SYLLABUS

Uppsala University
THIRD SEMESTER
PANGEA TRACK/PROFILE: 1 - PALAEOBIOLOGY

TITLE OF UNIT: Origin and Early Evolution of Life

NUMBER of ECTS: 15

OPTIONAL or COMPULSORY (if applicable): **Compulsory**

PREREQUISITES (either in term of skills or knowledge or units to be validated before registration to this course):

MODE OF TEACHING (distance education, webinar, workshops, seminars, lectures, supervised projects, etc):

Number of hours dedicated to lectures, practices, field-excursions, etc: **400 hours, including personal workload**

Personal workload (hours expected to be dedicated to, including supervised projects): **400 hours, including number of hours dedicated to lectures**

Description of the course

General aims

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

- describe key events in the evolution of life on Earth. In particular the biological and geological setting of the origin of life, the Precambrian evolution of life and the Cambrian explosion
- describe fossil representatives in the major groups of unicellular organisms including affinities, ecology and biochronology
- describe and evaluate the principal fossil faunas during the Precambrian-Cambrian transition including their distribution in time and space, together with their associated geochemical and tectonic events
- appraise and compare the different concepts concerning the early evolution of the major invertebrate phyla
- evaluate different techniques for dating the biological and geological events during the Precambrian-Cambrian
- collect and evaluate geological and palaeontological data in the field

Expected outcomes (knowledge)

- Key events in the evolution of life on Earth. In particular the biological and geological setting of the origin of life, the Precambrian evolution of life and the Cambrian explosion.
- Fossil representatives in the major groups of unicellular organisms including affinities, ecology and biochronology.

- Principal fossil faunas during the Precambrian-Cambrian transition including their distribution in time and space, together with their associated geochemical and tectonic events.
- The stem groups of the Cambrian biota.

Expected outcomes (skills)

- Assess the various theories for the origin of life.
- Appraise and compare the different concepts concerning the early evolution of the major invertebrate phyla.
- Evaluate different techniques for dating the biological and geological events during the Precambrian-Cambrian.
- Collect and evaluate geological and palaeontological data in the field.

Content summary

- Theories about the origin of life, environmental evolution and aspects of astrobiology.
- Origin and diversification of prokaryotes and eukaryotes.
- Palaeobiology and ecology of major groups of unicellular biota (bacteria and protists) and their evolution through time.
- Application in stratigraphy.
- The Proterozoic radiations of phytoplankton and heterotrophic protists.
- The Precambrian-Cambrian transition and the evidence for the origin of animals and nature of the Cambrian explosion.
- Origins of major terrestrial ecosystems.

Person in charge of the unit (first and last name, e-mail)
Study counsellor, Earth Sciences, studycounsellor@geo.uu.se

EVALUATION MODE	Ratio of the final grade
Written examination	**10 credits**
Moreover, the compulsory seminars, practices and field course must be approved	**5 credits**

TITLE OF UNIT: Origin and Evolution of the Vertebrates

NUMBER of ECTS: 15

OPTIONAL or COMPULSORY (if applicable):

PREREQUISITES (either in term of skills or knowledge or units to be validated before registration to this course): **120 credits with 90 credits within earth science or biology. Principles of Palaeobiology, 15 credits, Origin and Early Evolution of Life, 15 credits, or Evolution and development, 15 credits, is recommended**.

MODE OF TEACHING (distance education, webinar, workshops, seminars, lectures, supervised projects, etc): **Lectures, seminars, practicals, and supervised individual projects. Participation in all course components is compulsory**.

Number of hours dedicated to lectures, practicals, field-excursions, etc: **400 hours, including personal workload**

Personal workload (hours expected to be dedicated to, including supervised projects**): 400 hours, including number of hours dedicated to lectures**

Description of the course

General aims

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

- describe the systematic and geological context of vertebrate evolution
- explain key changes in vertebrate diversity, adaptational morphology, and radiation/extinction cycles
- recognise the palaeobiological framework for historical biodiversity, climate change impacts, and modern species conservation
- collate, evaluate and present scientific data derived from original fossils
- undertake comparative analyses of quantitative datasets
- develop methodologies for presenting research results both verbally and in writing

Expected outcomes (knowledge)

In-depth knowledge of vertebrate paleontology's main topics, questions and methods

- describe the systematic and geological context of vertebrate evolution
- explain key changes in vertebrate diversity, adaptational morphology, and radiation/extinction cycles
- recognise the palaeobiological framework for historical biodiversity, climate change impacts, and modern species conservation.

Expected outcomes (skills)

Critical thinking abilities and scientific presentation skills

- collate, evaluate and present scientific data derived from original fossils
- undertake comparative analyses of quantitative datasets
- develop methodologies for presenting research results both verbally and in writing

Content summary

- Research-oriented approach to vertebrate systematics, functional morphology and palaeoecology.
- Emphasis is placed upon major vertebrate radiations as tools for understanding macroevolutionary processes including the origins of key structures and environmental interplay in important radiation and extinction events.
- Practical study methods for the identification and analysis of fossil material. Supervised individual research project which is presented verbally and in writing.

Person in charge of the unit (first and last name, e-mail)
Study counsellor, Earth Sciences, studycounsellor@geo.uu.se

EVALUATION MODE	Ratio of the final grade
Individual research project presented both in a written scientific article format, and as one oral presentation	**8 credits**
Satisfactory completion of the mandatory seminars, written exercises, and group activities	**7 credits**