Opasraportti

LuTK - Geosciences 2010-2011 (2010 - 2011)

Tutkintorakenteisiin kuulumattomat opintokokonaisuudet ja -jaksot

774301A: A Basic Course in Geochemistry, 6 op
488115S: Advanced Geoenvironmental Engineering, 5 op
773646S: Advanced field techniques, 3 op
773618S: Advances in Palaeoecology, 5 op
773616S: Aerial photo interpretation in surficial geology, 5 op
774304A: Analytical methods in geochemistry, 5 op
772631S: Archean Geology, 5 op
771303A: Bachelor of Science thesis, 9 op
771102P: Basic course in mineralogy, 6 op
773303A: Basics of glacial geology, 4 op
772613S: Bedrock geology of Finland, 6 op
772334A: Bedrock mapping, 3 op
773341A: Biostratigraphy: diatom analyses, 5 op
773337A: Biostratigraphy: pollen analyses, 5 op
773605S: Composition and characteristics of fine-grained mineral sediments, 4 op
771302A: Digital modelling and geological information systems in geosciences, 5 op
771101P: Endogenic processes, 4 op
773314A: Environmental Geology, 3 op
773673S: Environmental geology and geophysicfield course, 3 op
772640S: Excursion, 5 op
773606S: Excursion in surficial geology, 2 - 5 op
773610S: Excursion on glacial geology of Lapland, 4 op
773612S: Excursion on regional surficial geology, 3 - 6 op
771109P: Exogenic Processes, 3 op
772103P: Field course in bedrock geology, 3 op
772662S: Field course in bedrock geology and geophysics, 3 op
773103P: Field course in surficial geology, 3 op
773324A: Field mapping of Quaternary deposits, 5 op
772310A: General mineralogy, 5 op
774636S: Geochemistry of Mining Environment, 5 op
774315A: Geochemistry of igneous rocks, 4 op
774630S: Geochemistry of radiogenic isotopes, 6 op
774631S: Geochemistry of stable isotopes, 4 op
773675S: Geological research methods in hydrogeology, 5 op
772628S: Geology of basic layered intrusions, 5 op
772621S: Geology of alkaline rocks, carbonatites and kimberlites, 5 op
773601S: Glacial Geology II, 5 op
773621S: Global environmental and climate change during the Cenozoic, 4 op
488108S: Groundwater Engineering, 5 op
773311A: Hydrogeology, 5 op
488102A: Hydrological Processes, 5 op
772341A: Igneous Petrology, 7 op
030005P: Information Skills, 1 op
774329A: Introduction to Environmental Geochemistry, 5 op
771108P: Introduction to Ore Geology, 2 op
771106P: Introduction to bedrock geology of Finland, 2 op
771110P: Introduction to classification of rocks, 2 op

Compulsory

771110P-02: Introduction to classification of rocks, practices, 0 op
771110P-01: Introduction to classification of rocks, lectures, 0 op
771107P: Introduction to historical geology and surficial geology of Finland, 2 op
772335A: Introduction to ore mineralogy, 5 op
774634S: La-ICP-MS -analytics, 4 op
773604S: Laboratory exercises on peat geology, 4 op
750616S: Legislation in environmental protection, 5 op
774629S: Literature essay, 4 - 5 op
773613S: Literature essay, 5 op
773607S: Literature study, 5 op
772615S: Literature study, 5 op
772666S: Master's thesis, 30 op
772342A: Metamorphic and sedimentary petrology, 7 op
772630S: Metamorphic petrology, 4 op
773614S: Microfossil research techniques (advanced), 4 op
772619S: Mineralogical instrumental analytics, 4 op
772601S: Mineralogy - advanced course, 5 op
772608S: Mining geology, 3 op
488111S: Modelling in Geoenvironmental Engineering, 5 op
772339A: Optical mineralogy, 6 op

Compulsory

772339A-01: Optical mineralogy, lectures, 0 op
772339A-02: Optical mineralogy, practices, 0 op
772625S: Ore geological field course, 2 op
772385A: Ore geology, 5 op
770001Y: Orientation course for new students, 1 op
773602S: Paleolimnology, 4 op
773330A: Peat geology, 5 op
773317A: Physical Sedimentology, 5 op
772636S: Practical course in fluid inclusion, 4 op
772635S: Practical course in mineral chemistry, 4 op
771304A: Practical training, 4 - 5 op
772612S: Precambrian sedimentology, 4 op
773657S: Pro gradu thesis, 30 op
773343A: Quaternary Geology Seminar I, 5 op
773306A: Quaternary Geology of Finland, 5 op
773300A: Quaternary Stratigraphy, 5 op
773619S: Quaternary geology seminar II, 5 op
772632S: Regional ore geology, 5 op
773648S: Sedimentary Structures, 5 op
772606S: Sedimentary petrology, 4 op
773647S: Sedimentology, 6 op
774316A: Seminar in environmental geochemistry, 5 op
772624S: Seminar in geology and mineralogy 2, 5 op
772337A: Seminar in geology and mineralogy I, 5 op
772667S: Seminar in ore geology, 5 op
772658S: Special issues in geology and mineralogy, 1 - 9 op
773608S: Special questions in Quaternary geology, 5 op
772316A: Structural geology, 5 op
772609S: Structural geology workshop, 6 op
773615S: Studia Generalia -lectures, 2 op
773679S: Studies in other universities, 0 op
772690S: Studies in other universities and colleges, 0 op
773645S: Study circle of glacial geology and ore exploration, 5 - 15 op
773322A: Surficial geology in ore exploration, 5 op
773641S: Surficial geology in ore exploration, advanced course 1, 5 op
773642S: Surficial geology in ore exploration, advanced course 2, 5 op
773316A: Technical Properties of Sediments, 8 op
772333A: Technical mineralogy, 5 op
773643S: Technical properties of sediments - advanced course, 5 op
Opintojaksojen kuvaukset

Tutkintorakenteisiin kuulumattomien opintokokonaisuuksien ja -jaksojen kuvaukset

774301A: A Basic Course in Geochemistry, 6 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Eero Hanski
Opintokohteen kielet: Finnish

ECTS Credits: 5 credits
Language of instruction: finnish
Timing: 1st or 2nd spring
Learning outcomes: The main objective is to provide students with the basic knowledge of various aspects of geochemistry.
Contents: Geochemistry as a field of science; history of geochemistry; tasks and fields of geochemistry; origin of chemical elements; origins and structure of the Earth; meteorites; moon and planets; composition of earth's different spheres; geochemical differentiation; geochemical circulation; the geochemical characteristics and circulation of elements; geochemistry of disintegration and stratification; pH-Eh-diagrams; clays; carbonate sediments; geochemical processes; the main fields of geochemistry and their applications.
Learning activities and teaching methods:
32 h lectures, 12 h exercises
Recommended optional programme components: 780109P
Assessment methods and criteria: examination
Grading: 1-5/fail
Person responsible: E. Hanski

488115S: Advanced Geoenvironmental Engineering, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Process and Environmental Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Kauko Kujala
Opintokohteen kielet: Finnish
Leikkaavuudet:

480211A Advanced Course in Environmental Geotechnics 5.0 op

ECTS Credits:
5.0 cr
Language of instruction:
Finnish
Timing:
Implementation in 3rd-4th periods.
Learning outcomes:
To familiarise the student with properties of soil, geomaterials and by-products from industry, load, design and construction of geo- and environmental structures.
Contents:
Learning activities and teaching methods:
Lectures, calculation and design exercises
Recommended optional programme components:
Basics in Geoenvironmental Engineering.
Recommended or required reading:
Handout and other materials delivered in lectures.
Assessment methods and criteria:
Examination and homeworks.
Person responsible:
Chief engineer Kauko Kujala
Other information:
Lectures are given every year.

773646S: Advanced field techniques, 3 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Juha Pekka Lunkka
Opintokohteen kielet: Finnish

ECTS Credits:
3 credits
Language of instruction:
Finnish
Timing:
4th or 5th year
Learning outcomes:
After completion students are able to use appropriate field methods and approaches to solve particular research problem in Quaternary geology.
Contents:
Planning and carrying out research in the field. An introduction to various field methods and analyzing techniques.
Grading:
pass/fail
Person responsible:
V. Peuraniemi or J. P. Lunkka
773618S: Advances in Palaeoecology, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Hicks Sheila
Opintokohteen kielet: English

ECTS Credits:
5 credits
Language of instruction:
english
Timing:
4th or 5th year
Contents:
The course will consist of 6-8 meetings during the academic year. At each meeting a topic of significance to palaeoecological research will be discussed, the discussion being based on 2-3 key published articles, which participants will be expected to read and analyse beforehand. All articles will be considered from two points of view, (i) their contribution to unravelling questions of climate change and/or environmental reconstruction and (ii) their format as a scientific paper. Emphasis will be on quantification, a multidisciplinary approach and the significance of different temporal and spatial scales. Where possible literature discussion meetings will be replaced by seminar discussions with visiting international researchers.
Grading:
pass/fail
Person responsible:
S. Hicks

773616S: Aerial photo interpretation in surficial geology, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Peuraniemi, Vesa Juhani
Opintokohteen kielet: Finnish

ECTS Credits:
5 credits
Language of instruction:
finnish
Timing:
4th or 5th year
Learning outcomes:
Upon completion of the course, student should be able to identify and interpret basic landforms from air photos.
Contents:
Basics of air photo interpretation; identifying landforms from air photos and topography maps; mapping based on air photo interpretation and the necessary field research. Students draw up a map of a small area.
Learning activities and teaching methods:
20 h lectures, 30 h practical exercises
Assessment methods and criteria:
excersices and an examination
Grading:
1-5/fail
Person responsible:
V. Peuraniemi
774304A: Analytical methods in geochemistry, 5 op

**Opiskelumuoto:** Intermediate Studies  
**Laji:** Course  
**Vastuuyksikkö:** Department of Geosciences  
**Arvostelu:** 1 - 5, pass, fail  
**Opintokohteen kielet:** Finnish

**ECTS Credits:** 5 credits  
**Language of instruction:** finnish  
**Timing:** 2nd or 3rd year  
**Learning outcomes:** After the course students should know which kind of sample pretreatment and analysis methods are used for geological samples.  
**Contents:** Detection limits and errors in analysis, presentation of analytical results, sampling, sample pretreatment, sample digestion (melts, solutions), silicate analysis theories and practice of different instrumental methods (AAS, XRF, ICP-AES, ICP-MS, TIMS), a visit to a geochemical laboratory.  
**Learning activities and teaching methods:** 24 h lectures, 6 h exercises  
**Recommended optional programme components:** Basic course in geochemistry (774301A)  
**Assessment methods and criteria:** examination  
**Grading:** 1-5/fail  
**Person responsible:** E. Hanski

772631S: Archean Geology, 5 op

**Voimassaolo:** 01.08.2010 -  
**Opiskelumuoto:** Advanced Studies  
**Laji:** Course  
**Vastuuyksikkö:** Department of Geosciences  
**Arvostelu:** 1 - 5, pass, fail  
**Opettajat:** Maier, Wolfgang Derek  
**Opintokohteen kielet:** English

Ei opintojaksokuvauksia.

