

GEOB21, Geology: Evolution of Life and Earth's Climate, 15 credits

Geologi: Livets utveckling och jordens klimat, 15 högskolepoäng
First Cycle / Grundnivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2016-03-14 to be valid from 2016-06-01, autumn semester 2016.

General Information

The course is a compulsory course at first cycle level for a Degree of Bachelor of Science in geology.

Language of instruction: Swedish

Main field of studies

Geology

Depth of study relative to the degree requirements

G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements

Learning outcomes

The course forms part of a series of six compulsory courses, which aims at providing basic knowledge within a broad range of geological disciplines.

Knowledge and understanding

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

- explain the basics of biological systematics and nomenclature, as well as account for the morphology, systematics, ecology and evolutionary history of the biostratigraphically most important animal and plant groups
- account for how fossils can be used for relative age determination of sedimentary successions as well as for palaeoecological, palaeobiogeographic and biostratigraphic analyses

- explain the patterns, mechanisms and processes of evolution
- describe important, global ecosystem changes during the evolution of the biosphere, as well as account for the theories that explain the causes and causal relations of the ecosystem changes
- describe the structure of Earth's climate system, as well as explain the principles behind changes that can arise in the climate system
- account for the basic parameters and processes in the atmosphere and in the oceans that determine local, regional and global climate conditions, as well as describe how these parameters and processes can be studied
- explain how geological data can be used for reconstruction of climate changes, as well as account for important climate changes and their causes during Earth's history
- describe the principles of popular and scientific writing, as well as account for different formats within reference management

Competence and skills

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

- identify the most common and most important plant and animal fossils
- carry out a basic palaeoclimate study based on proxy analysis of a stratigraphy, compile and interpret the proxy records, and present the results
- carry out general and subject-specific searches in the collections of the library and various types of databases, assess information obtained from these sources, and identify various types of publications
- write and design brief popular and scientific texts, and apply scientific referencing

Judgement and approach

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

- argue for an evolutionary perspective on the origin and evolution of life
- discuss the reliability of future climate scenarios

Course content

The course consists of two parts.

Module 1: The evolution of life- evolutionary palaeobiology, biostratigraphy, palaeontology and palaeoecology (7.5 credits)

Module 1 contains the following components:

- Fossilization processes, different modes of preservation and excellently preserved fossil environments
- Overview of the morphology, systematics, phylogeny and ecology of selected animal and plant groups, with an emphasis on the biostratigraphically most useful fossil groups
- Basic palaeoecology and palaeobiogeography
- General evolutionary biology- processes, patterns, speciation and issues, as well as the biostratigraphic principles and procedures

- Important events in the evolution of life- mass extinctions, diversity changes and the evolutionary appearance of new groups (taxa)
- Quaternary environments and human evolution
- Writing and design of popular text- information retrieval from the collections and databases of the library, literature compilation and referencing

Module 2. Earth's climate- meteorology, oceanography, climatology and palaeoclimatology (7.5 credits)

Module 2 contains the following components:

- The climate system of Earth- components, external forcing, internal interaction, processes and feedbacks
- The structure of the atmosphere and climatic mechanisms
- Meteorological observations, climate data and regional climatology
- Physical oceanography and palaeoceanography
- Methods for reconstruction of climate changes- natural climate archives and proxy data
- Climate changes in different time perspectives, from decades to millions of years, and their causes as well as palaeoclimatic conditions during different parts of Earth's history
- Climate modelling and future climate
- Writing and design of scientific text- information retrieval from various types of databases, selection and structuring of content, referencing and language processing

Course design

The teaching consists of lectures, field trips, seminars, group work and project work. Participation in field trips, seminars, group work and project work, as well as thereby integrated other teaching, is compulsory.

Assessment

Examination takes place in writing in the form of examinations during the course, through assessment of project reports, as well as through participation in compulsory modules. Students who failed the first exam opportunity will be offered an additional exam opportunity shortly thereafter.

Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, Pass, Pass with distinction.

To pass the entire course, passed examinations, passed reports as well as passed compulsory components are required. The final grade is decided through a joint assessment of the results of the examinations of the included modules in proportion to their extent.

Entry requirements

For admission to the course, general entry requirements are required, as well as GEOA01 Planet Earth ? an Introduction, 15 credits, GEOA81 Geology: Earth, Water and the Environment, 15 credits, or the equivalent knowledge.

Further information

The course may not be included in a degree together with GEOB01 Life and Evolution- Biostratigraphy, Palaeontology and Palaeoecology, 15 credits, GEOB02 Climatology and Geomorphology, 15 credits, GEL302 Life and Evolution- Biostratigraphy, Palaeontology and Palaeoecology, 10 credits, or GEL303 Climatology and Geomorphology, 10 credits.

Subcourses in GEOB21, Geology: Evolution of Life and Earth's Climate

Applies from H16

- 1601 Evolution of Life, 7,5 hp
Grading scale: Fail, Pass, Pass with distinction
- 1602 Earth's Climate, 6,0 hp
Grading scale: Fail, Pass, Pass with distinction
- 1603 Climate Reconstruction, report, 1,5 hp
Grading scale: Fail, Pass, Pass with distinction
- 1604 Practical Tasks, 0,0 hp
Grading scale: Fail, Pass