Faculty of Science

GEOM04, Evolution of the Biosphere, Palaeoecology and Palaeontology, 15 credits

Berggrundsgeologi: Biosfärens utveckling, paleoekologi och paleontologi, 15 högskolepoäng

Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2008-03-12 to be valid from 2008-03-12, autumn semester 2008.

General Information

The course is an elective course for second-cycle studies for a Degree of Master of Science (120 credits) in geology. The course is given in English.

Language of instruction: English and Swedish

Main field of studies	*Depth of study relative to the degree requirements*
Geology	A1N, Second cycle, has only first-cycle course/s as entry requirements

Learning outcomes

The aims of the course are that students should have acquired the following knowledge and skills on completion of the course; they should

- be able to describe and discuss basic palaeobiological concepts and problems, with a focus on taphonomy, evolution and evolutionary processes, biodiversity changes through time, and fossils as environmental indicators,
- be able to account for the distribution of various fossil groups and their applications for reconstruction of palaeogeography and interpretation of past climates and environments,
- be able to understand the scientific models for the origin of life, and be able to describe the evidence for early life and the diversification of life,
- be able to describe the structure and composition of fossil marine and terrestrial ecosystems and ecosystem changes during the Phanerozoic,

- be able to describe global ecosystem changes, e.g., mass extinctions and biotic recoveries, and the causes, patterns and timing of such changes,
- have in-depth knowledge of the Phanerozoic time scale and a comprehensive knowledge of various analytical methods and their applications in chronostratigraphy and for global correlation,
- be able to assimilate, critically assess and discuss primary scientific publications within the subject, and be able to collect, compile and present data and recent research results within a specific topic.

Course content

The course consists of three parts:

Part 1. Palaeoecology, evolution and palaeobiogeography
Presevation processes (taphonomy) and preservation environments; uniquely preserved fossil environments.
Ecological factors and fossils as climatic and environmental indicators.
Evolutionary biology and phylogeny, the rate and direction of evolution.
Palaeobiogeography and palaeogeography.

Part 2. The evolution of the biosphere
Scientific theories of the origin, conditions and limitations of life; the early evolution of life as reflected in sedimentary successions.
Diversification changes, evolutionary faunas and the structure and evolution of marine and terrestrial ecosystems through Phanerozoic time.
Mass extinctions and recovery: theories, processes and explanations.
Phylogeny and adaptive and functional morphology of selected animal and plant groups.

Part 3. Stratigraphic methods
High-resolution correlation based on palaeontological, sedimentological and geochemical parameters. Particular emphasis is given to chronostratigraphy, the geological time scale, event stratigraphy, global stratotypes and marker beds.

Course design

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

Assessment

The examination takes place in writing in the form of examination at the end of the course and through assessment of project reports. For students who have not passed the regular examination, additional examination in close connection to this is offered.

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.
The grades in the course are passed with distinction, passed and failed. To pass the entire course, approved examination, approved project reports and active participation in all compulsory parts are required. The final grade is determined by summarising the results of all parts that are included in the examination.

Entry requirements

For admission to the course, general entry requirements are required and 90 credits in geology including GEOB01-GEOB05 or the equivalent knowledge, and English B or the equivalent.

Further information

The course may not be included in a higher education qualification together with HGP516 Historical geology and palaeontology: Advanced pre-Quaternary palaeontology, 10 credits, HGP519 Historical geology and palaeontology: Advanced pre-Quaternary palaeontology, 10 credits, or HGP521 Historical geology and palaeontology: The development of the biosphere, palaeoecology and stratigraphy, 10 credits.

Subcourses in GEOM04, Evolution of the Biosphere, Palaeoecology and Palaeontology

Applies from V08

0801 Evolution of the Biosphere, Palaeoecology and Palaeontology, 15,0 hp
Grading scale: Fail, Pass, Pass with distinction