771303A: Bachelor of Science thesis, 9 op

**Opiskelumuoto:** Intermediate Studies  
**Laji:** Course  
**Vastuuyksikkö:** Department of Geosciences  
**Arvostelu:** 1 - 5, pass, fail  
**Opintokohteen kielet:** Finnish
ECTS Credits: 9 credits
Language of instruction: finnish
Timing: 3rd year
Learning outcomes: Students show that they have basic knowledge of the essential methods of their research field and they are able to use the scientific literature.
Contents: A thesis based on individual research of literature, field work or laboratory work. Before starting the thesis, students must agree upon the details of the thesis with their professor.
Grading: pass / fail
Person responsible: professors

771102P: Basic course in mineralogy, 6 op
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Pekka Tuisku, Hanna Junttila
Opintokohteen oppimateriaali:
Risto Piispanen ja Pekka Tuisku (http://cc.oulu.fi/~petuisku/Mineralogia/MinPer.htm, 2005
Opintokohteen kielet: Finnish

ECTS Credits: 5 credits
Language of instruction: finnish
Timing: 1st autumn
Learning outcomes: Students know a basic knowledge on mineralogy.
Contents: Crystal, crystal systems, mineral, rocks. Formation of minerals in geological processes, chemical and physical properties of minerals, occurrence and utilization. Exercises are compulsory.
Learning activities and teaching methods: 20 h lectures, 16 h exercises
Assessment methods and criteria: compulsory exercises, examination
Grading: 1-5/fail
Person responsible: P. Tuisku

773303A: Basics of glacial geology, 4 op
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Peuraniemi, Vesa Juhani
Opintokohteen kielet: Finnish
ECTS Credits:
4 credits

Language of instruction:
finnish

Timing:
2nd or 3rd year

Learning outcomes:
Upon completion of the course, student should have acquired knowledge of theories of how glaciers were born, of glaciogenic sediment types and of morphological landforms.

Contents:
A review to history of glacial research and its methods; theories of how glaciers were born and factors that have affect on them; present-day glaciers and their research; how snow turns into ice; movement of ice; structures of glaciers; glacier types; facts and theories about the geological activities in glaciers and how glacial sediments, landforms and erosional features are formed; glaciofluvial, glaciolacustrine and glaciomarine sedimentation, glacial deposits in pre-pleistocene formations, causes of ice ages.

Learning activities and teaching methods:
26 h lectures

Recommended optional programme components:
Exogenic processes (771109P), Surficial geology in Finland (773306A)

Recommended or required reading:

Assessment methods and criteria:
examination

Grading:
1-5/fail

Person responsible:
V. Peuraniemi

772613S: Bedrock geology of Finland, 6 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
6 credits

Language of instruction:
finnish

Timing:
4th or 5th year

Learning outcomes:
After the course student should have a good overview of the Finnish bedrock and its evolution through time.

Contents:
The main geological units of the Finnish bedrock in the light of geological processes and as a function of geological time.

Learning activities and teaching methods:
40 h lectures

Recommended or required reading:

Assessment methods and criteria:
examination

Grading:
1-5/fail

Person responsible:
N. N.

772334A: Bedrock mapping, 3 op
Opiskelumuoto: Intermediate Studies  
Laji: Course  
Vastuuysikkö: Department of Geosciences  
Arvostelu: 1 - 5, pass, fail  
Opettajat: Kärki, Aulis Juhani  
Opintokohteen kielet: Finnish

ECTS Credits:  
3 credits  
Language of instruction:  
finnish / english  
Timing:  
2nd or 3rd year  
Contents:  
The course familiarizes the students with methods of bedrock mapping, compilation of geological maps and utilization of various source materials and data in those assignments.  
Learning activities and teaching methods:  
8 h lectures, 32 h fieldwork and exercises.  
Recommended optional programme components:  
Basic Studies in Geosciences and courses 772308A Petrology and 772316A Structural geology.  
Assessment methods and criteria:  
Active participation, written work report.  
Grading:  
pass/fail  
Person responsible:  
A. Kärki

773341A: Biostratigraphy: diatom analyses, 5 op

Opiskelumuoto: Intermediate Studies  
Laji: Course  
Vastuuysikkö: Department of Geosciences  
Arvostelu: 1 - 5, pass, fail  
Opettajat: Tiina Eskola  
Opintokohteen kielet: Finnish

ECTS Credits:  
5 credits  
Language of instruction:  
finnish / english  
Timing:  
2nd or 3rd year  
Learning outcomes:  
Upon completion of the course, student should be able to prepare diatom samples in the laboratory and identify some of the most general diatoms in Finland.  
Contents:  
The aim of this course is to use diatoms as an indicator for their sedimentary environment; the salinity, acidity and nutritive value. Exercises to identify the most general diatoms; manufacturing preparations; sediment analysis.  
Learning activities and teaching methods:  
12 h lectures, 50 h exercises  
Recommended optional programme components:  
Exogenic processes (771109P)  
Recommended or required reading:  
**Assessment methods and criteria:**
Written report and an Examination on identifying the species of diatoms.

**Grading:**
pass/fail

**Person responsible:**
T. Eskola

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**773337A: Biostratigraphy: pollen analyses, 5 op**

**Opiskelumuoto:** Intermediate Studies

**Laji:** Course

**Vastuuysikkö:** Department of Geosciences

**Arvostelu:** 1 - 5, pass, fail

**Opettajat:** Tiina Eskola

**Opintokohteen kielet:** Finnish

**ECTS Credits:**
5 credits

**Language of instruction:**
finnish / english

**Timing:**
2nd or 3rd year

**Learning outcomes:**
Upon completion of the course, student should be able to prepare pollen samples in the laboratory and identify the most general pollen types and spores in Finland.

**Contents:**
The aim of this course is to familiarize students with the analysis and methods in pollen analysis and to examine the composition of pollen in organic or mineral sediments. Exercises to identify the most general pollen types and spores; manufacturing preparations; sediment analysis.

**Learning activities and teaching methods:**
12 h lectures, 50 h exercises

**Recommended optional programme components:**
Exogenic processes (771109P)

**Recommended or required reading:**

**Assessment methods and criteria:**
Written report and an Examination on identifying the species of pollen and spores.

**Grading:**
pass/fail

**Person responsible:**
T. Eskola

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**773605S: Composition and characteristics of fine-grained mineral sediments, 4 op**

**Opiskelumuoto:** Advanced Studies

**Laji:** Course

**Vastuuysikkö:** Department of Geosciences

**Arvostelu:** 1 - 5, pass, fail

**Opettajat:** Peuraniemi, Vesa Juhani

**Opintokohteen kielet:** Finnish

**ECTS Credits:**
4 credits

**Language of instruction:**
finnish
Timing:
4th or 5th year

Contents:
The weathering of rocks produces different kinds of fine-grained sediments. The mineralogical and chemical composition of fine-grained sediments; the physical properties of sediments and their practical importance.

Learning activities and teaching methods:
10 h lectures

Recommended or required reading:

Assessment methods and criteria:
examination

Grading:
1-5/fail

Person responsible:
V. Peuraniemi

771302A: Digital modelling and geological information systems in geosciences, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Kärki, Aulis Juhani

Opintokohteen kielet: Finnish

ECTS Credits:
5 credits

Language of instruction:
finnish

Timing:
2nd or 3rd autumn

Learning outcomes:
After the course students will have a basic knowledge on 3D-digital modeling and GIS-softwares and the opportunities what they offer in geosciences.

Contents:
The aim of this course is to give students basic knowledge on 3D- digital modelling and geographic information systems and introduce the opportunities they offer in geosciences (e.g. geological mapping and modelling, different kind of feasibility study of raw materials).

Learning activities and teaching methods:
8 h lectures, 20 h demonstrations, 50 h exercises

Recommended or required reading:

Assessment methods and criteria:
examination

Grading:
1-5/fail

Person responsible:
A. Kärki

771101P: Endogenic processes, 4 op

Voimassaolo: - 31.08.2011

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Seppo Gehör
Opintokohteen oppimateriaali:
Opintokohteen kielet: Finnish

ECTS Credits:
4 credits
Language of instruction:
finnish
Timing:
1st autumn
Learning outcomes:
The student will have an understanding of the basic concepts of the geological processes affecting rocks under the earth surface. This course is intended as an introduction to the scope and methods of igneous and metamorphic petrology.
Contents:
Magmatism, tectonics, origin and crystallization of magmas, volcanism, metamorphism and formation of metamorphic rocks, plate tectonics and tectonic structures.
Learning activities and teaching methods:
24 h lectures
Target group:
all geology students
Recommended or required reading:
Assessment methods and criteria:
examination
Grading:
1-5/fail
Person responsible:
E. Hanski

773314A: Environmental Geology, 3 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Peuraniemi, Vesa Juhani
Opintokohteen kielet: Finnish
Leikkaavuudet:
ay773314A Environmental Geology (OPEN UNI) 3.0 op

ECTS Credits:
3 credits
Language of instruction:
finnish
Timing:
2nd or 3rd year
Learning outcomes:
Upon completion of the course, student should have acquired knowledge of basic concepts of environmental geology.
Contents:
Basic concepts of environmental geology, geological processes, landforms and risks related to geological processes, geological resources, and environmental geological aspects in planning the land usage, environmental geochemistry.
Learning activities and teaching methods:
24 h lectures
Recommended optional programme components:
Exogenic processes (771109P)

Recommended or required reading:

Assessment methods and criteria:
examination

Grading:
1-5/fail

Person responsible:
V. Peuraniemi

773673S: Environmental geology and geophysical field course, 3 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Peuraniemi, Vesa Juhani
Opintokohteen kielet: Finnish

ECTS Credits:
3 credits
Language of instruction:
finnish
Timing:
4th or 5th year
Contents:
Course gives basic knowledge and skills for studying the Quaternary landforms, their consistency, ground water questions and environmental issues with geological and geophysical methods.

