

Opasraportti

Faculty of Science - Geosciences 09-10 (2009 - 2010)

THE DEGREE PROGRAMME IN GEOSCIENCES

GENERAL DESCRIPTION

Bachelor of Science degree

Students can choose either geology and mineralogy or surficial geology as their major subject. Regardless of their major subject, they can also specialize in geoenvironment by choosing relevant courses from a joint programme with the Technical faculty. Geochemistry is available for all students as a minor subject.

Master of Science degree

The Degree Programme in Geosciences offers the possibility of majoring in geology and mineralogy or surficial geology

Two lines of specialisation are available:

- 1) Geoenvironment (majors in geology and mineralogy or surficial geology)
- 2) Exploration and mining (major in geology and mineralogy)

Geochemistry is available as a minor subject.

Geology and mineralogy is the study of the solid Earth, the materials of which it is made, including minerals, rocks and geological formations, and the processes acting upon them. Using field studies and geochronological tools, geologists determine and date the time sequence of events in the Earth's history, from the beginning to the present time. Important applications are geological mapping, exploration and exploitation of natural resources in bedrock and environmental questions. Mineralogy concentrates on the generation, structure, composition, occurrence and utilization of minerals and forms a foundation to geological research.

Surficial geology consists of physical geology, historical geology and palaeontology and many applications of the field (e.g. hydrogeology, environmental geology, peat geology, and ore prospecting). At the University of Oulu, the surficial geology concentrates mainly on the surface of the earth's crust, which is formed by different kinds of sediments. Due to the fact that many soil types were formed during the Quaternary period, this field is often called Quaternary geology.

The line of Geoenvironment is an interdisciplinary curriculum, which concerns geological processes and their relations with human actions. It crosses the faculty lines and includes following topics: geoenvironment and its processes; geological resources, geomaterials and recycled products; geomechanics and geostructures; environmental geological hazards and risk assessments; protection and renovation techniques of geoenvironment; geoenvironment of cold climate; hydrogeology and hydrotechnology.

Geochemistry studies the chemical composition of natural substances such as minerals, rocks and waters, in order to describe and quantify the processes which control the cycling of elements and isotopes in nature. The main applications are geochemical exploration of ores, environmental issues and determining the age and genesis of different rock types.

QUALIFICATION AWARDED

Within the degree programmes students can obtain the following degrees:

Bachelor of Science (B.Sc.) (180 credits)

In the Bachelor's degree about half of the studies are common compulsory studies for everyone. The rest are optional studies which develop a base for the upcoming specializing studies in the Master phase. Students select their optional studies according to their own interests and therefore direct their future profession profile. The degree includes a B.Sc. Thesis.

Master of Science (M.Sc.) (120 credits)

The degree consists of studies in the major subject (minimum 60 credits, including a M.Sc. Thesis 35 credits) and studies in two or more minor subjects. During the Master's phase a student can direct his/her future profession profile through the specialization program, advanced special studies, master's thesis, working experience and secondary subject studies.

Post-graduate degrees:

Licentiate of Science in Geosciences. In addition to M.Sc., 60 credits in major and minor subjects plus a Ph.Lic. Thesis (90 credits).

Doctor of Science in Geosciences. In addition to M.Sc., 60 credits in major and minor subjects (not required if Ph.Lic. is completed) plus a Ph.D. Thesis.

A student with the Master of Science degree may proceed to pursue the degree of Licentiate of Philosophy or Doctor of Philosophy provided that the grade for the major subject is high enough and that he/she presents an acceptable research plan. The Dean grants the permission to pursue postgraduate studies. The Dean's decision will be based on a statement by the Department Council on the student's previous studies in his/her major subject.

EDUCATIONAL AND PROFESSIONAL GOALS

The Degree Programme in Geosciences admits 20-30 new students annually, and ca. 13 geology students obtain the Master of Science degree every year. The degree programme in Geosciences aims at providing the student with the capacity to work as an expert of geology, geochemistry or geophysics in demanding tasks in the industry or private and public sector or NGO's. Graduates are familiar with the geological processes and they are able to apply scientific methods for locating and mapping, utilising and preserving natural resources. Field work and laboratory exercises are an essential part of the degree programme. Graduates understand the meaning of international cooperation in the field of geosciences as geological formations commonly cross-cut man-made border lines.

STRUCTURE OF THE DEGREES

The studies in geosciences consist of basic studies (code P), subject studies (code A) and advanced studies (code S). In addition, language studies and orientation studies (code Y) are part of the curriculum. The education in geology is given in the form of lecture courses, practical exercises, seminars, workshops and field courses.

Personal study plan (PSP) is made for the entire study period but it is also good to be prepared to change it when needed. Students of geosciences sketch a preliminary PSP in the first autumn during orientation and will make a more precise PSP later on in their studies. Own interests and fields that are strong should be valued. The first year studies are mainly common for all students. The major studies can be chosen during the second or third year. You can get help for your planning from e.g. amanuensis, student tutors of different subjects.

BACHELOR OF SCIENCE (B.Sc.) 180 credits

- General studies 9 credits
- Basic studies in Geosciences 28 credits
- Major subject studies (compulsory)
- Subject studies in Geosciences (optional)
- Compulsory minor studies
- Optional minor studies
- Bachelor of Science Thesis and Maturity test 9 credits

GENERAL STUDIES (9 credits)

770001Y Orientation course for new students 2 credits 1st autumn

030005Y Information Skills 1 credits 3rd spring

English 1 (Reading for Academic Purposes) 2 credits 1st spring

English 2 (Scientific Communication) 2 credits 2nd spring

Swedish 2 credits 3rd year

COMPULSORY COURSES to all students in the Degree Programme in geosciences (28 credits)

Geological processes:

771100P The Earth in Universe (2 credits) 1st autumn

771101P Endogenic processes (4 credits) 1st autumn

771109P Exogenic processes (3 credits) 1st autumn

Mineralogy:

771102P Basic Mineralogy (5 credits) 1st autumn

771110P Introduction to classifications of rocks (2 credits) 1st autumn

Geology of Finland:

771106P Introduction to bedrock geology of Finland (2 credits)

771107P Introduction to surficial geology of Finland and 1st spring

Historical geology (2 credits)

771108P Introduction to ore geology (2 credits) 1st spring

772102P Field course in bedrock geology (3 credits) 1st spring

773103P Field course in surficial geology (3 credits) 1st spring

MAJOR SUBJECT STUDIES (COMPULSORY)

Geology and mineralogy (19 credits):

771302A Digital modelling and geological information systems in geosciences

772302A Bedrock geology of Finland 5 credits

771304A Practical training 4 credits

772337A Seminar in geology and mineralogy I 5 credits

Surficial geology (17 credits):

773306A Surficial geology of Finland 5 credits

773314A Environmental Geology 3 credits

771304A Practical training 4 credits

773343A Seminar in surficial geology I 5 credits

SUBJECT STUDIES IN GEOSCIENCES (Optional min. 33 credits)

A student can choose his or her subject studies freely from the following list. It is important to notice that certain courses depending of the major subject should be completed in the M.Sc. phase at the latest.

