Opasraportti

LuTK - Geosciences 2011-12 (2011 - 2012)

Tutkintorakenteisiin kuulumattomat opintokokonaisuudet ja -jakset

774301A: A Basic Course in Geochemistry, 6 op
30002M: Advanced Information Skills, 1 op
773645S: Advanced field techniques, 3 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
771302A: Digital modelling and geological information systems in geosciences, 5 op
771111P: Endogenic Processes, 6 op

Compulsory
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771111P-02: Endogenic processes, Rock identification, 0 op
773314A: Environmental Geology, 3 op
773673S: Environmental geology and geophysics field 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
771112P: Exogenic Processes, 4 op

Compulsory
771112P-01: Exogenic Processes, lectures, 0 op
771112P-02: Exogenic Processes, practices, 0 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
772628S: Geology of basic layered intrusions, 5 op
772621S: Geology of alkaline rocks, carbonatites and kimberlites, 5 op
488115S: Geomechanics, 5 op
773601S: Glacial Geology II, 5 op
773621S: Global environmental and climate change during the Cenozoic, 4 op
488108S: Groundwater Engineering, 5 op
773331A: Hydrogeology, 5 op
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<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
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<tr>
<td>488102A</td>
<td>Hydrological Processes</td>
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<tr>
<td>772341A</td>
<td>Igneous Petrology</td>
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<td>030005P</td>
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<tr>
<td>774329A</td>
<td>Introduction to Environmental Geochemistry</td>
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<td>771108P</td>
<td>Introduction to Ore Geology</td>
<td>2 op</td>
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<td>Introduction to bedrock geology of Finland</td>
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<td>Introduction to historical geology and surficial geology of Finland</td>
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<td>772353A</td>
<td>Introduction to ore mineralogy</td>
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<td>750616S</td>
<td>Legislation in environmental protection</td>
<td>5 op</td>
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<td>773613S</td>
<td>Literature essay</td>
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<td>Master's thesis</td>
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<td>Metamorphic Petrology</td>
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<td>Metamorphic petrology, lectures</td>
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<td>772619S</td>
<td>Mineralogical instrumental analytics</td>
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<td>772601S</td>
<td>Mineralogy - advanced course</td>
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<td>772608S</td>
<td>Mining geology</td>
<td>3 op</td>
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<td>Modelling in Geoenvironmental Engineering</td>
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<td>772339A</td>
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<td>772385A</td>
<td>Ore geology</td>
<td>5 op</td>
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<td>770001Y</td>
<td>Orientation course for new students</td>
<td>1 op</td>
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<td>773317A</td>
<td>Physical Sedimentology</td>
<td>5 op</td>
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<td>Practical course in fluid inclusion</td>
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<td>Practical course in mineral chemistry</td>
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<td>771304A</td>
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<td>773657S</td>
<td>Pro gradu thesis</td>
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<td>773343A</td>
<td>Quaternary Geology Seminar I</td>
<td>5 op</td>
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<td>773306A</td>
<td>Quaternary Geology of Finland</td>
<td>5 op</td>
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<td>773300A</td>
<td>Quaternary Stratigraphy</td>
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<td>Quaternary geology seminar II</td>
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<td>772632S</td>
<td>Regional ore geology</td>
<td>5 op</td>
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<td>Sedimentary Structures</td>
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<td>773647S</td>
<td>Sedimentology</td>
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<td>772624S</td>
<td>Seminar in geology and mineralogy</td>
<td>5 op</td>
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<td>772337A</td>
<td>Seminar in geology and mineralogy I</td>
<td>5 op</td>
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<td>772667S</td>
<td>Seminar in ore geology</td>
<td>5 op</td>
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<td>772658S</td>
<td>Special issues in geology and mineralogy</td>
<td>1 - 9 op</td>
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<td>773608S</td>
<td>Special questions in Quaternary geology</td>
<td>5 op</td>
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<td>772316A</td>
<td>Structural geology</td>
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<td>772609S</td>
<td>Structural geology workshop</td>
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<td>773615S</td>
<td>Studia Generalia -lectures</td>
<td>2 op</td>
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<td>773679S</td>
<td>Studies in other universities</td>
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<td>772690S</td>
<td>Studies in other universities and colleges</td>
<td>0 op</td>
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<td>773322A</td>
<td>Surficial geology in ore exploration</td>
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<td>Surficial geology in ore exploration, advanced course</td>
<td>1, 5 op</td>
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<td>Surficial geology in ore exploration, advanced course</td>
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<td>Technical Properties of Sediments</td>
<td>8 op</td>
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<td>Technical mineralogy</td>
<td>5 op</td>
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<td>772357A</td>
<td>Technical use of rocks and minerals</td>
<td>4 op</td>
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<td>772620S</td>
<td>Tectonics</td>
<td>5 op</td>
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<tr>
<td>771100P</td>
<td>The Earth in Universe</td>
<td>2 op</td>
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<td>773345A</td>
<td>Work practice</td>
<td>2 - 4 op</td>
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<tr>
<td>772614S</td>
<td>Workshop in bedrock mapping</td>
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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