Learning activities and teaching methods:
8 h lectures, 32 h exercises
Assessment methods and criteria:
active participation
Grading:
pass/fail
Person responsible:
V. Peuraniemi

772640S: Excursion, 5 op

Voimassaolo: 01.08.2010 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

773606S: Excursion in surficial geology, 2 - 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Peuraniemi, Vesa Juhani
Opintokohteen kielet: Finnish

ECTS Credits: 2-5 credits
Language of instruction: finnish
Timing: 4th or 5th year
Contents: One to three five-day excursions in Finland or abroad during which the participants become familiar with different formations, stratigraphically good model targets, research areas and with their characteristics.
Grading: pass/fail
Person responsible: V. Peuraniemi

773610S: Excursion on glacial geology of Lapland, 4 op
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Peuraniemi, Vesa Juhani
Opintokohteen kielet: Finnish

773612S: Excursion on regional surficial geology, 3 - 6 op
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Peuraniemi, Vesa Juhani
Opintokohteen kielet: Finnish

ECTS Credits: 3-6 credits
Language of instruction: finnish
Timing: 4th or 5th year
Assessment methods and criteria: written report
Grading: pass/fail
Person responsible: V. Peuraniemi

771109P: Exogenic Processes, 3 op
Voimassaolo: - 31.07.2011
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
ECTS Credits: 3 credits

Language of instruction: Finnish

Timing: 1st autumn

Learning outcomes: Upon completion of the course, student should have acquired knowledge of basic concepts and processes of surficial geology. Student should also be able to identify basic sediment types and soils.

Contents: Basic concepts of surficial physical geology, weathering, erosion, sedimentation, sediment types, soils.

Learning activities and teaching methods: 16 h lectures, 6 h exercises


Assessment methods and criteria: compulsory exercises, examination

Grading: 1-5/fail

Person responsible: V. Peuraniemi

772103P: Field course in bedrock geology, 3 op

Voimassaolo: 01.08.2006 -
Opiskelumuoto: Basic Studies

Laji: Course

Vastuuysikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Kärki, Aulis Juhani

Opintokohteen kielet: Finnish

ECTS Credits: 5 credits

Language of instruction: Finnish / English

Timing: 1st spring

Learning outcomes: Upon completion of the course, student should be able to identify rocks and minerals in the field and know the basics of bedrock mapping.

Contents: Introduction to bedrock mapping as part of field work. Map material (geological maps, topographic maps) and geologist's tools. Review to identification of rocks and minerals in the field.

Learning activities and teaching methods: 8 h lectures, 32 h demonstrations

Recommended optional programme components: basic studies in geosciences

Assessment methods and criteria: active participation, written work report

Grading: pass/fail

Person responsible: A. Kärki

Other information: The course consists of two parts (772301A and 773302A), which are compulsory for all geology students.
772662S: Field course in bedrock geology and geophysics, 3 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Kärki, Aulis Juhani
Opintokohteen kielet: Finnish

ECTS Credits: 3 credits
Language of instruction: finnish / english
Timing: 4th or 5th year
Contents: Application of geophysical and geological methods to bedrock mapping, ore research and structures of bedrock.
Learning activities and teaching methods: 8 h lectures, a field course with 32 h of demonstrations, 20 h independent exercises and a written report.
Assessment methods and criteria: Active participation, a written work report.
Grading: pass /fail
Person responsible: A. Kärki

773103P: Field course in surficial geology, 3 op

Voimassaolo: 01.01.2006 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Peuraniemi, Vesa Juhani
Opintokohteen kielet: Finnish

ECTS Credits: 3 credits
Language of instruction: finnish
Timing: 1st spring
Learning outcomes: Upon completion of the course, student should be able to identify the most important sediment types and. Student should also be able to observe ice flow directions.
Contents: During this field course students will be introduced with the most important sediment types and the methods of their study and determination and with different glacial landforms. Lectures on the different sediment types and their characteristics in Finland.
Learning activities and teaching methods: 8 h lectures, 32 h exercises
Recommended optional programme components: basic studies in geoscience
Assessment methods and criteria: compulsory exercises
Grading: pass/fail
773324A: Field mapping of Quaternary deposits, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Juha Pekka Lunkka
Opintokohteen kielet: Finnish

ECTS Credits: 5 credits
Language of instruction: finnish
Timing: 2nd or 3rd year
Learning outcomes:
To learn the basic methods in mapping of Quaternary deposits.
Contents:
A field course that introduces techniques used in the mapping of Quaternary deposits. In the field students are reconstructing a 1: 20 000 scale Quaternary map from pre-selected mapping area.
Learning activities and teaching methods:
40 h lectures and exercises in the field
Assessment methods and criteria:
examination
Grading:
1-5/fail
Person responsible:
J.P. Lunkka

772310A: General mineralogy, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Pekka Tuisku
Opintokohteen kielet: Finnish

ECTS Credits: 5 credits
Language of instruction: finnish
Timing: 2nd or 3rd year
Learning outcomes:
The student will deepen their basic knowledge of mineralogy.
Contents:
Research history and research methods of mineralogy. Classification of minerals, crystal chemical structures, chemical compositions, the most important properties and occurrence of minerals in rocks.
Learning activities and teaching methods:
26 h lectures
Recommended optional programme components:
Basic Mineralogy 771102P
Recommended or required reading:

Assessment methods and criteria:
examination
Grading:
1-5/fail

Person responsible:
P. Tuisku

774636S: Geochemistry of Mining Environment, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

ECTS Credits:
5 credits
Language of instruction:
finnish
Timing:
4th or 5th year
Learning outcomes:
After the course students are able to understand geochemical processes related to the mining environment.
Contents:
Oxidation of sulfide minerals, water chemistry in a mining environment, acid neutralization capacity of rocks, acid mining drainage (AMD) and its prevention.
Learning activities and teaching methods:
28 h lectures
Recommended optional programme components:
Basic course in geochemistry 774301A and Introduction to environmental geochemistry 77439A
Recommended or required reading:
Assessment methods and criteria:
examination/essay
Grading:
1-5/fail
Person responsible:
E. Hanski

774315A: Geochemistry of igneous rocks, 4 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Eero Hanski
Opintokohteen kielet: Finnish

ECTS Credits:
4 credits
Language of instruction:
finnish
Timing:
2nd or 3rd year
Learning outcomes:
Upon completion of the course students are able to classify igneous rocks and make conclusions on their genesis on the basis of their geochemical composition.

Contents:
Manipulation and graphical presentation of geochemical data, geochemical classification of magmas, normative mineral compositions, mobility of elements, geochemistry of volcanics in different geotectonic environments, the behavior and modeling of trace elements in magmas.

Learning activities and teaching methods:
26 h lectures, 20 h computer exercises

Recommended optional programme components:
Basic course in geochemistry (774301A) and petrology (772308A)

Recommended or required reading:

Assessment methods and criteria:
written work report

Grading:
1-5/fail

Person responsible:
E. Hanski

774630S: Geochemistry of radiogenic isotopes, 6 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Eero Hanski
Opintokohteen kielet: Finnish

ECTS Credits:
6 credits

Language of instruction:
finnish

Timing:
4th or 5th year

Learning outcomes:
To be able to read geological literature containing isotope data and evaluate the possibilities of utilizing isotopes in solving geological problems.

Contents:
Mechanisms of radioactive disintegration; mass spectrometry; Rb-Sr-, Sm-Nd-, K-Ar-, Ar-Ar-, Re-Os-, Lu-Hf-, Sm-Nd- and U-Pb-methods, isotope geochemistry of lead; fission track and uranium-thorium disequilibrium method; cosmogenics and short-lived isotopes.

Learning activities and teaching methods:
32 h lectures, 20 h computer exercises

Recommended optional programme components:
Basic course in geochemistry 774301A

Recommended or required reading:

Assessment methods and criteria:
2 examinations

Grading:
1-5/fail

Person responsible:
E. Hanski

774631S: Geochemistry of stable isotopes, 4 op

Voimassaolo: - 31.07.2010
Advanced Studies: Geological research methods in hydrogeology, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Juha Pekka Lunkka
Opintokohteen kielet: Finnish

ECTS Credits: 5 credits
Language of instruction: finnish
Timing: 4th or 5th year
Learning outcomes: After completion students are able to use appropriate field methods techniques in hydrogeology.
Contents: Geological and geophysical research methods in hydrogeology.
Learning activities and teaching methods: 20 h lectures
Assessment methods and criteria: examination
Grading: 1-5/fail

Person responsible: E. Hanski
772628S: Geology of basic layered intrusions, 5 op

Voice massaolo: 01.08.2009 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Maier, Wolfgang Derek
Opintokohteen kielet: English

ECTS Credits:
5 credits
Language of instruction: english
Timing:
4th or 5th year
Learning outcomes:
By the end of this course, students should be able to understand which kind of processes result in the formation of layered intrusions and their internal structures and ore deposits.
Contents:
Layered intrusions in space and time and the mineralogy, petrology, stratigraphy and ore-forming processes in layered intrusions.
Learning activities and teaching methods:
36 h lectures
Recommended or required reading:
Assessment methods and criteria:
examination
Grading:
1-5/fail
Person responsible:
W. Maier