GEOLOGY AND MINERALOGY (p = should be completed in M.Sc., (geology and mineralogy major) at the latest.

772308A Petrology 6 credits (P)

772310A General mineralogy 5 credits (P)

772316A Structural geology 5 credits (P)

772323A Petrography I 8 credits (P)

772334A Bedrock mapping 3 credits (P)

772335A Introduction to ore mineralogy 5 credits (P)

772336A Optical mineralogy 7 credits (P)

772337A Seminar in geology and mineralogy I 5 credits

772357A Technical use of rocks and minerals 4 credits

772385A Ore geology 5 credits (P)

SURFICIAL GEOLOGY (p = should be completed in M.Sc. (Surficial geology major) at the latest.

773300A Quaternary stratigraphy 5 credits (P)

773303A Basics of glacial geology 4 credits (P)

773316A Technical properties of sediments 8 credits (P)

773317A Physical sedimentology 5 credits (P)

773322A Surficial geology in ore exploration 5 credits

773324A Field mapping of Quaternary deposits 5 credits

773330A Peat geology 5 credits

773337A Biostratigraphy: Pollen course 5 credits (P)

773341A Biostratigraphy: Diatom course 5 credits (P)

773343A Seminar in surficial geology I 5 credits

GEOENVIRONMENT

488106A Basics in environmental geotechnics
 773331A Hydrogeology 5 credits
 488102A Hydrological processes 5 credits
 774329A Introduction to environmental geochemistry 5 credits
 772333A Technical mineralogy 5 credits
 488103A Environmental impact assessment 5 credits

GEOCHEMISTRY

774304A Analytical methods in geochemistry 5 credits
 774329A Introduction to environmental geochemistry 5 credits
 774315A Geochemistry of igneous rocks 5 credits
 774316A Seminar in environmental geochemistry 5 credits

MINOR SUBJECT STUDIES

The minimum of studies accepted as a minor subject is 15 credits. Often the amount of 25 credits is recommended. Minor subject studies include some compulsory studies, which could be part of the amount of 15 or 25 credits. Minor subject studies consist often one other geosciences subjects (geology and mineralogy, surficial geology) depending on the major subject of the student. Minor subject studies can also be taken from other departments or universities. The most common minor studies for geologist are chemistry, physics (geophysics), mathematics, computer sciences, biology and geography.

COMPULSORY MINOR SUBJECT STUDIES

Geology and mineralogy (major):

Surficial geology:

773306A Surficial geology of Finland 5 credits
 773314A Environmental Geology 3 credits

Geochemistry:

774301A Basic course in geochemistry 5 credits

Chemistry:

Minimum 4 credits (780109P Basic Principles in Chemistry 4 credits, recommend)

Geophysics:

Minimum 4 credits

Line of Geoenvironment (major geology and mineralogy), also:

031010P Calculus I

Surficial geology (major):

Geology and mineralogy:

771302A Digital modelling and geological information systems
 in geosciences 5 credits

772302A Bedrock geology of Finland 5 credits

Geochemistry:

774301A Basic course in geochemistry 5 credits

Chemistry:

Minimum 4 credits (780109P Basic Principles in Chemistry 4 credits, recommend)

Geophysics:

Minimum 4 credits

Line of Geoenvironment (major surficial geology), also:

031010P Calculus I

The students who will specialise to exploration and mining can do minor at process and environmental engineering studies.

Process and Environmental Engineering studies (optional) (minimum 15 credits):

488101P Environmental legislation 5 credits

488011P Introduction to Environmental Engineering 5 credits

488106A Basics on Geoenvironmental Engineering 5 credits

477101A Fluid and Particle Engineering 1 3 credits

477611A Introduction to Process Engineering 5 credits
 477702A Rock Engineering 3 credits
 031010P Calculus 1 5 credits

BACHELOR OF SCIENCE THESIS 9 credits

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 the professor.

MATURITY TEST

After completing the Bachelor of Science and Master of Science Thesis, the student writes an essay in his/her native language on the thesis, to show a good command of the language and the topic of the thesis.

MASTER OF SCIENCE DEGREE (M.Sc.) 120 credits

- Advanced major subject studies minimum 25 credits
- Minor studies 60 credits
 - o Line of Exploration and mining specialised studies minimum 40 credits
- Master of Science Thesis and Maturity test 35 credits

ADVANCED STUDIES IN GEOLOGY AND MINERALOGY

Mineralogy:

772636S Practical course in fluid inclusion 4 credits
 772635S Practical course in mineral chemistry 4 credits
 772601S Mineralogy -advanced course 5 credits
 772619S Mineralogical instrumental analytics 4 credits
 772618S Practical course in applied mineralogy 4 credits

Petrography:

772627S Petrography II 10 credits

Petrology:

772621S Geology of alkaline rocks, carbonatites and kimberlites 4 credits
 772628S Geology of basic layered intrusions 5 credits
 772603S Igneous petrology 6 credits
 772604S Metamorphic petrography 6 credits
 772606S Sedimentary petrography 4 credits

Ore geology:

772645S Regional ore geology 6 credits
 772608S Mining geology 2 credits
 772607S Seminar in ore geology 4 credits
 772625S Ore geological field course 2 credits

Structural geology and tectonics:

772609S Structural geology workshop 6 credits
 772620S Tectonics 5 credits

Regional geology:

772610S Excursion 2 credits
 772612S Precambrian sedimentology 4 credits
 772613S Evolution of the bedrock geology of Finland 6 credits
 772626S Archaean geology 5 credits

Other advanced studies:

772658S Special issues in geology and mineralogy 5 credits
 772662S Field course in bedrock geology and geophysics 3 credits
 772614S Workshop in bedrock mapping 5 credits
 772615S Literature study 5 credits

772624S Seminar In geology and mineralogy 2 5 credits
 772690S Courses taken at other universities
 772666S Master's thesis (Pro gradu) 35 credits

ADVANCED STUDIES IN SURFICIAL GEOLOGY

Glacial geology and ore exploration:

773601S Glacial geology II 5credits
 773645S Study circle of glacial geology and ore exploration 5 - 15 credits
 773641S Advanced course of surficial geology in ore exploration I 5 credits
 773642S Advanced course of surficial geology in ore exploration II 5 credits
 773616S Aerial photo interpretation in surficial geology 5 credits (compulsory)
 773610S Excursion on glacial geology of Lapland 4 credits

Environmental geology:

773621S Global environmental and climate change during the Cenozoic 4 credits
 773614S Microfossil research techniques -advanced 4 credits
 773622S Utilization of peat 4 credits
 773638S Laboratory course in peat geology 4 credits
 773602S Paleolimnology 4 credits
 773673S Field course in environmental geology and geophysics 3 credits

Sedimentology:

773612S Excursion on regional surficial geology 3-6 credits
 773605S Composition and characteristics of fine-grained mineral sediments 4 credits
 773646S Advanced field techniques 3 credits
 773643S Technical properties of sediments -advanced course 5 credits
 773648S Sedimentary structures 5 credits
 773647S Sedimentology 6 credits

Other advanced studies:

773618S Advances in palaeoecology 5 credits
 773606S Field excursion in surficial geology 2 - 5 credits
 773613S Literature essay 5 credits
 773607S Literature study 5 credits

773608S Special questions on surficial 5 credits
 773619S Seminar in Surficial geology 2 5 credits
 773615S Studia Generalia-lectures 2 credits
 773679S Courses taken at other
 773657S Master's thesis (Pro gradu) 35 credits

ADVANCED STUDIES IN GEOCHEMISTRY

774635S Basic course in geothermodynamics 6 credits
 774633S Hydrogeochemistry 6 credits
 774636S Geochemistry of Mining Environments 5 credits
 774629S Literature essay 4 credits
 774634S LA-ICP-MS -analytics 4 credits
 774630S Geochemistry of radiogenic isotopes 6 credits
 774631S Geochemistry of stable isotopes 4 credits

ADVANCED STUDIES IN GEOENVIRONMENT

488115S Advanced Geoenvironmental Engineering 5 credits
 488111S Modelling in geoenvironmental engineering 5 credits
 773675S Geological methods in hydrogeology 5 credits
 774633S Hydrogeochemistry 6 credits
 488108S Groundwater engineering 5 credits
 750616S Environmental legislation 5 credits

EXPLORATION AND MINING SPECIALISED STUDIES

A minimum 40 credits from the following course units:

488103A Environmental Impact Assessment 5 credits
 477707A Mining Engineering 3 credits
 477704A Principles of Mineral Processing 5 credits
 555220A Basic course in industrial engineering and management 3 credits
 555280A Basic course of project management 2 credits
 477702A Surface Chemistry Principles of Mining 3 credits
 477724S Numerical Mine Modelling 3 credits
 477721S Mineral processing 7,5 credits (LTU)
 477706S Geophysical Investigation Methods of Bedrock 3 credits
 477705S Field Course in Economic Geology 2 credits
 774636S Geochemistry of Mining Environments 5 credits

774304A Analytical methods in geochemistry 5 credits
 773316A Technical properties of sediments 8 credits
 773322A Surficial geology in ore exploration 5 credits

The education in exploration and mining is given in collaboration with the Department of Process and Environmental Engineering. The students can also choose some courses from the University of Luleå to their studies.

The studies specializing in exploration and mining are focused on understanding and controlling processes and operations connected to the full-scale life span of mines. Teaching in ore exploration, ore and mining geology, ore mineralogy, technical mineralogy, mineral processing, mining engineering, environmental engineering, environmental and mining legislation is central in the education.

GEOSCIENCES AS A MINOR SUBJECT

Also students studying geosciences as an optional minor subject are accepted to the courses within the resources of the department. If the number of participants of a course has to be limited, the number of minor students can be limited.

In Geosciences it is possible to complete 25 credits of minor studies, which consist of basic studies of geosciences.

EXAMINATION AND ASSESSMENT REGULATIONS

During the terms examinations are arranged twice a month on Fridays at 9.00-12.00 in room GO101 unless otherwise stated. The dates in academic year 2009-2010 are 4.9., 9.10., 6.11., 4.12., 15.1., 12.2., 12.3., 9.4 and 7.5. (surficial geology and geochemistry) 25.9., 23.10., 20.11., 18.12., 29.1., 26.2., 26.3., 23.4 and 21.5 (geology and mineralogy). The students must register for the examinations via WebOodi on the previous Monday at 12.00 at the latest. The students must register for summer examinations during May.

Grades from 1 to 5 are used, 5 being the best. For study units consisting of several subunits, the grade is the average of all courses.

CONTACTS AND STAFF:

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Tutkintorakenteisiin kuulumattomat opintokokonaisuudet ja -jaksot

774301A: A Basic Course in Geochemistry, 6 op
 772618S: A practical course in applied mineralogy, 4 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
 772626S: Archaean geology, 5 op
 771303A: Bachelor of Science thesis, 9 op
 774635S: Basic course in geothermodynamics, 6 op
 771102P: Basic course in mineralogy, 6 op
 773303A: Basics of glacial geology, 4 op
 772613S: Bedrock geology of Finland, 6 op
 772302A: Bedrock geology of Finland, 5 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
 772610S: Excursion, 2 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
 774633S: Hydrogeochemistry, 6 op
 773331A: Hydrogeology, 5 op
 488102A: Hydrological Processes, 5 op
 772603S: Igneous petrology, 6 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
 771107P: Introduction to historical geology and surficial geology of Finland, 2 op
 772335A: Introduction to ore mineralogy, 5 op
 772335A-01: Introduction to ore mineralogy, lectures, 0 op
 772335A-02: Introduction to ore mineralogy, practices, 0 op
 774634S: La-ICP-MS -analytics, 4 op
 773638S: 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
 772604S: Metamorphic petrology, 6 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
 772336A: Optical mineralogy, 7 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
 772323A: Petrography I, 8 op
 772627S: Petrography II, 10 op
 772308A: Petrology, 10 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

