



Faculty of Science

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 is an old version, approved by Study programmes board, Faculty of Science on 2016-09-17 and was valid from 2017-01-01, spring semester 2017.

General Information

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

Main field of studies

Geology

Depth of study relative to the degree requirements

A1N, Second cycle, has only first-cycle course/s as entry requirements

Learning outcomes

The overall aim of the course is to provide students with specialised knowledge of the origin and development of life, focusing on the Phanerozoic. In order to attain this knowledge, it is essential for students to study palaeoecology, evolution and palaeobiogeography in depth, and be able to interpret stratigraphic data and concepts. Together with knowledge obtained from other second cycle courses in bedrock geology, this knowledge will form the basis for specialised understanding of the development of the lithosphere and the biosphere in an extended time perspective.

Knowledge and understanding

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

- account for general palaeobiological research issues, focusing 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 and for climatic and environmental interpretations
- understand and explain the theories of the emergence and early development of life
- provide a detailed account of marine and terrestrial ecosystem structures and their development during the Phanerozoic eon
- describe global ecosystem dynamics in the form of mass extinctions and recovery, and explain the causes and processes of these changes
- demonstrate familiarity with the Phanerozoic time scale and with different stratigraphic methods of analysis and their chronostratigraphic applications

Competence and skills

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

- assimilate, critically assess and discuss primary research publications in the field, and use this material to summarise a set current research issue
- independently compile and present published primary data in the field
- write and design scientific texts and use scientific reference techniques

Judgement and approach

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

- assess and critically discuss views and conclusions expressed in primary research publications in the field

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 it is reflected in stratigraphy
- Diversity dynamics and evolutionary faunas, and the structure and development of marine and terrestrial ecosystems throughout the Phanerozoic eon
- Mass extinctions and recovery; theories, processes and causal 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 focusing 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 exercises and project work. Compulsory participation is required in field trips, seminars, laboratory sessions, group exercises and project work, and associated elements.

Assessment

The assessment is based on a written exam at the end of the course and a project report.

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

For a Pass on the whole course, the student must have passed the project report and exam, and participated in all the compulsory components. The final grade is determined by the aggregated results of the exam and project report in proportion to their scope (see appendix).

Entry requirements

To be admitted to the course, students must have 90 credits in geology, including knowledge equivalent to GEOB21-GEOB25 or GEOB01-GEOB04. 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.

Subcourses in GEOM09, Bedrock Geology: Evolution of the Biosphere, Palaeoecology and Palaeontology

Applies from V17

- 1601 Written Examination, 12,0 hp
Grading scale: Fail, Pass, Pass with distinction
- 1602 Project Report, 3,0 hp
Grading scale: Fail, Pass, Pass with distinction
- 1603 Mandatory Learning Activities, 0,0 hp
Grading scale: Fail, Pass