772621S: Geology of alkaline rocks, carbonatites and kimberlites, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Seppo Gehör
Opintokohteen kielet: Finnish

ECTS Credits:
4 credits
Language of instruction: finnish
Timing:
4th or 5th year
Contents:
Occurrence of carbonatites, alkaline rocks and kimberlites; mineralogy, petrography, geochemistry, petrogenesis and economic geology.
Learning activities and teaching methods:
24 h lectures
Recommended or required reading:
Assessment methods and criteria:
examination
Grading:
1-5/fail
Person responsible:
S. Gehör

773601S: Glacial Geology II, 5 op
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Juha Pekka Lunkka
Opintokohteen kielet: Finnish

ECTS Credits:
5 credits
Language of instruction:
finnish
Timing:
4th or 5th year
Learning outcomes:
After completion students will be able to understand physical properties of glaciers and the genesis of glacial sediments and glacial landforms.
Contents:
Dynamics and hydrology of glaciers; erosion and sedimentation processes in glacial environment; basics of glaciology; subglacial, englacial and supraglacial processes. Origin of different glacigenic sediments and landforms and modelling of paleo-ice-sheets.
Learning activities and teaching methods:
30 h lectures
Recommended or required reading:
Assessment methods and criteria:
examination
Grading:
1-5/fail
Person responsible:
J. P. Lunkka

773621S: Global environmental and climate change during the Cenozoic, 4 op
Voimassaolo: 01.08.2009 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Juha Pekka Lunkka
Opintokohteen kielet: Finnish

ECTS Credits:
4 credits
Language of instruction:
finnish
Timing:
4th or 5th year

Learning outcomes:
After completion students will be able to understand the mechanisms behind the natural climate and environmental change and relate that to the ongoing changes in climate and environment.

Contents:
Mechanisms and rates of the environmental and climate change during the past 100 million. The course introduces, for example the influence of orbital cycles, tectonics, ocean currents and ice sheets on the environmental and climate change during the deep past.

Learning activities and teaching methods:
24 h lectures

Recommended or required reading:

Assessment methods and criteria:
examination

Grading:
1-5/fail

Person responsible:
J. P. Lunkka

488108S: Groundwater Engineering, 5 op

Voimassaolo: - 31.07.2017
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Process and Environmental Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Björn Klöve
Opintokohteen kielet: English
Leikkaavuudet:
480122A Groundwater Technology 5.0 op

ECTS Credits:
5,0 cr

Language of instruction:
Finnish

Timing:
Implementation in 1st-2nd periods.

Learning outcomes:
To acquire knowledge on water retention and flow in soils, hydraulics of ground water systems, ground water quality, ground water use and modelling.

Learning outcomes: Students learn to define hydraulic characteristics of soil and aquifers. Students can estimate key factors influencing on discharge and water quality of groundwater. Students can use general methods to calculate groundwater flow and design sustainable use and management of groundwaters.

Contents:
Soil and ground water, water balance, hydraulic properties of soils, formation of ground water, flow equations and solutions, pumping tests and methods, ground water quality and modelling.

Learning activities and teaching methods:
Lectures, calculus assignments, a modelling tasks (GMS-MODFLOW).

Recommended optional programme components:
Hydrological Processes.

Recommended or required reading:

Assessment methods and criteria:
Examination and report about modelling task are graded in the scale 1-5. Calculus assignments can give 1-3 points for the examination.

Person responsible:
773331A: Hydrogeology, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Juha Pekka Lunkka
Opintokohteen kielet: Finnish

ECTS Credits:
5 credits
Language of instruction:
finnish
Timing:
2nd or 3rd year

Learning outcomes:
To learn basic concepts in hydrogeology and to introduce hydrogeological research methods.

Contents:
Hydrological cycle, especially phases of earth water and ground water, origin of ground water and its occurrence in Finnish soil and bedrock and in other sediment, karst and volcanic formations; examples from Finland and elsewhere; ground water on climatic peripheries; flow of ground water and well hydraulics; ground water research, geological geophysical methods; stable and radioactive isotopes; principles of hydrochemistry; quality of ground water; deep ground water research; mineral waters and thermal waters; artificial ground waters; contaminating of ground water and its protection.

Learning activities and teaching methods:
30 h lectures and exercises

Recommended or required reading:

Assessment methods and criteria:
examination
Grading:
1-5/fail

Person responsible:
J. P. Lunkka

488102A: Hydrological Processes, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Department of Process and Environmental Engineering
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Leikkaavuudet:
ay488102A Hydrological Processes (OPEN UNI) 5.0 op
480207A Hydraulics and Hydrology 5.0 op

ECTS Credits:
6.0 cr
Language of instruction:
Finnish
Timing:
Implementation in 4th-5th periods.

**Learning outcomes:**
To provide a basic understanding of water flow and storage processes involved in the hydrological cycle and introduce engineering computational methods used to manage water resources in natural and man made environments.

**Learning outcomes:** The student will be able to explain the main hydrological processes quantitatively through mathematical methods.

**Contents:**
Hydrological cycle, physical properties of water, distribution of water resources, water balance, precipitation, evapotranspiration, soil and ground water, infiltration, runoff, snow hydrology, hydrometry, water quality, rivers and lakes.

**Learning activities and teaching methods:**
Lectures 24 h, exercises 12 h, an assignment.

**Recommended optional programme components:**
Material and Energy Balances (recommended).

**Recommended or required reading:**

**Assessment methods and criteria:**
Examination (1-5), the assignment (accepted/not accepted), peer review (accepted/not accepted).

**Person responsible:**
Professor Björn Klöve

**Other information:**
The English version from the course is available.

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**772341A: Igneous Petrology, 7 op**

**Voimassaolo:** 01.01.2009 -

**Opiskelumuoto:** Intermediate Studies

**Laji:** Course

**Vastuuyksikkö:** Department of Geosciences

**Arvostelu:** 1 - 5, pass, fail

**Opettajat:** Maier, Wolfgang Derek

**Opintokohteen kielet:** English

Ei opintojaksokuvauksia.

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**030005P: Information Skills, 1 op**

**Opiskelumuoto:** Basic Studies

**Laji:** Course

**Vastuuyksikkö:** Faculty of Technology

**Arvostelu:** 1 - 5, pass, fail

**Opettajat:** Koivuniemi, Mirja-Liisa, Sassali, Jani Henrik

**Opintokohteen kielet:** Finnish

**Leikkaavuudet:**

030004P Introduction to Information Retrieval 0.0 op

**ECTS Credits:**
1 credit.

**Language of instruction:**
Finnish/English

**Timing:**
Learning outcomes:
Students know the different phases of information retrieval process and basic techniques of scientific information retrieval. They will find the most important reference databases of their discipline and know how to evaluate information sources and retrieval results.

Contents:
Retrieval of scientific information, the retrieval process, key databases of the discipline, and evaluation of information retrieval and information sources.

Learning activities and teaching methods:
The course involves training sessions (8h), web-based learning materials, exercises in the Optima learning environment and a final assignment on a topic of the student's own choice.

Recommended or required reading:
Web-based learning material from Toolbox of Research (https://wiki.oulu.fi/display/tor/1.1+Finding+scientific+information)

Assessment methods and criteria:
Passing the course requires participation in the training sessions and successful completion of the course assignments.

Grading:
pass/fail

Person responsible:
Science and Technology Library Tellus, tellustieto(at)oulu.fi

Other information:

774329A: Introduction to Environmental Geochemistry, 5 op

Voimassaolo: 01.01.2005 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Eero Hanski
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

ECTS Credits:
5 credits

Language of instruction:
finnish

Timing:
2nd or 3rd year

Learning outcomes:
After the course students should have basic knowledge on the reactions that affect the behavior of harmful (mainly inorganic) substances in the environment.

Contents:
Concepts of the environment and environmental geochemistry; solution, hydrolysis and redox reactions of minerals, sorption and related geochemical processes, topical environmental problems (acid rain, decrease of ozone, greenhouse phenomenon, heavy metal fallout) from the viewpoint of geochemistry; buffer systems of nature; heavy metals in environment; acid mine drainage.

Learning activities and teaching methods:
30 h lectures, 12 h computer exercises

Recommended optional programme components:
Basic course in geochemistry (774301A)

Recommended or required reading:

Assessment methods and criteria:
examination

Grading:
771108P: Introduction to Ore Geology, 2 op

Opiskelumuoto: Basic Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Seppo Gehör
Opintokohteen kielet: Finnish

ECTS Credits:
2 credits
Language of instruction:
finnish
Timing:
1st spring
Learning outcomes:
Students will gain a general view on the raw materials, their environmental impacts and exploration.

Contents:
Aspects of mineral economy, environmental impacts of raw material production and use, classification of ores and ore-forming processes, examples of ore types of abundant and scarce elements, methods of ore exploration, mining legislation.

Learning activities and teaching methods:
14 h lectures
Target group:
all geology students

Recommended or required reading:

Assessment methods and criteria:
written examination

Grading:
1-5/fail

Person responsible:
E. Hanski

771106P: Introduction to bedrock geology of Finland, 2 op

Opiskelumuoto: Basic Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Kärki, Aulis Juhani
Opintokohteen kielet: Finnish

ECTS Credits:
2 credits
Language of instruction:
finnish
Timing:
1st spring
Learning outcomes:
After the course students know main geological features of bedrock of Finland.

Contents:
The main geological features of the bedrock of Finland including its structure, age and orogenic evolution.
Learning activities and teaching methods:
10 h lectures

Recommended or required reading:

Assessment methods and criteria:
examination
Grading:
1-5/fail
Person responsible:
A. Kärki

ECTS Credits:
2 credits

Language of instruction:
finnish / english

Timing:
1st autumn

Learning outcomes:
After this course student will possess the naming and classification of rock types and is able to identify the most important rock types macroscopically.

Contents:
The origin of rock types, macroscopic identification and description of origin, structure and mineralogical composition of the most important rock types.