772645S: Regional ore geology, 6 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
 772607S: Seminar in ore geology, 4 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
 772357A: Technical use of rocks and minerals, 4 op
 772620S: Tectonics, 5 op
 771100P: The Earth in Universe, 2 op
 773622S: Utilization of peat, 4 op
 773345A: Work practice 2, 4 - 5 op
 772338A: Work practice II, 4 - 5 op
 772614S: Workshop in bedrock mapping, 5 op

Opintojaksojen kuvaukset

Tutkintorakenteisiin kuulumattomien opintokokonaisuuksien ja -jaksojen kuvaukset

774301A: A Basic Course in Geochemistry, 6 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: 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

Recommended or required reading:

Gill, Robin, Chemical Fundamentals of Geology, Chapman & Hall, London, 1996, 298 p. And Mason, B. & Moore, C.B.: Principles of Geochemistry, 4th Student Edition, J. Wiley, New York, 1982, p. 187-209.

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

E. Hanski

772618S: A practical course in applied mineralogy, 4 op

Voimassaolo: - 31.07.2010

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

Learning activities and teaching methods:

22 h lectures, 12 h exercises

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

S. Gehör

488115S: Advanced Geoenvironmental Engineering, 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

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:

Soils, geomaterials and by-products. Strength and deformation properties. Calculation of stability, Bearing and soil pressure. Seepage water flow. Soil strengthening, congealing and melting. Soil investigation.

Learning activities and teaching methods:

Lectures. Calculation and design exercises

Other information:

Requirements: Laboratory and calculation exercises

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

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

Vastuuyksikkö: 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**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 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**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)

Recommended or required reading:

Gill, Robin (ed.): Modern analytical geochemistry: an introduction to quantitative chemical analysis for earth, environmental and materials scientists, Harlow, Longman, 1997, 329 p. and Sawyer, Clair N., McCarty, Perry L., Parkin, Gene F.: Chemistry for Environmental Engineering and Science, Boston, McGraw-Hill, 2003, p. 410-451.

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

E. Hanski

772626S: Archaean geology, 5 op

Voimassaolo: 01.08.2009 - 31.07.2010

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Maier, Wolfgang Derek

Opintokohteen kielet: Finnish

ECTS Credits:

5 credits

Language of instruction:

english

Timing:

4th or 5th year

Learning outcomes:

Students will be able to put Finnish Archean geology into a global context, enhancing understanding of Finland's geological history and mineral potential.

Contents:

Overview of geology of main Archean cratons, focusing on Karelia, Kaapvaal (South Africa), Yilgarn and Pilbara (Australia), and Superior (Canada) cratons. Processes that control mineralization in Archean terranes, notably Au, PGE-Ni-Cr-V, and diamonds.

Learning activities and teaching methods:

20 h lectures, 10 hours exercises

Recommended or required reading:

class handouts and selected readings

Assessment methods and criteria:

written report

Grading:

1-5/fail

Person responsible:

W. Maier

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

774635S: Basic course in geothermodynamics, 6 op

Voimassaolo: - 31.07.2010

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: 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:

Upon completion of the course students understand the basic thermodynamics principles and their applications in geology.

Contents:

Basic laws and concepts of thermodynamics, standard states, activities; fugacities; chemical equilibrium; Gibb`s free energy; heat capacity; chemical potential; Clausius and Clapeyron equation; calculation of reaction boundaries; activities in multicomponental ideal and real solutions, mineral-solution equilibrium, redox reactions, geothermometry and geothermobarometry; behaviour of elements in melting and crystallization.

Learning activities and teaching methods:

24 h lectures, 20 h compulsory exercises

Recommended optional programme components:

Basic course in geochemistry 774301A

Recommended or required reading:

Anderson, Greg M., Thermodynamics of Natural Systems, Cambridge University Press, 2007, 662 pp.

Assessment methods and criteria:

2 examinations

Grading:

1-5/fail

Person responsible:

E. Hanski

771102P: Basic course in mineralogy, 6 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Hanna Junntila, Pekka Tuisku

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:Risto Piispanen ja Pekka Tuisku (2005) Mineralogian perusteet. <http://cc oulu.fi/~petuisku/Mineralogia/MinPer.htm>**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**Vastuuyksikkö:** 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:

Bennet, M. R. & Glasser, N. F. 1996. Glacial Geology, Ice sheet and Landforms. Wiley. 364 s.

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:

Lehtinen, M., Nurmi, P. and Rämö, T., 2005. Precambrian Geology of Finland. 736 p. Elsevier

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

N. N.

772302A: Bedrock geology of Finland, 5 op**Voimassaolo:** - 31.12.2010**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 activities and teaching methods:

30 h lectures

Recommended or required reading:

Lehtinen, M., Nurmi, P. ja Rämö, T., 1998: Suomen Kallioperä, Suomen Geologinen Seura, pages. 105- 355.

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

S. Gehör

772334A: Bedrock mapping, 3 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: 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

Vastuuyksikkö: 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:

Battarbee, R.W., Jones, V.J., Flower, R.J., Cameron, N.g., Bennion, H., Varvalho, L., Juggins, S., 2001. Diatoms. In: Smol, J.P., Birks, H.J.B., Last, W.M. (eds.). Tracking Environmental Change Using Lake Sediments. Volume 3: Terrestrial, Algal, and Siliceous Indicators. Kluwer, Dordrecht, The Netherlands, pp. 155 - 202. Berglund, B. (ed.) Handbook of Holocene Palaeoecology and Palaeohydrology. Wiley & Sons., 1988, ss. 527-570. Forsström, L. Piikuoriset levät

Opintomoniste, Oulun yliopisto Geotieteiden laitos 1999, 104 p. Plus class handouts.