300002M: Advanced Information Skills, 1 op

Voimassaolo: 01.08.2009 -
Opiskelumuoto: Other Studies
Laji: Course
Vastuuysikkö: Faculty of Science
Arvostelu: 1 - 5, pass, fail
Opettajat: Sassali, Jani Henrik
Opintokohteen kielet: Finnish
**ECTS Credits:**
1 ECTS credit

**Language of instruction:**
Finnish

**Timing:**
Recommend to degree students who are working on their diploma/master’s thesis. The course unit is held once in the autumn and once in the spring semester.

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

**Contents:**
Scientific information retrieval, evaluation of search results and information sources, information search on subject areas of diploma/master’s thesis.

**Mode of delivery:**
Blended teaching: lectures, web-based learning material and exercises in Optima environment, personal guidance

**Learning activities and teaching methods:**
Lectures 6h, self-study 20h, personal guidance 1h

**Recommended or required reading:**
Parts from the following chapters of the Toolbox of Research: [https://wiki.oulu.fi/display/tor/1.1+Finding+scientific+information](https://wiki.oulu.fi/display/tor/1.1+Finding+scientific+information) [https://wiki.oulu.fi/display/tor/1.3.1+Evaluation+based+on+academic+publishing](https://wiki.oulu.fi/display/tor/1.3.1+Evaluation+based+on+academic+publishing)

**Assessment methods and criteria:**
Passing the course requires participation in the lectures (6h) and personal guidance and successful completion of the course assignments.

**Grading:**
pass/fail

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

**Other information:**

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**773646S: Advanced field techniques, 3 op**

**Opiskelumuoto:** Advanced Studies

**Laji:** Course

**Vastuuyksikkö:** Department of Geosciences

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

**Opettajat:** Juha Pekka Lunkka

**Opintokohteen kielet:** Finnish

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**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
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: exercises and an examination
Grading: 1-5/fail
Person responsible: V. Peuraniemi

774304A: Analytical methods in geochemistry, 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: 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:
772631S: Archean Geology, 5 op

Voimassaolo: 01.08.2010 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: 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
Vastuuysikkö: 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
**Recommended or required reading:**
**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
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:**  
Forsström. L. Piikouriset levät  
**Assessment methods and criteria:**  
Written report and an Examination on identifying the species of diatoms.  
**Grading:**  
pass/fail  
**Person responsible:**  
T. Eskola

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

**Opiskelumuoto:** Intermediate 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:**
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

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771111P: Endogenic Processes, 6 op

**Voimassaolo:** 01.08.2011 -

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

Ei opintojaksokuvauksia.