Learning activities and teaching methods:
6 h lectures, 6 h exercises

Recommended optional programme components:
preliminary data: Basic Mineralogy

Recommended or required reading:
Martti Lehtinen, Pekka Nurminen ja Tapani Rämö, , 1998

Assessment methods and criteria:
lectures, practical exercises, identification exam and lecture diary
Grading:
pass/fail

Person responsible:
H. Junnila

Compulsory

771110P-02: Introduction to classification of rocks, practices, 0 op

Voimassaolo: 01.08.2010 - 31.07.2011
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuysikkö: Department of Geosciences
77110P-01: Introduction to classification of rocks, lectures, 0 op

Voimassaolo: 01.08.2010 - 31.07.2011
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Hanna Junttila
Opintokohteen kielet: Finnish

771107P: Introduction to historical geology and surficial geology of Finland, 2 op

Opiskelumuoto: Basic Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Peuraniemi, Vesa Juhani
Opintokohteen kielet: Finnish

ECTS Credits:
2 credits
Language of instruction:
finnish
Timing:
1st spring
Learning outcomes:
Upon completion of the course, student should have acquired knowledge of the main features of the Finnish preglacial and Quaternary deposits and the main features of the history of life and geological time table.
Contents:
Main features and origin of the Finnish preglacial and Quaternary deposits. Historical geology: Geological time table, main features of the history of life, mass extinctions.
Learning activities and teaching methods:
10 h lectures
Recommended or required reading:
Assessment methods and criteria:
examination
Grading:
1-5/fail
Person responsible:
V. Peuraniemi

772335A: Introduction to ore mineralogy, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Contents:
Division and structure of ore minerals, composition and texture, phase diagrams and their applications. Ore microscope and how it is used, microscopic properties of ore minerals. Ore mineral assemblages and their occurrence.

Learning activities and teaching methods:
22 h lectures, 12 h exercises

Recommended optional programme components:
Introduction to ore geology (771108P), Basic mineralogy (771102P)

Recommended or required reading:

Assessment methods and criteria:
written examination and a practical test on ore microscopy

Grading:
1-5/fail

Person responsible:
W. Maier

ECTS Credits:
4 credits

Language of instruction:
finnish

Timing:
4th or 5th year

Learning outcomes:
After the course the student will be able to work independently (under the control) in the geochemical laboratory.

Contents:
The theoretical base and the use of laser ablation inductively coupled plasma mass spectrometry (La-ICP-MS). How to express the results, limits, accuracies and how to prepare the samples.

Learning activities and teaching methods:
20 h lectures, 20 h exercises

Recommended or required reading:

Assessment methods and criteria:
examination
Grading:
1-5/fail
Person responsible:
S. Gehör

773604S: Laboratory exercises on peat geology, 4 op

Voimassaolo: - 31.07.2010
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Holappa, Kauko Einari
Opintokohteen kielet: Finnish

750616S: Legislation in environmental protection, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Huttunen, Satu
Opintokohteen oppimateriaali:
Opintokohteen kielet: Finnish

ECTS Credits:
5 cr.
Language of instruction:
Finnish.
Timing:
B.Sc. 3rd or M.Sc. 1st autumn - spring. Every second year.
Learning outcomes:
To familiarise students with environmental legislation in European Union with regard to environmental protection and natural resources. Student is able to apply his knowledge to different environmental questions and analyze the needed means. Student knows the environmental administration and organisations in environmental protection and natural resources.
Contents:
Environmental protection and natural resources legislation in Finland and in Europe. Environmental administration and organisations, use and protection of natural resources, prevention of environmental destruction, assessment of environmental effect as well as principles of environmental legislation and main international conventions, environmental issues in UNEP and OECD are covered.
Learning activities and teaching methods:
24 h lectures, 18 h exercises including demonstrations, literature, and final exam.
Target group:
Compulsory to students who are doing the environmental protection 25 cr study module.
Recommended or required reading:
Assessment methods and criteria:
Final exam.
Grading:
1-5 / Fail.
Other information:
The course will take place if sufficient resources are available. Also the environmental legislation course that Faculty of technology arranges is accepted.

774629S: Literature essay, 4 - 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Eero Hanski
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

ECTS Credits:
4 credits
Language of instruction:
finnish
Timing:
4th or 5th year
Learning outcomes:
Students acquire deep knowledge on a particular geochemical topic.
Contents:
Independent literature search and construction of an essay on a given theme.
Learning activities and teaching methods:
see above
Recommended optional programme components:
Basic course in geochemistry (774301A) and one of the other geochemistry courses
Recommended or required reading:
Will be informed separately.
Assessment methods and criteria:
essay
Grading:
pass/fail
Person responsible:
E. Hanski

773613S: Literature essay, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Peuraniemi, Vesa Juhani
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

773607S: Literature study, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
ECTS Credits: 5 credits  
Language of instruction: finnish  
Timing: 4th or 5th year  
Learning outcomes: Students acquire deep knowledge on a particular surficial geology topic.  
Contents: Independent literature search and construction of a report on a given theme.  
Learning activities and teaching methods: see above  
Recommended optional programme components: Basic course in geochemistry (774301A) and one of the other geochemistry courses  
Recommended or required reading: Will be informed separately.  
Assessment methods and criteria: a report  
Grading: pass/fail  
Person responsible: V. Peuraniemi

772615S: Literature study, 5 op  
Opiskelumuoto: Advanced Studies  
Laji: Course  
Vastuuyksikkö: Department of Geosciences  
Arvostelu: 1 - 5, pass, fail  
Opettajat: Eero Hanski  
Opintokohteen kielet: Finnish

ECTS Credits: 4 credits  
Language of instruction: finnish  
Timing: 4th or 5th year  
Learning outcomes: Students acquire deep knowledge on a particular geology and mineralogy topic.  
Contents: Independent literature search and construction of a report on a given theme.  
Learning activities and teaching methods: see above  
Recommended or required reading: Will be informed separately.  
Assessment methods and criteria: a report  
Grading: pass/fail  
Person responsible: professors

772666S: Master's thesis, 30 op  
Opiskelumuoto: Advanced Studies
Laji: Diploma thesis  
Vastuuysikkö: Department of Geosciences  
Arvostelu: A,B,N,C,M,EX,L  
Opintokohteen kielet: Finnish

ECTS Credits:
35 credits  
Language of instruction:  
finnish / english  
Timing:  
5th year  
Contents:  
A thesis based on individual research of literature, field work or laboratory work. Before starting the thesis, students must agree upon the details of the thesis with their professor.  
Person responsible:  
professors

772342A: Metamorphic and sedimentary petrology, 7 op

Voimassaolo: 01.08.2010 -  
Opiskelumuoto: Intermediate Studies  
Laji: Course  
Vastuuysikkö: Department of Geosciences  
Arvostelu: 1 - 5, pass, fail  
Opettajat: Pekka Tuisku  
Opintokohteen kielet: Finnish

772630S: Metamorphic petrology, 4 op

Voimassaolo: 01.08.2010 -  
Opiskelumuoto: Advanced Studies  
Laji: Course  
Vastuuysikkö: Department of Geosciences  
Arvostelu: 1 - 5, pass, fail  
Opettajat: Pekka Tuisku  
Opintokohteen kielet: Finnish

773614S: Microfossil research techiques (advanced), 4 op

Opiskelumuoto: Advanced Studies  
Laji: Course  
Vastuuysikkö: Department of Geosciences  
Arvostelu: 1 - 5, pass, fail  
Opettajat: Tiina Eskola  
Opintokohteen kielet: Finnish

ECTS Credits:
4 credits  
Language of instruction:  
finnish  
Timing:
Learning outcomes:
Upon completion of the course, student should have acquired knowledge of various microfossils.

Contents:
Use of various microfossils as indicators of ecological changes.

Learning activities and teaching methods:
10 h demonstrations, 40 h exercises

Recommended optional programme components:
Biostratigraphy: pollen course (773337A), Biostratigraphy: diatom course (773341A)

Recommended or required reading:
class handouts

Assessment methods and criteria:
examination

Grading:
pass/fail

Person responsible:
T. Eskola

772619S: Mineralogical instrumental analytics, 4 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Seppo Gehör

Opintokohteen kielet: Finnish

ECTS Credits:
4 credits

Language of instruction:
finnish

Timing:
4th or 5th year

Learning activities and teaching methods:
26 h lectures, 16 h exercises and a practice work

Recommended or required reading:
Class handouts and selected readings

Person responsible:
S. Gehör

772601S: Mineralogy - advanced course, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Pekka Tuisku

Opintokohteen kielet: Finnish

ECTS Credits:
5 credits

Language of instruction:
finnish

Timing:
4th or 5th year

Contents:
Profound survey to the mineralogy and mineralogical research. Mineral chemistry; crystal structures; stability of minerals.
Learning activities and teaching methods:
lectures

Recommended optional programme components:
Basic Mineralogy (771102P)

Recommended or required reading:

Assessment methods and criteria:
examination

Grading:
5-1/fail

Person responsible:
P. Tuisku

772608S: Mining geology, 3 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Maier, Wolfgang Derek
Opintokohteen kielet: Finnish
Leikkaavuudet:
ay772608S  Mining geology (OPEN UNI)  3.0 op

ECTS Credits:
2 credits

Language of instruction:
finnish

Timing:
4th or 5th year

Learning outcomes:
Students learn practical aspects of the work of mining geologists.

Contents:
Lectures of rock mechanical and rock technical geology and geologic mapping inside a mine.

Learning activities and teaching methods:
8 h lectures, 32 h exercises

Recommended optional programme components:
Ore geology (772385A)

Recommended or required reading:
Will be given on site.

Grading:
pass / fail

Person responsible:
E. Hanski

488111S: Modelling in Geoenvironmental Engineering, 5 op

Voimassaolo: 01.08.2005 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Process and Environmental Engineering
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:
485305S  Modelling in Geoenvironmental Engineering  5.0 op
ECTS Credits: 5.0 cr
Language of instruction: Finnish
Timing: Implementation in 5th-6th periods.

Learning outcomes: To provide the student with the use of models and computational programs used in design and sizing of geoenvironmental materials and geostructures.


Learning activities and teaching methods: Lectures, design and modelling assignments.

Recommended optional programme components: Basics in Geoenvironmental Engineering, Advanced Geoenvironmental Engineering.

Recommended or required reading: Lecture handout and other materials delivered in lectures.