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

Vastuuyksikkö: 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:

Bennett, K.D. & Willis, K.J., 2001. Pollen. In: Smol, J.P., Birks, H.J.B., Last, W.M. (eds.). Tracking Environmental Change Using Lake Sediments. Volume 3: Terrestrial, Algal, and Siliceous Indicators. Kluwer, Dordrecht, The Netherlands, pp. 5 - 32. Berglund, B. (ed.). Handbook of Holocene Palaeoecology and Palaeohydrology. Wiley & Sons, 1988, ss. 455-484. Plus class handouts.

Assessment methods and criteria:

Written report and an Examination on identifying the species of pollen and spores.

Grading:

pass/fail

Person responsible:

T. Eskola

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

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: 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:

Meunier A., 2005. Clays. Springer, 472 pages.

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-sofwares 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:

Tokola, T., Soimasuo, J., Turkia, A., Talkkari, A., Store, R. & Kangas, A., (toim.) 1994: Paikkatieto ja paikkatietojärjestelmät. Silva Carelica 28. Joensuun Yliopisto. Blom, T., 1995: Paikkatietojärjestelmien perusteet. Helsingin yliopiston maantieteen laitoksen opetusmonisteita 37; Bonham-Carter, G. F., 1994: Geographical information systems for geoscientist. Modelling with GIS .

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: Eero Hanski

Opintokohteen oppimateriaali:

Press, F., Siever, R., Grotzinger, J., , 2007

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:

Press, F., Siever, R., Grotzinger, J. & Jordan, and T.H.: Understanding Earth. W.H. Freeman and Company, New York, 2004, 4. ed, Chapters 2, 5, 6, 9 and 11.

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:

Murck, B.W., Skinner, B.J. & Porter, S.C., 1996: Environmental Geology, John Wiley & Sons, 535 p.

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**Vastuuyksikkö:** 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

772610S: Excursion, 2 op**Voimassaolo:** - 31.12.2010**Opiskelumuoto:** Advanced Studies**Laji:** Course**Vastuuyksikkö:** Department of Geosciences**Arvostelu:** 1 - 5, pass, fail**Opintokohteen kielet:** Finnish**ECTS Credits:**

2 credits

Language of instruction:

finnish

Timing:

4th or 5th year

Learning outcomes:

The objective is to widen students' field experience on the Finnish bedrock.

Contents:

Introduction to Finnish or foreign geological field targets. Students write a report on the excursion.

Recommended or required reading:

Will be informed separately.

Assessment methods and criteria:

examination

Grading:

pass /fail

Person responsible:

N. N.

773606S: Excursion in surficial geology, 2 - 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:

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

Vastuuyksikkö: 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

Vastuuyksikkö: 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

Vastuuyksikkö: 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 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

Recommended or required reading:

Monroe, J.S. & Wicander, R.: The Changing Earth. Exploring Geology and Evolution. Brooks/Cole, 2001. Pages 113-147, 210-233, 301-483.

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

Vastuuyksikkö: 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

Vastuuyksikkö: 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

Vastuuyksikkö: 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

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

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:

Wenk & Bulakh, Minerals: their Constitution and Origin, Cambridge University Press.

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:

Jambor, J. L., Blowes, D. W., Ritchie, A. I. M. (Eds.) Environmental Aspects of Mine Wastes, Mineralogical Association of Canada, Short Course Series, Vol. 31, 2003, 430 s., Plumlee, G.S., Longsdon, M.J. (Eds.) The Environmental Geochemistry of Mineral Deposits. Reviews in Economic Geology, 1999, Vol. 6A.

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

Vastuuyksikkö: 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:

Rollinson, Hugh: Using Geochemical Data: Evaluation, Presentation, Interpretation, Harlow, Pearson Education Ltd, 1993, pp. 1-214., and selected journal articles.

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

Vastuuyksikkö: 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:

Faure, G.: Principles of Isotope Geology. 2nd ed., J. Wiley & Sons, New York, 1986, pp. 1-423. Dickin, A.P.: Radiogenic Isotope Geology, 2nd ed., Cambridge University Press, 2005, 492 p.

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

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:

After the course students should have basic knowledge on the behavior of stable isotopes in nature and their application in geological and environmental research.

Contents:

Principles of fractionation of stable isotopes; mass spectrometry; standards; geothermometry; paleoclimatology; geochemistry of commonly used stable isotopes (O, H, C, N & S); stable isotopes in environmental studies; heavy stable isotopes.

Learning activities and teaching methods:

24 h lectures

Recommended optional programme components:

Basic course in geochemistry 774301A

Recommended or required reading:

Criss, Rogert, E.: Principles of Stable Isotope Distribution, 1999, Oxford Univ. Press, 264 p., and Faure, G.: Principles of Isotope Geology. 2nd ed., J. Wiley & Sons, New York, 1986, pp. 429-548.

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

E. Hanski

773675S: Geological research methods in hydrogeology, 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:

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:

J. P. Lunkka

772628S: Geology of basic layered intrusions, 5 op

Voimassaolo: 01.08.2009 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: 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:

Cawthorn, R.G.: Layered Intrusions. Elsevier, 1996, 531 p., Parsons, I. (ed.): Origins of Igneous Layering. NATO ASI series, Series C, Mathematical and physical sciences; vol. 196. D. Reitel Publishing Company, Dordrecht, Holland, 1987.

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

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:

Lehtinen, M., Nurmi, P. & T. Rämö (ed.), Precambrian Geology of Finland - Key to the evolution of the Fennoscandian Shield. Elsevier, Amsterdam. Mitchell, R.H. 1986: Kimberlites; Mineralogy, Geochemistry and Petrology, 442 p.

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

S. Gehör

773601S: Glacial Geology 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:

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 glacial sediments and landforms and modelling of paleo-ice-sheets.

Learning activities and teaching methods:

30 h lectures

Recommended or required reading:

Glaciers & Glaciation. Benn, D. I. & Evans, D. J. A. Arnold. 1998.

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

Vastuuyksikkö: 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:

Lunkka, J. P. 2008. Maapallon ilmastohistoria. Gaudeamus - Helsinki University Press. 286 s. and other selected readings

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

Vastuuyksikkö: Department of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Björn Klöve, Anna-Kaisa Ronkanen

Opintokohteen kielet: English

Leikkaavuudet:

480122A Groundwater Technology 5.0 op

Ei opintojaksokuvauksia.