Compulsory

771111P-01: Endogenic processes, Lectures, 0 op

Voimassaolo: 01.08.2011 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Seppo Gehör
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

771111P-02: Endogenic processes, Rock identification, 0 op

Voimassaolo: 01.08.2011 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Hanna Junttila
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

773314A: Environmental Geology, 3 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: 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 geophysicfield 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

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**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

**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

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**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
771112P: Exogenic Processes, 4 op

Voimassaolo: 01.08.2011 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Peuraniemi, Vesa Juhani
Opintokohteen kielet: Finnish
Leikkaavuudet:
   ay771112P  Exogenic Processes (OPEN UNI)  4.0 op

Ei opintojaksokuvauksia.

Compulsory

771112P-01: Exogenic Processes, lectures, 0 op

Voimassaolo: 01.08.2011 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Peuraniemi, Vesa Juhani
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

Electives

771112P-02: Exogenic Processes, practices, 0 op

Voimassaolo: 01.08.2011 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Tiina Eskola
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

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
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
Person responsible:
V. Peuraniemi
Other information:
The course consists of two parts (772301A and 773302A), which are compulsory for all geology students.

773324A: Field mapping of Quaternary deposits, 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 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
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
Vastuuyksikkö: 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:
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)
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

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**772628S: Geology of basic layered intrusions, 5 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

**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

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

Opiskelumuoto: Advanced Studies

Laji: Course
Vastuuyksikkö: 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

488115S: Geomechanics, 5 op
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: 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:
The aim of the course is to provide the students an overview of mechanical behaviour of soil and rock materials in civil engineering applications.
Learning outcomes: Have a clear understanding of mechanical behaviour of soil structures in loading and environmental conditions. Understand design and dimensioning principles and can explain environmental aspects of soil behaviour.
Contents:
Origins and composition of soils, classification of soils, stresses and strains in soils, mechanical properties of soils, stability of slopes, bearing capacity of foundation, seepage analyses, freezing and thawing of soils, site investigations and in situ testing.
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.

### 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 paleoic-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

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488108S: Groundwater Engineering, 5 op

**Voimassaolo:** - 31.07.2017

**Opiskelumuoto:** Advanced Studies

**Laji:** Course

**Vastuuyksikkö:** Department of Process and Environmental Engineering

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

**Opettajat:** Pekka Rossi, 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. Student is able to estimate key factors influencing on discharge and water quality of groundwater and to use general methods to calculate groundwater flow. The student is able to plan and manage, and protect groundwater resources in a sustainable way.

**Contents:**
Soil and ground water, water balance, hydraulic properties of soils, formation of ground water systems, 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.

**Person responsible:**
Professor Björn Klöve
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

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

Contents:

488102A: Hydrological Processes (OPEN UNI) 5.0 op
480207A Hydraulics and Hydrology 5.0 op

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

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, calculus sessions and an assignment.

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

**Recommended or required reading:**

**Assessment methods and criteria:**
Examination (1-5), the assignment (pass/fail).

**Person responsible:**
Professor Björn Klöve

**Other information:**
English version (self-study package) from the course is available.

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

Voimassaolo: 01.01.2009 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: 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
Vastuuysikkö: 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:**
2nd or 3rd year.

**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:**

**Other information:**

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**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:**
1-5/fail

**Person responsible:**
E. Hanski

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

**Opiskelumuoto:** Basic Studies

**Laji:** Course
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.


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


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

Person responsible: E. Hanski
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
Arvostelu: 1 - 5, pass, fail
Opettajat: Seppo Gehör
Opintokohteen kielet: English
Voidaan suorittaa useasti: Kyllä

ECTS Credits:
5 credits
Language of instruction:
english
Timing:
2nd or 3rd year
Learning outcomes:
Students will obtain basic knowledge on ore minerals and their mode of occurrence and learn to recognize the most common ore minerals under the ore-microscope.
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

**Target group:**
students specializing in geology and mineralogy

**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

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**750616S: Legislation in environmental protection, 5 op**

**Opiskelumuoto:** Advanced Studies

**Laji:** Course

**Vastuuysikkö:** Department of Biology

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

**Opettajat:** Jari-Heikki Oksanen

**Opintokohde opimateriaali:**
Hollo, Erkki J., , 2001

**Opintokohde kielo:** 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:**
The availability of the literature can be checked from [this link](#).