Assessment methods and criteria: To solve given assignments and to write reports about them.

Person responsible: Chief engineer Kauko Kujala

Other information: Lectures are given every year.

772339A: Optical mineralogy, 6 op

Voimassaolo: 01.08.2010 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Pekka Tuisku
Opintokohteen kielet: Finnish

Compulsory

772339A-01: Optical mineralogy, lectures, 0 op

Voimassaolo: 01.08.2010 -
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Pekka Tuisku
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

772339A-02: Optical mineralogy, practices, 0 op

Voimassaolo: 01.08.2010 -
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuysikkö: Department of Geosciences
772625S: Ore geological field course, 2 op

Voimassaolo: 01.08.2009 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Maier, Wolfgang Derek
Opintokohteen kielet: English

Ei opintojaksokuvauksia.

772385A: Ore geology, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Maier, Wolfgang Derek
Opintokohteen kielet: English

ECTS Credits:
5 credits
Language of instruction:
english
Timing:
2nd or 3rd year
Learning outcomes:
Upon completion of the course, students should have basic knowledge on the classification of ore deposits and have understanding of various ore-forming processes.
Contents:
The ore-forming processes of orthomagmatic, hydrothermal and sedimentary mineral deposits, and examples of different ore types.
Learning activities and teaching methods:
30 h lectures
Recommended or required reading:
Laurence Robb 2008: Introduction to Ore-Forming Processes (Blackwell) and Ed. Chusi Li, Edward M. Ripley (Geological Publishing House, Beijing): New Developments in Magmatic Ni-Cu and PGE Deposits
Assessment methods and criteria:
examination
Grading:
1-5/fail
Person responsible:
W. Maier

770001Y: Orientation course for new students, 1 op

Opiskelumuoto: General Studies
ECTS Credits: 2 credits
Language of instruction: finnish
Timing: 1st autumn
Learning outcomes: After this course the student is familiar with the Department of Geosciences and the University and planning his/her studies.
Contents: The aim of the course is to introduce a student to the University, academic studies, the department and the studies of geology.
Learning activities and teaching methods: 18 h lectures
Assessment methods and criteria: active participation
Grading: pass/fail
Person responsible: amanuensis

773602S: Paleolimnology, 4 op

ECTS Credits: 4 credits
Language of instruction: finnish
Timing: 4th or 5th year
Learning outcomes: Upon completion of the course, student should have acquired knowledge of lake sediment sampling techniques. Student should also be able to prepare the sample in the laboratory.
Contents: Lakes as sedimentation environments. Lake sediment types. Use of lake sediments in environmental and paleoclimate research. Sampling techniques of lake sediments.
Learning activities and teaching methods: 10 h lectures, 16 h field and laboratory demonstrations
Recommended or required reading: class handouts
Assessment methods and criteria: examination
Grading: pass/fail
Person responsible: V. Peuraniemi, T. Eskola
77330A: Peat geology, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

ECTS Credits:
5 credits
Language of instruction:
finnish
Timing:
2nd or 3rd year
Learning outcomes:
After the course students know the basics of mire ecology, the fields and structure of mires, classification and properties of peats.
Contents:
Learning activities and teaching methods:
30 h lectures
Recommended or required reading:
Assessment methods and criteria:
examination
Grading:
1-5/fail
Person responsible:
K. Holappa

773317A: Physical Sedimentology, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Juha Pekka Lunkka
Opintokohteen kielet: Finnish

ECTS Credits:
5 credits
Language of instruction:
finnish
Timing:
2nd or 3rd year
Learning outcomes:
To learn the basic concepts in sedimentology.
Contents:
The aim of the lecture course is to give geological and physical background of the exogenic processes that operate in terrestrial and marine sedimentary environments. The lecture course also introduces the basic methods and concepts used in physical sedimentology. The topics discusses are related to modern and ancient sedimentary environments and processes including themes such as weathering, soils and palaeosols, mass movement mechanisms, water and ice flow dynamics, erosion and sedimentation processes and products.
Learning activities and teaching methods:
30 h lectures

**Recommended optional programme components:**
The course is a prerequisite for other courses in the field of surficial geology.

**Recommended or required reading:**

**Assessment methods and criteria:**
examination

**Grading:**
1-5/fail

**Person responsible:**
J. P. Lunkka

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**772636S: Practical course in fluid inclusion, 4 op**

**Opiskelumuoto:** Advanced Studies

**Laji:** Course

**Vastuuysikkö:** Department of Geosciences

**Arvostelu:** 1 - 5, pass, fail

**Opettajat:** Seppo Gehör

**Opintokohteen kielet:** Finnish

**ECTS Credits:**
4 credits

**Language of instruction:**
finnish

**Timing:**
4th or 5th year

**Contents:**
Introduction to the basics of fluid inclusion research. What is a fluid inclusion, where and how are they formed and how they are studied.

**Learning activities and teaching methods:**
6 h lectures, 80 h exercises

**Recommended or required reading:**

**Assessment methods and criteria:**
examination

**Person responsible:**
S. Gehör

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**772635S: Practical course in mineral chemistry, 4 op**

**Opiskelumuoto:** Advanced Studies

**Laji:** Course

**Vastuuysikkö:** Department of Geosciences

**Arvostelu:** 1 - 5, pass, fail

**Opettajat:** Kaukonen, Risto Johan

**Opintokohteen kielet:** Finnish

**ECTS Credits:**
4 credits

**Language of instruction:**
finnish

**Timing:**
4th or 5th year

**Learning outcomes:**
Students will be able to utilize the electron microanalyzer in their future thesis work or research.

**Contents:**
Analyzing of different minerals with an electron microprobe. Processing of the analyzed results with a computer and Examination of errors.

**Learning activities and teaching methods:**
4 h demonstrations and 76 h independent work

**Assessment methods and criteria:**
written work report

**Grading:**
pass /fail

**Person responsible:**
E. Hanski and R. Kaukonen

771304A: Practical training, 4 - 5 op

**Opiskelumuoto:** Intermediate Studies

**Laji:** Practical training

**Vastuuysikkö:** Department of Geosciences

**Arvostelu:** 1 - 5, pass, fail

**Opintokohteen kielet:** Finnish

**ECTS Credits:**
4 credits

**Language of instruction:**
finnish

**Timing:**
2nd or 3rd summer

**Learning outcomes:**
To get familiar with geologist's work in real life.

**Contents:**
Practical training accomplished under the direction of a qualified geologist. Before the training, students must in advance agree upon the details of the field work with their professor such as the work place, time, instructor and the supervisor.

**Target group:**
all geology students

**Assessment methods and criteria:**
a written report on the training work

**Grading:**
pass/fail

**Person responsible:**
professors

**Other information:**
compulsory to the Bachelor’s degree

772612S: Precambrian sedimentology, 4 op

**Opiskelumuoto:** Advanced Studies

**Laji:** Course

**Vastuuysikkö:** Department of Geosciences

**Arvostelu:** 1 - 5, pass, fail

**Opettajat:** Kari Strand

**Opintokohteen kielet:** Finnish

**ECTS Credits:**
4 credits

**Language of instruction:**
finnish

**Timing:**
4th or 5th year

**Learning outcomes:**
Students will get familiar with sedimentological research in metamorphosed and deformed shield areas. They will be able to apply sequence stratigraphy in stratigraphic research and make basin reconstructions in different tectonic environments.

**Contents:**
The course covers topics like the sequence stratigraphy, Precambrian evolution, origin of the atmosphere, glaciations, plate tectonics, sedimentary ore deposits in different shield areas and global correlation of Precambrian sedimentary sequences and geological events.

**Learning activities and teaching methods:**
40 h lectures

**Recommended optional programme components:**
Physical sedimentology (773317A), sedimentary petrology (772606S) and sedimentary structures (773648S)

**Recommended or required reading:**

**Assessment methods and criteria:**
examination

**Grading:**
1-5/fail

**Person responsible:**
K. Strand

773657S: Pro gradu thesis, 30 op

**Opiskelumuoto:** Advanced Studies

**Laji:** Diploma thesis

**Vastuuysikkö:** Department of Geosciences

**Arvostelu:** 1 - 5, pass, fail

**Opintokohteen kielet:** Finnish

**ECTS Credits:**
35 credits

**Language of instruction:**
finnish

**Timing:**
5th year

**Contents:**
A thesis based on individual research of literature, field work or laboratory work. Before starting the thesis, students must agree upon the details of the thesis with their professor.

**Person responsible:**
professors

773343A: Quaternary Geology Seminar I, 5 op

**Opiskelumuoto:** Intermediate Studies

**Laji:** Course

**Vastuuysikkö:** Department of Geosciences

**Arvostelu:** 1 - 5, pass, fail

**Opettajat:** Juha Pekka Lunkka

**Opintokohteen kielet:** Finnish

**ECTS Credits:**
5 credits

**Language of instruction:**
finnish

**Timing:**
2nd or 3rd year

**Learning outcomes:**
The objective is to enhance students' ability to construct and give a scientific presentation on a subject of their field.

**Contents:**
Students prepare and give an oral presentation (about 30 minutes) on a subject that has required independent work and judgement. Each participant acts once as an opponent. Active class participation required.

**Assessment methods and criteria:**
oral presentation and acting as an opponent

**Grading:**
pass/fail

**Person responsible:**
J. P. Lunkka

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773306A: Quaternary Geology of Finland, 5 op

**Opiskelumuoto:** Intermediate Studies  
**Laji:** Course  
**Vastuuysikkö:** Department of Geosciences  
**Arvostelu:** 1 - 5, pass, fail  
**Opettajat:** Peuraniemi, Vesa Juhani  
**Opintokohteen kielet:** Finnish

**ECTS Credits:**  
5 credits

**Language of instruction:**  
finnish

**Timing:**  
2nd or 3rd year

**Learning outcomes:**  
Upon completion of the course, student should have acquired knowledge of the Finnish glacial landforms and deglaciation in Finland.