774633S: Hydrogeochemistry, 6 op

Voimassaolo: - 31.07.2010

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: 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:

After the course students have knowledge on the chemical composition of natural waters and the chemical reactions that affects it.

Contents:

Geochemistry of natural waters; solubility of elements; the contents of elements in surface water and ground water; minerals of soil and their chemical properties; sorption and ion change reactions; electrochemistry and kinetic; non-organic and organic contaminants.

Learning activities and teaching methods:

32 h lectures, 20 h computer exercises

Recommended optional programme components:

Basic course in geochemistry 774301A and Introduction to environmental geochemistry 77439A

Recommended or required reading:

Langmuir, Donald, Aqueous Environmental Geochemistry, New Jersey, Prentice-Hall, 1997, 600 s.

Assessment methods and criteria:

2 examinations

Grading:

1-5/fail

Person responsible:

E. Hanski

773331A: Hydrogeology, 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 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:

Grundvatten, Teori & Tillämpning. Knutsson, G. & Morfeldt, C-O. Svensk Byggtjänst. 1993, 304 s. Maanalaiset vedet - pohjavesigeologian perusteet. Korkka-Niemi, K. & Salonen, V-P. Täydennyskoulutuskeskus. Turun yliopisto. 1996. 181 s. Pohjavesi ja pohjaveden ympäristö. Mälkki, E. Tammi. 1999 304 s.

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

J. P. Lunkka

488102A: Hydrological Processes, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: 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

Learning outcomes:

To provide a basic understanding of water flow and storage processes involved in the hydrological cycle and provide an introduction to 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 and Exercises

Recommended optional programme components:

Material and Energy Balances (recommended).

Recommended or required reading:

Lecture notes

772603S: Igneous petrology, 6 op

Voimassaolo: - 31.07.2010

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Maier, Wolfgang Derek, Eero Hanski

Opintokohteen kielet: Finnish

ECTS Credits:

6 credits

Language of instruction:

finnish

Timing:

4th or 5th year

Learning outcomes:

By the end of this *course*, students should be able to understand the use of phase diagrams in the interpretation of the genesis of igneous rocks and the diversity of magmas in different tectonic environments.

Contents:

Basic concepts of the petrology of igneous rocks; experimental petrology and phase diagrams; genesis and differentiation of magmas; variation diagrams; occurrence and genesis of the most important associations of igneous rocks.

Learning activities and teaching methods:

20 h lectures, seminar presentations

Recommended optional programme components:

Petrology (772308A)

Recommended or required reading:

Hess, P.C.: Origin of Igneous rocks, Harvard University Press, 1989, 336 p. Prichard, H.M., et al. (ed.): Magmatic Processes and Plate Tectonics, 1993, Geol. Soc. Spec. Publication No. 76, 528 p.

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

E. Hanski

030005P: Information Skills, 1 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Technology

Arvostelu: 1 - 5, pass, fail

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

Opintokohteen kielet: Finnish

Leikkaavuudet:

030004P Introduction to Information Retrieval 0.0 op

Language of instruction:

English

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 (<http://www.kirjasto.oulu.fi/index.php?id=822>)

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 , <http://www.kirjasto.oulu.fi/index.php?id=738>

774329A: Introduction to Environmental Geochemistry, 5 op

Voimassaolo: 01.01.2005 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: 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:

Sawyer, Clair N., McCarty, Perry L., Parkin, Gene F., Chemistry for Environmental Engineering and Science, Boston, McGraw-Hill, 2003, p. 1-397 and Alloway, B. J. (ed.) Heavy Metals in Soils, London, Blackie Academic & Professional, 1995, p. 1-57.

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

E. Hanski

771108P: Introduction to Ore Geology, 2 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Eero Hanski

Opintokohteen kielet: Finnish

ECTS Credits:

2 credits

Language of instruction:

finnish

Timing:

1st spring

Learning outcomes:

Students will 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:

Craig, J.R., Vaughan, D.J. & Skinner, B.J.: Resources of the Earth - Origin, Use, and Environmental Impact. Prentice Hall, 1996, 472 p.

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

Vastuuyksikkö: 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:

Lehtinen, M., Nurmi, P. ja Rämö, T., 1998: Suomen Kallioperä, Suomen Geologinen Seura or Lehtinen et al. (ed) 2005. Precambrian Geology of Finland. Elsevier, Amsterdam, 736 s

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

A. Kärki

771110P: Introduction to classification of rocks, 2 op

Voimassaolo: - 31.07.2011

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Hanna Junntila

Opintokohteen oppimateriaali:

Martti Lehtinen, Pekka Nurminen ja Tapani Rämö, , 1998

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

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: Suomen kallioperä - 3000 vuosimiljoonaa. Suomen Geologinen Seura, Gummerus Jyväskylä 1998, ISBN 952-90-9260-1. Chapters 2-3.

Assessment methods and criteria:

lectures, practical exercises, identification exam and lecture diary

Grading:

pass/fail

Person responsible:

H. Junttila

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

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: 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:

Monroe, J.S. & Wicander, R.: The Changing Earth. Exploring Geology and Evolution. Brooks/Cole, 2001. Pages 514-537, 560-733.

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

Vastuuyksikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Maier, Wolfgang Derek

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:

Stanton, R.L.: Ore Petrology, McGrawHill Book Company, 1972, p. 36-132.; Craig, J.P. & Vaughan, D.J.: Ore Microscopy and Ore Petrography. Wiley & Sons, 1994, 2nd ed. 434 p. *Handbooks:* Criddle A.J. & Stanley, C.J. (Ed.): Quantitative Data for Ore Minerals. Chapman Hall, 1993, 635 p.; Ramdohr, P.: The Ore Minerals and their Intergrowths, vol. 1 and 2. Pergamon Press, 1980, 1205 p.

Assessment methods and criteria:

written examination and a practical test on ore microscopy

Grading:

1-5/fail

Person responsible:

W. Maier

772335A-01: Introduction to ore mineralogy, lectures, 0 op

Voimassaolo: 01.08.2008 -

Opiskelumuoto: Intermediate Studies

Laji: Partial credit

Vastuuyksikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Eero Hanski

Opintokohteen kielet: English

Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

772335A-02: Introduction to ore mineralogy, practices, 0 op

Voimassaolo: 01.08.2008 -

Opiskelumuoto: Intermediate Studies

Laji: Partial credit

Vastuuyksikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Kaukonen, Risto Johan

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

774634S: La-ICP-MS -analytics, 4 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

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:

Sylvester, Paul J., Laser-ablation-ICPMS in the earth sciences; principles and applications. Mineralogical Association of Canada, Short Course Series 29, 2001, 243 pp.