**Assessment methods and criteria:**
Final exam.

**Grading:**
1-5 / Fail.

**Person responsible:**
Prof. Satu Huttunen.
Other information:
The course will take place if sufficient resources are available. Also the environmental legislation course that Faculty of technology arranges is accepted.

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
Opettajat: Peuraniemi, Vesa Juhani
Opintokohteen kielet: Finnish

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
Vastuuysikkö: 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: 1 - 5, pass, fail
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

772345A: Metamorphic Petrology, 6 op
Voimassaolo: 01.08.2011 - 31.07.2015
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Pekka Tuisku
Opintokohteen kielet: Finnish

Compulsory

772345A-01: Metamorphic petrology, lectures, 0 op
Voimassaolo: 01.08.2011 - 31.07.2015
Opiskelumuoto: Intermediate Studies
772345A-02: Metamorphic petrology, exercises, 0 op

Voimassaolo: 01.08.2011 - 31.07.2015
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Pekka Tuisku
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

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:
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)


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
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 dimensioning of geoenvironmental materials and geostuctures.
Learning outcomes: After the course the student can apply the numerical calculation methods in design and dimensioning of earth and geoenvironmental structures. The student can evaluate the influence of boundary conditions and material parameters in calculation results.
Contents:
Contaminant transport. Design and dimensioning of waste containment systems, liner systems for landfills and surface impoundment, tailings and dams. Freezing and thawing of earth structures.
Learning activities and teaching methods:
Lectures, design and modelling assignments.
Recommended optional programme components:
Geomechanics
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

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
Arvostelu: 1 - 5, pass, fail
Opettajat: Pekka Tuisku
Opintokohteen kielet: Finnish

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

773317A: Physical Sedimentology, 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 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 palaeosoils, 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

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

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
Practical training

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

773657S: Pro gradu thesis, 30 op

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
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

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

773300A: Quaternary Stratigraphy, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
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
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:
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:
772632S: Regional ore geology, 5 op

Voimassaolo: 01.08.2010 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: J. P. Lunkka or V. Peuraniemi
Opintokohteen kielet: English

Ei opintojaksokuvauksia.

772344A: Sedimentary Petrology, 5 op

Voimassaolo: 01.08.2011 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Pekka Tuisku
Opintokohteen kielet: Finnish

Compulsory

772344A-01: Sedimentary Petrology, lectures, 0 op

Voimassaolo: 01.08.2011 -
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Pekka Tuisku
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

772344A-02: Sedimentary Petrology, practices, 0 op

Voimassaolo: 01.08.2011 -
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuysikkö: Department of Geosciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Pekka Tuisku
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

773648S: Sedimentary Structures, 5 op
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

773647S: Sedimentology, 6 op

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
Assessment methods and criteria: examination
Grading: 1-5/fail
Person responsible: J. P. Lunkka
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
772667S: Seminar in ore geology, 5 op

Grading:
1-5/fail
Person responsible:
E. Hanski

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

773608S: Special questions in Quaternary geology, 5 op

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:
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
Arvostelu: 1 - 5, pass, fail
Opettajat: Kärki, Aulis Juhani
Opintokohteen kielet: Finnish

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:
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
**773322A: Surficial geology in ore exploration, 5 op**

**Opiskelumuoto:** Intermediate Studies  
**Laji:** Course  
**Vastuuyksikkö:** 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 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:**  
**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  
**Vastuuyksikkö:** 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 (773222A)

Recommended or required reading:

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

Person responsible:
V. Peuraniemi

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

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
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
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
Recommended optional programme components:
basics studies of geosciences
Recommended or required reading:
Assessment methods and criteria:
examination
Grading:
1-5/fail
Person responsible:
A. Kärki

771100P: The Earth in Universe, 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 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

773345A: Work practice 2, 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 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

772614S: Workshop in bedrock mapping, 5 op
Opiskelumuoto: Advanced Studies
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