**Contents:**  
The pre-Quaternary landform of Finland; thermomers and cryomers during Pleistocene period; Finnish glacial landforms and their regional division; occurrence of landforms and their combinations as seen in aerial photos; deglaciation; the highest shoreline and its meaning; water-laid deposits; eolian deposits; land uplift; evolutionary phases of lakes; evolution of organic environment.

**Learning activities and teaching methods:**  
30 h lectures

**Recommended optional programme components:**  
Exogenic processes (771109P)

**Recommended or required reading:**  
Koivisto M. 2004: Jääkaudet. WSOY, Helsinki, 233s.

**Assessment methods and criteria:**  
examination

**Grading:**  
1-5/fail

**Person responsible:**  
V. Peuraniemi

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773300A: Quaternary Stratigraphy, 5 op

**Opiskelumuoto:** Intermediate Studies  
**Laji:** Course  
**Vastuuysikkö:** Department of Geosciences  
**Arvostelu:** 1 - 5, pass, fail  
**Opettajat:** Juha Pekka Lunkka  
**Opintokohteen kielet:** Finnish

**ECTS Credits:**
5 credits

Language of instruction: finnish

Timing: 2nd or 3rd year

Learning outcomes:
To learn basic concepts of stratigraphy, and Earth's Quaternary history. Students will also be acquainted with research methods applied in Quaternary Geology.

Contents:
The last period of the history of Earth is called the Quaternary. The course focuses on Quaternary history and stratigraphy of the Earth. The course consists of the following topics: basic concepts of stratigraphy including litho-, bio-, and chronostratigraphy, geochronology and other types of stratigraphical practices; stratigraphical methods; absolute and relative dating methods; marine and terrestrial sediments as stratigraphical archives; classical and modern stratigraphical models; climate change.

Learning activities and teaching methods:
30 h lectures

Recommended or required reading:

Assessment methods and criteria:
examination

Grading: 1-5/fail

Person responsible:
J. P. Lunkka

773619S: Quaternary geology seminar II, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuysikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Juha Pekka Lunkka

Opintokohteen kielet: Finnish

- ECTS Credits: 5 credits
- Language of instruction: finnish
- Timing: 4th or 5th year
- Learning outcomes: The objective is to enhance students' ability to construct and give a scientific presentation on a subject of their field.
- Contents: Students prepare and give an oral presentation (about 30 minutes) on a subject that has required independent work and judgement. Each participant acts once as an opponent. Active class participation required.
- Assessment methods and criteria: oral presentation and acting as an opponent
- Grading: pass/fail
- Person responsible: J. P. Lunkka or V. Peuraniemi

772632S: Regional ore geology, 5 op

Voimassaolo: 01.08.2010 -
Opiskelumuoto: Advanced Studies
Laji: Course  
Vastuuyksikkö: Department of Geosciences  
Arvostelu: 1 - 5, pass, fail  
Opettajat: Pekka Tuisku  
Opintokohteen kielet: English

Ei opintojaksokuvauksia.

773648S: Sedimentary Structures, 5 op

Opiskelumuoto: Advanced Studies  
Laji: Course  
Vastuuyksikkö: Department of Geosciences  
Arvostelu: 1 - 5, pass, fail  
Opettajat: Juha Pekka Lunkka  
Opintokohteen kielet: English

ECTS Credits:  
5 credits  
Language of instruction:  
finnish  
Timing:  
4th or 5th year  
Learning outcomes:  
After completion students are able to identify various sedimentary structures and facies associations and use them for palaeoenvironmental reconstructions.  
Contents:  
The most general sedimentary structures and their occurrence; exercises to identify different structures.  
Learning activities and teaching methods:  
26 h lectures, 29 h exercises  
Recommended or required reading:  
topical publications  
Assessment methods and criteria:  
examination  
Grading:  
1-5/fail  
Person responsible:  
J. P. Lunkka

772606S: Sedimentary petrology, 4 op

Opiskelumuoto: Advanced Studies  
Laji: Course  
Vastuuyksikkö: Department of Geosciences  
Arvostelu: 1 - 5, pass, fail  
Opettajat: Kari Strand  
Opintokohteen kielet: Finnish

ECTS Credits:  
4 credits  
Language of instruction:  
finnish  
Timing:  
4th or 5th year  
Learning outcomes:
After successful completion of the course students have gained and deep understanding of depositional processes and environments and interpretation of ancient sedimentary rocks.

**Contents:**
Properties, classification and occurrence of sedimentary rocks and the processes that form them.

**Learning activities and teaching methods:**
24 h lectures

**Recommended or required reading:**

**Assessment methods and criteria:**
examination

**Grading:**
1-5/fail

**Person responsible:**
N. N.

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**773647S: Sedimentology, 6 op**

**Opiskelumuoto:** Advanced Studies

**Laji:** Course

**Vastuuysikkö:** Department of Geosciences

**Arvostelu:** 1 - 5, pass, fail

**Opettajat:** Juha Pekka Lunkka

**Opintokohteen kielet:** Finnish

**ECTS Credits:**
6 credits

**Language of instruction:**
finnish

**Timing:**
4th or 5th year

**Learning outcomes:**
To provide a complete picture on sedimentological processes and products.

**Contents:**
sedimentary environments, processes and products

**Learning activities and teaching methods:**
30 h lectures

**Recommended or required reading:**

**Assessment methods and criteria:**
examination

**Grading:**
1-5/fail

**Person responsible:**
J. P. Lunkka

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**774316A: Seminar in environmental geochemistry, 5 op**

**Opiskelumuoto:** Intermediate Studies

**Laji:** Course

**Vastuuysikkö:** Department of Geosciences

**Arvostelu:** 1 - 5, pass, fail

**Opettajat:** Eero Hanski

**Opintokohteen kielet:** Finnish

**ECTS Credits:**
5 credits
Language of instruction:
finnish
Timing:
2nd or 3rd year
Learning outcomes:
After the course, students will understand more about the behavior of certain harmful compounds in the environment.
Contents:
Abundances and behaviour of environmentally important elements, such as heavy metals, and their compounds in geomaterials.
Learning activities and teaching methods:
Students prepare and give an oral presentation (about 30 minutes) on a subject that has required independent work and judgement. Each participant acts once as an opponent.
Recommended optional programme components:
Basic course in geochemistry (774301A) and Introduction to environmental geochemistry (774329A)
Recommended or required reading:
Will be informed upon starting the course.
Person responsible:
E. Hanski

772624S: Seminar in geology and mineralogy 2, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

ECTS Credits:
5 credits
Language of instruction:
finnish
Timing:
4th or 5th year
Learning outcomes:
The objective is to enhance students' ability to construct and give a scientific presentation on a subject of their field.
Contents:
Students prepare and give an oral presentation (about 30 minutes) on a subject that has required independent work and judgement. Each participant acts once as an opponent.
Learning activities and teaching methods:
see above
Recommended or required reading:
Will be informed upon starting the course.
Assessment methods and criteria:
oral presentation and acting as an opponent
Grading:
1-5/fail
Person responsible:
professors

772337A: Seminar in geology and mineralogy I, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Eero Hanski
Opintokohteen kielet: Finnish

ECTS Credits: 5 credits
Language of instruction: finnish
Timing: 2nd or 3rd year
Learning outcomes: The objective is to enhance students' ability to construct and give a scientific presentation on a subject of their field.
Contents: Students prepare and give an oral presentation (about 30 minutes) on a subject that has required independent work and judgement. Each participant acts once as an opponent.
Learning activities and teaching methods: see above
Recommended or required reading: Will be informed upon starting the course.
Assessment methods and criteria: oral presentation and acting as an opponent
Grading: 1-5/fail
Person responsible: E. Hanski

772667S: Seminar in ore geology, 5 op

Voimassaolo: 01.08.2010 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

772658S: Special issues in geology and mineralogy, 1 - 9 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Eero Hanski
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

773608S: Special questions in Quaternary geology, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
ECTS Credits:
1-9 credits
Language of instruction:
finnish
Timing:
4th or 5th year
Learning outcomes:
The objective of the course is to provide the student's with knowledge on the current developments in a special topic in geology and mineralogy.
Contents:
A course on a current topic given by a staff member or outside lecturer.
Learning activities and teaching methods:
30 h lectures
Recommended or required reading:
Will be informed separately.
Assessment methods and criteria:
examination
Grading:
1-5/fail
Person responsible:
N. N.

772316A: Structural geology, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

ECTS Credits:
5 credits
Language of instruction:
finnish
Timing:
2nd or 3rd year
Learning outcomes:
This course familiarizes the students with the basic reasons for deformation: stress theory and strain theory.
Contents:
The origin and characteristic features of deformation structures like folds, faults, foliations, lineations, fractures and polyphase deformation are handled in detail.
Learning activities and teaching methods:
24 h lectures
Recommended or required reading:
Assessment methods and criteria:
examination
Grading:
1-5/fail
Person responsible:
A. Kärki

772609S: Structural geology workshop, 6 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Department of Geosciences
ECTS Credits:
6 credits

Language of instruction:
finnish / english

Timing:
4th or 5th year

Contents:
Geometric analysis and identification of different structural elements in the field. Structural synthesis and modelling the regional structure of bedrock that is based on information collected from field observations and geophysical data maps. Maps of structural geology, profiles, sector diagrams and projections. Statistical methods and GIS-applications in the data processing.

Learning activities and teaching methods:
16 h lectures, 32 h modelling demonstrations and 40 h exercises, a written report

Recommended optional programme components:
Structural geology (772316A), Digital modeling and geological information systems in geosciences (771302A)

Recommended or required reading:

Assessment methods and criteria:
examination

Grading:
1-5/fail

Person responsible:
A. Kärki

773615S: Studia Generalia -lectures, 2 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail

Opettajat: Seija Roman
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

773679S: Studies in other universities, 0 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail

Opettajat: Peuraniemi, Vesa Juhani
Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

Contents:
Courses taken in international exchange programs (Erasmus, Nordplus) or courses taken in other Finnish universities.

Person responsible:
V. Peuraniemi
772690S: Studies in other universities and colleges, 0 op

Opiskelumuoto: Advanced Studies  
Laji: Course  
Vastuuysikkö: Department of Geosciences  
Arvostelu: 1 - 5, pass, fail  
Opintokohteen kielet: Finnish  
Voidaan suorittaa useasti: Kyllä

Contents:
Courses taken in international exchange programs (Erasmus, Nordplus) or courses taken in other Finnish universities.