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

S. Gehör

773638S: Laboratory exercises on peat geology, 4 op

Voimassaolo: 01.08.2009 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Holappa, Kauko Einari

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

4 credits

Language of instruction:

finnish

Timing:

4th or 5th year

Learning outcomes:

A student is able to use different peat research methods on field and in laboratory work.

Contents:

Taking peat samples; preparation and laboratory techniques; definition of the physical and chemical properties of peat; definition of the quality of fuel and growth peat.

Learning activities and teaching methods:

10 demonstrations, 50 h exercises

Recommended or required reading:

Lappalainen, Sten, Häikiö 1984 . Turvetutkimusten maasto-opas. Geologian tutkimuskeskus. Opas 12., Energiaturpeen laatuohje 2006. Polttoaineluokitus ja laadunmääritys, näytteenotto ja ominaisuuksien määrittäminen. Nordic Innovation Centre 2006. Nordtest, NT ENVIR 009. Method., Kasvuturpeen laadunmääritysopas 1997. Turveteollisuusliitto ry., ENSFS standardit

Grading:

pass/fail

Person responsible:

K. Holappa

750616S: Legislation in environmental protection, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Department of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Huttunen, Satu

Opintokohteen oppimateriaali:

Hollo, Erkki J. , , 2001

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:

Hollo, E. J. 2001: Ympäristönsuojeluoikeus, WSOY, 592 p.

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.

774629S: Literature essay, 4 - 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: 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

Vastuuyksikkö: 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

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:

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**Vastuuyksikkö:** 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

772604S: Metamorphic petrology, 6 op**Voimassaolo:** - 31.07.2010**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:

Students will be able to determine histories of metamorphic rocks based on textures and phase equilibria.

Contents:

The basic concepts of the petrology of metamorphic rocks; phase diagrams; Eskola's metamorphic facies concept; metamorphic reactions and changes in mineral suites; defining metamorphic grade and isogrades; metamorphism and deformation; anatexis and migmatites. metamorphic fluids and metasomatism.

Learning activities and teaching methods:

30 h lectures

Recommended or required reading:

Winter, J.D.: An Introduction to Igneous and Metamorphic Petrology. Prentice Hall. 2001. Power point-lectures be found from: <http://www.whitman.edu/geology/winter/>

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

N. N.

773614S: Microfossil research techniques (advanced), 4 op**Opiskelumuoto:** Advanced Studies**Laji:** Course**Vastuuyksikkö:** Department of Geosciences**Arvostelu:** 1 - 5, pass, fail**Opettajat:** Tiina Eskola**Opintokohteen kielet:** Finnish**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 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**Vastuuyksikkö:** Department of Geosciences**Arvostelu:** 1 - 5, pass, fail**Opettajat:** Seppo Gehör**Opintokohteen kielet:** Finnish**ECTS Credits:**

4 credits

Language of instruction:

finnsih

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**Vastuuyksikkö:** 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:

Putnis, A. (1992) Introduction to mineral sciences. Cambridge University Press. And Deer, W.A., Howie, R.A. & Zussman, J. (1992) An introduction to rock forming minerals. Longman.

Assessment methods and criteria:

examination

Grading:

5-1/fail

Person responsible:

P. Tuisku

772608S: Mining geology, 3 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Maier, Wolfgang Derek, Eero Hanski

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

Vastuuyksikkö: Department of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

Learning outcomes:

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

Contents:

Transportation of detrimental elements. Risk assessment. Design of initial and surface structures for waste final placement. Stability of landfills and seepage water drainage. Landscaping. Life cycle evaluation of geostructures.

Learning activities and teaching methods:

Examination. Design and modelling exercises. Seminar work.

Recommended optional programme components:

Course Basics in Geoenvironmental Engineering recommended beforehand

Recommended or required reading:

Lecture handout and material given during the course.

772336A: Optical mineralogy, 7 op

Voimassaolo: - 31.07.2014

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Pekka Tuisku

Opintokohteen kielet: Finnish

ECTS Credits:

7 credits

Language of instruction:

finnish

Timing:

2nd 3rd year

Learning outcomes:

After the course students are able to identify most common minerals from thin sections under the microscope.

Contents:

The basics of crystal optics. Research of the properties of minerals, identifying minerals from thin sections, usage of stereographic projector and basics of the universal stage method.

Learning activities and teaching methods:

40 h lectures, 68 h exercises

Recommended optional programme components:

771102P Basic Mineralogy

Recommended or required reading:

Wm. Revell Phillips (1971) Mineral Optics, s. 1-170; Risto Piispanen (1981) Kideoptiikka, osa I, Isotrooppisten aineiden kideoptiikka; Risto Piispanen ja Pekka Tuisku (1996) Kideoptiikka, osa II, anisotrooppisten aineiden kideoptiikka; Käsikirjat: Alexander ja Horace Winchell (1967) Elements of Optical Mineralogy. Part II: Description of Minerals. 6. painos; W. E. Tröger (1971) Optische Bestimmung der gesteinsbildenden Minerale. Teil 1, Bestimmungstabellen. 4. uudistettu painos; W. E. Tröger (1967) Optische Bestimmung der gesteinsbildenden Minerale. Teil 2, Textband.

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

P. Tuisku

772625S: Ore geological field course, 2 op

Voimassaolo: 01.08.2009 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: 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

Vastuuyksikkö: 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

Vastuuyksikkö: 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

773602S: Paleolimnology, 4 op

Voimassaolo: - 31.07.2010

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Peuraniemi, Vesa Juhani, Tiina Eskola

Opintokohteen kielet: Finnish

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

773330A: Peat geology, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Holappa, Kauko Einari

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:

Concepts of peat geology, bog formation processes, function of a bog ecosystem. Global peat resources. Classifications of bogs and their structures. Methods of inventory and characteristics of peat.

