Department of Earth and Enironmental Sciences

GEOM09, Bedrock Geology: 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 2016-09-17 and was last revised on 2016-09-17. The revised syllabus comes into effect 2016-09-17 and is valid from the spring semester 2017.

General information

The course is an elective second cycle course for a degree of Master of Science (120 credits) in Geology.

Language of instruction: English

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

Learning outcomes

The general aims of the course are advanced knowledge of the origin and development of life, with a focus on the Phanerozoic. In order to reach this knowledge, students need detailed insight into palaeoecology, evolution and palaeobiogeography, as well as the ability to interpret stratigraphic data and concepts. Together with knowledge obtained from other Master courses in bedrock geology, this knowledge will form the basis for advanced understanding of the development of the lithosphere and the biosphere in a longer time perspective.

Knowledge and understanding

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

- account for general palaeobiological research questions with an emphasis on taphonomy, evolution, diversity dynamics and fossils as environmental indicators
- account for the distribution of different fossil organisms in time and space, and their importance for palaeogeographic reconstructions as well as climatic and environmental interpretations
- understand and explain the theories about the development of early life
- account thoroughly for marine and terrestrial ecosystem structures and their development during Phanerozoic time
- describe global ecosystem dynamics in the form of mass extinctions and recovery, and explain the causes and development of these changes
- show good familiarity with the Phanerozoic time scale as well as different stratigraphic methods and their chronostratigraphic applications

Competence and skills

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

- comprehend, critically assess and discuss scientific primary publications within the subject area, as well as, based on such material, summarise current research problems
- independently compile and present published primary data within the subject
- write and design scientific texts and use scientific reference techniques

Judgement and approach

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

- assess and argue critically about views and conclusions expressed in scientific primary publications within the subject area

Course content

The course consists of three integrated parts:

Part 1. Palaeoecology, Evolution and Palaeobiogeography:

- Taphonomy and environments of preservation; 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. Development of the Biosphere:

- Scientific theories of the origin, conditions and limitations of life; the early development of life as reflected in stratigraphy
- Diversity dynamics and evolutionary faunas as well as the structure and development of marine and terrestrial ecosystems through Phanerozoic time

- Mass extinctions and recovery; theories, processes and causal relations
- Phylogeny as well as adaptive and functional morphology of selected animal and plant groups

Part 3. Stratigraphic Methods:

- High-resolution correlation based on palaeontological, sedimentological and geochemical parameters with an emphasis on chronostratigraphy and the geological time scale
- Event stratigraphy, global stratotypes and reference levels

Course design

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

Assessment

Examination takes place in the form of a written examination at the end of the course, through assessment of submitted project reports as well as through compulsory activities.

Students who failed the first exam opportunity will be offered an additional exam opportunity shortly thereafter.

Grades

Grading scale includes the grades: Fail, Pass, Pass with distinction
To pass the entire course, passed project report, approved examination as well as participation in all compulsory activities are required. 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

For admission to the course, general entry requirements are required as well as 90 credits in geology including GEOB22-GEOB25 or GEOB01-GEOB04 or the equivalent knowledge. Proficiency in English corresponding to English B/English 6 from Swedish upper secondary school.

Further information

The course may not be included in a degree together with GEOM04 Bedrock Geology: The Evolution of the Biosphere, Palaeoecology and Palaeontology, 15 credits, HGP521 Historical Geology and Palaeontology: The Evolution of the Biosphere, Palaeoecology and Stratigraphy, 10 credits, HGP519 Historical Geology and Palaeontology: Advanced Pre-Quaternary Palaeontology, 10 credits, or HGP516 Historical Geology and Palaeontology: Advanced Pre-Quaternary Palaeontology, 10 credits.