Person responsible:
teachers

773645S: Study circle of glacial geology and ore exploration, 5 - 15 op

Voimassaolo: - 31.07.2007  
Opiskelumuoto: Advanced Studies  
Laji: Course  
Vastuuysikkö: Department of Geosciences  
Arvostelu: 1 - 5, pass, fail  
Opettajat: Peuraniemi, Vesa Juhani  
Opintokohteen kielet: Finnish

ECTS Credits:  
5-15 credits  
Language of instruction:  
finnish  
Timing:  
4th or 5th year  
Learning outcomes:  
Upon completion of the course, student has a good knowledge on the use of different surficial deposits in ore exploration.

Contents:
Glacial processes, glacigenic sediments and landforms and ore exploration studied in group work. Group work in field and laboratory, seminars and lectures on current issues. Contents, extent and used material changes every year.

Learning activities and teaching methods:  
lectures, field- and laboratory works  
Recommended optional programme components:  
Surficial geology in ore exploration (773322A)  
Recommended or required reading:  

Assessment methods and criteria:  
examination  
Grading:  
1-5/fail  
Person responsible:  
V. Peuraniemi

773322A: Surficial geology in ore exploration, 5 op

Opiskelumuoto: Intermediate Studies
ECTS Credits: 5 credits
Language of instruction: finnish
Timing: 2nd or 3rd year
Learning outcomes: Upon completion of the course, student should have a basic knowledge of the dispersal of ore boulders, tracing them and of the use of till geochemistry in ore exploration.
Contents: This course provides practical skills for performing surficial geological ore prospecting in glaciated areas. Boulder prospecting; glacigenic and geochemical dispersion in different landforms; different modes of occurrence of element. Methods: digging, boring, grain analyses, separations and applications.
Learning activities and teaching methods: 30 h lectures
Recommended optional programme components: Exogenic processes (771109P), Surficial geology in Finland (773306A), Basics of glacial geology (773303A)
Recommended or required reading: Kujansuu, R. ja Saarnisto, M. (eds.): Glacial Indicator Tracing, A.A. Balkema, 1990, 252 p
Assessment methods and criteria: examination
Grading: 1-5/fail
Person responsible: V. Peuraniemi

773641S: Surficial geology in ore exploration, advanced course 1, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Peuraniemi, Vesa Juhani
Opintokohteen kielet: Finnish

ECTS Credits: 5 credits
Language of instruction: finnish
Timing: 4th or 5th year
Learning outcomes: Upon completion of the course, student has the knowledge of the mode of occurrence of elements in surficial deposits and of their research methods and of the use heavy minerals in ore exploration.
Contents: Mode of occurrence of elements in surficial deposits; research methods of occurrence of elements; using partial extraction methods; separating different fractions from a sample; heavy mineral prospecting; mineral determinations and analysis; defining mechanisms of dispersion.
Learning activities and teaching methods: 30 h lectures
Recommended optional programme components: Surficial geology in ore exploration (773322A)
Recommended or required reading:
773642S: Surficial geology in ore exploration, advanced course 2, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Peuraniemi, Vesa Juhani
Opintokohteen kielet: Finnish

ECTS Credits: 5 credits
Language of instruction: finnish
Timing: 4th or 5th year
Learning outcomes: Upon completion of the course student has a knowledge on the use of organic sediments, waters, snow and air in ore exploration.
Contents: Dispersion in organic material, waters, snow and in air and there use in ore exploration.
Learning activities and teaching methods: 30 h lectures
Recommended optional programme components: Advanced course of surficial geology in ore exploration I (773641S)
Recommended or required reading: Selected articles
Assessment methods and criteria: examination
Grading: 1-5/fail
Person responsible: V. Peuraniemi

773316A: Technical Properties of Sediments, 8 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Tiina Eskola
Opintokohteen kielet: Finnish

ECTS Credits: 8 credits
Language of instruction: finnish
Timing: 2nd or 3rd year
Learning outcomes:
Upon completion of the course, student should have acquired knowledge of specify the physical and geotechnical qualities of sediments.

Contents:
Introduction to different boring methods; taking samples of fine-grained sediments. Laboratory work: defining consistency and structure of different sediments; defining different mechanical and thermal properties of sediments.

Learning activities and teaching methods:
45 h demonstrations, 135 h practical exercises, written report

Recommended optional programme components:
Exogenic processes (771109P), Field course in surficial geology (773302A), Surficial geology of Finland (773306A)

Recommended or required reading:

Assessment methods and criteria:
written reports and an examination

Grading:
1-5/fail

Person responsible:
T. Eskola and K. Holappa

772333A: Technical mineralogy, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Seppo Gehör
Opintokohteen kielet: Finnish

ECTS Credits:
5 credits
Language of instruction:
finnish
Timing:
2nd or 3rd year

Contents:
Occurrence and properties of non-metallic recourses; mineralogy of technical mass-productions (ceramics, glass, cement, calc, zeolite, bentonite), mineralogy of progressive ceramic products; Properties and technical use of clayminerals and their sorption, modification and use in environmental technical applications. Reactive materials and their use in environmental technical applications.

Learning activities and teaching methods:
26 h lectures and 10 h exercises lectures

Assessment methods and criteria:
examination

Grading:
1-5/fail

Person responsible:
S. Gehör and K. Kujala

773643S: Technical properties of sediments - advanced course, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Tiina Eskola
Opintokohteen kielet: Finnish

ECTS Credits:
5 credits

Language of instruction:
finnish

Timing:
4th or 5th year

Learning outcomes:
Upon completion of the course, student should have acquired knowledge of mechanical and physical properties of sediments.

Contents:
Advanced course on the mechanical and physical properties of sediments, studied by geotechnical methods.

Learning activities and teaching methods:
30 h demonstrations, 60 h exercises

Recommended optional programme components:
Technical properties of sediments 773316A, Technical use of rocks and minerals 772357A

Recommended or required reading:

Assessment methods and criteria:
written reports and an examination

Grading:
1-5/fail

Person responsible:
K. Holappa, T. Eskola

772357A: Technical use of rocks and minerals, 4 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Kärki, Aulis Juhani
Opintokohteen kielet: Finnish

ECTS Credits:
4 credits

Language of instruction:
finnish

Timing:
2nd or 3rd year

Contents:
Usage of rock varieties and minerals in industry and in construction. Required qualifications for using rock varieties and minerals. Occurrences of Finnish building rocks, industrial rocks and industrial minerals; exploration of these occurrences and research methods; required qualifications of road surface materials.

Learning activities and teaching methods:
20 h lectures and a literature work

Assessment methods and criteria:
examination

Grading:
1-5/fail

Person responsible:
A. Kärki

772620S: Tectonics, 5 op

Opiskelumuoto: Advanced Studies
ECTS Credits: 5 credits

Language of instruction: finnish

Timing: 4th or 5th year

Contents: The structure of Earth's crust. The tectonic features of Archaean, Proterozoic and Phanerozoic periods. Detailed presentation of the tectonic-magmatic activation and development of shield areas and plate tectonics in different geotectonic environments.

Learning activities and teaching methods: 24 h lectures


Assessment methods and criteria: examination

Grading: 1-5/fail

Person responsible: A. Kärki

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ECTS Credits: 2 credits

Language of instruction: finnish

Timing: 1st autumn

Contents: origin of elements, solar system, history of evolution, structure and composition of the Earth

Learning activities and teaching methods: 12 h lectures

Assessment methods and criteria: examination

Grading: 1-5/fail

Person responsible: S. Gehör
**773603S: Utilization of peat, 4 op**

Voimassaolo: - 31.07.2010  
Opiskelumuoto: Advanced Studies  
Laji: Course  
Vastuuysikkö: Department of Geosciences  
Arvostelu: 1 - 5, pass, fail  
Opettajat: Holappa, Kauko Einari  
Opintokohteen kielet: Finnish

**773345A: Work practice 2, 4 - 5 op**

Opiskelumuoto: Intermediate Studies  
Laji: Practical training  
Vastuuysikkö: Department of Geosciences  
Arvostelu: 1 - 5, pass, fail  
Opettajat: Holappa, Kauko Einari  
Opintokohteen kielet: Finnish

**ECTS Credits:**
4 credits  
**Language of instruction:**
finnish  
**Timing:**
2nd or 3rd year  
**Learning outcomes:**
To get familiar with geologists's field work in practice.  
**Contents:**
Practical training accomplished under the direction of a qualified geologist. Before the training, students must in advance agree upon the details of the field work with their professor such as the work place, time, instructor and the supervisor.  
**Learning activities and teaching methods:**
practical work over a period of three months  
**Assessment methods and criteria:**
a written report on the work  
**Grading:**
pass/fail  
**Person responsible:**
professor

**772338A: Work practice II, 4 - 5 op**

Opiskelumuoto: Intermediate Studies  
Laji: Practical training  
Vastuuysikkö: Department of Geosciences  
Arvostelu: 1 - 5, pass, fail  
Opettajat: Eero Hanski  
Opintokohteen kielet: Finnish

**ECTS Credits:**
4 credits  
**Language of instruction:**
finnish  
**Timing:**
2nd or 3rd year  
**Learning outcomes:**
Contents:
Practical training accomplished under the direction of a qualified geologist. Before the training, students must in advance agree upon the details of the field work with their professor such as the work place, time, instructor and the supervisor.

Learning activities and teaching methods:
practical work over a period of three months

Assessment methods and criteria:
a written report on the work

Grading:
pass/fail

Person responsible:
professor

772614S: Workshop in bedrock mapping, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuysikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Kärki, Aulis Juhani

Opintokohteen kielet: Finnish

ECTS Credits:
5 credits

Language of instruction:
finnish

Timing:
4th or 5th year

Learning activities and teaching methods:
12 h lectures, a field course with 48 h of demonstrations, 20 h independent exercises and a written

Assessment methods and criteria:
Active participation, a written work report.

Grading:
pass /fail

Person responsible:
professors