods within palaeoceanography
- Regional marine geology with a focus on the Quaternary evolution of the North Sea and the Baltic Sea. A field expedition to the Swedish west coast or the Baltic Sea for sampling of marine sediments is included in this component.

Course design

The teaching consists of lectures, laboratory exercises, field exercises, seminars, group exercises and project work. Participation in laboratory exercises, field exercises, seminars, group exercises and project work, as well as associated activities, is compulsory.

Assessment

The assessment is based on the written performance of students in examinations during the course, their written performance in a project report at the end of the course and through participation in compulsory components. Students who do not pass an assessment will be offered another opportunity for assessment soon thereafter.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Grades

Grading scale includes the grades: Fail, Pass, Pass with distinction
For a grade of Pass on the whole course, approved examination, passed project work and participation in all compulsory components are required. The grades on active participation in seminars, exercises and compulsory components are Failed and Passed. The grades on written examination, oral presentation and written project report are Failed, Passed and Passed with distinction. The final grade is decided through a joint assessment of the results of the examination and the project report in proportion to their extent (see appendix).

Entry requirements

To be admitted to the course, students must have obtained general entry requirements as well as 90 credits in geology, physical geography or environmental sciences, or 90 credits in biology with aquatic specialisation, and English B or the equivalent.

Further information

The course may not be included in a degree together with GEON04 Quaternary Geology: Global and Regional Marine Geology, 15 credits.