Learning activities and teaching methods:

30 h lectures

Recommended or required reading:

Lappalainen, E. 1996. (Ed.). Global Peat Resources. International Peat Society, Finland. Gore, A.J.P (edit.). Mires: Swamp, bog, fen and moor. Ecosystems of the world 4 A. General studies. 1983. 440 p. Gore, A.J.P. (edit.). Mires: Swamp, bog, fen and moor. Regional studies. Ecosystems of the World. 1983. 480 p. Williams, M. (Ed.). 1990. Wetlands. A Threatened Landscape. Blackwell. 418 p. Charman, D. 2002. Peatlands and Environmental Change. University of Plymouth, UK. John Wiley & Sons, LTD. 301 p

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

K. Holappa

772323A: Petrography I, 8 op**Voimassaolo:** - 31.12.2010**Opiskelumuoto:** Intermediate Studies**Laji:** Course**Vastuuyksikkö:** Department of Geosciences**Arvostelu:** 1 - 5, pass, fail**Opettajat:** Pekka Tuisku**Opintokohteen kielet:** Finnish**Voidaan suorittaa useasti:** Kyllä**ECTS Credits:**

8 credits

Language of instruction:

finnish

Timing:

2nd or 3rd year

Learning outcomes:

After the course students are able to classify different rocks and make individual thin section microscopy research.

Contents:

Microscopic research and description of the most usual minerals and textures of different rocks. Introduction to classifying rocks and e.g. petrography. Additionally, lectures concerning structures, terminology and classification of rocks. The exam is to evaluate student's skills in thin section microscopy and the second is a literature and lecture Examination.

Learning activities and teaching methods:

26 h lectures, 120 h exercises

Recommended optional programme components:

Optical mineralogy 772336A, Basic Mineralogy 771102P

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

P. Tuisku

772627S: Petrography II, 10 op**Voimassaolo:** 01.01.2006 - 31.07.2010**Opiskelumuoto:** Advanced Studies**Laji:** Course**Vastuuyksikkö:** Department of Geosciences**Arvostelu:** 1 - 5, pass, fail**Opettajat:** Pekka Tuisku**Opintokohteen kielet:** Finnish**ECTS Credits:**

10 credits

Language of instruction:

finnish

Timing:

4th or 5th year

Learning outcomes:

By the end of this *course*, students should be able to research igneous-, metamorphic- and sedimentary rocks under the microscopy.

Contents:

Microscopic research and description of the most usual minerals and textures of different rocks, classifying rocks and e.g. petrography. Additionally, lectures concerning structures, terminology and classification of rocks.

Learning activities and teaching methods:

200 h exercises

Recommended optional programme components:

Basic mineralogy (771102P), Optical mineralogy (772336A) and Petrography I (772323A)

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

P. Tuisku

772308A: Petrology, 10 op**Voimassaolo:** 01.08.2005 - 31.07.2012**Opiskelumuoto:** Intermediate Studies**Laji:** Course**Vastuuyksikkö:** Department of Geosciences**Arvostelu:** 1 - 5, pass, fail**Opintokohteen kielet:** Finnish**ECTS Credits:**

6 credits

Language of instruction:

finnish

Timing:

2nd or 3rd year

Learning outcomes:

The student will acquire basic knowledge of different rock types, their classification and origin.

Part 1: Igneous rocks 3 credits

Contents: Basic concepts of the petrology of igneous rocks; phase diagrams; genesis and differentiation of magmas; variation diagrams; occurrence, classification and genesis of the most important associations of igneous rocks.

Working methods: 10 h lectures**Part 2:** Sedimentary rocks 1 credit

Contents: Properties, classification and occurrence of sedimentary rocks.

Working methods: 5 h lectures

Part 3: Metamorphic rocks 2 credits

Contents: The basic concepts of the petrology of metamorphic rocks; phase diagrams; occurrence and textures of metamorphic rocks.

Working methods: 10 h lectures

Recommended or required reading:

Raymond Loren A.: Petrology: The Study of Igneous, Sedimentary and Metamorphic Rocks. Waveland Press, Inc., 720 p.

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

N.N.

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 discussed 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:

Press, F. & Siever, R. 1998. Understanding Earth. W. H. Freeman and Company, p. 134 - 161, p. 264 - 455 and other selected readings.

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

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:

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:

E. Roedder, Fluid Inclusions. Reviews in Mineralogy, vol.12. Min.Soc. America. 1984. 644 p.

Assessment methods and criteria:

examination

Person responsible:

S. Gehör

772635S: Practical course in mineral chemistry, 4 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: 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

Vastuuyksikkö: 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

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:

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:

Eriksson, P., Altermann, W., Nelson, D. Mueller W. and Catuneanu O. (eds.): The Precambrian Earth: tempos and events. Elsevier, 2004, 941 p. (partly), lecture material and a list of journal articles.

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

Vastuuyksikkö: 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

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:

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

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 acquired knowledge of the Finnish glacial landforms and deglaciation in Finland.

Contents:

The pre-Quaternary landform of Finland; thermomeres and cryomeres 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

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 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:

Ehlers, J.: Quaternary and Glacial Geology. Wiley & Sons, New York. Lowe, J.J. & Walker, M.J.C.:

Reconstructing Quaternary Environments, , Longman, Hong Kong, 2. ed, 1997. Donner, J.: The Quaternary

History of Scandinavia. World and Regional Geology 7. Cambridge University Press, 200 pp. 1995.

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:

J. P. Lunkka or V. Peuraniemi

772645S: Regional ore geology, 6 op

Voimassaolo: - 31.07.2010

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Eero Hanski, Maier, Wolfgang Derek

Opintokohteen kielet: Finnish

ECTS Credits:

6 credits

Language of instruction:

finnish

Timing:

4th or 5th year

Learning outcomes:

After the course students should have a view on the occurrence of ore deposits in different geotectonic environments and time periods in Earth's history.

Contents:

Factors that control occurrences of ores, changes in ore formation processes, mineral deposits in Archean, Proterozoic and Phanerozoic areas.

Learning activities and teaching methods:

40 h lectures

Recommended optional programme components:

Ore geology (772385A)

Recommended or required reading:

Vanecek, M. (ed.) Mineral Deposits of the world. Elsevier Science, 1994, 520 pages. Hutchison, Ch.S.: Economic deposits and their tectonic setting. Wiley & Sons, Inc., New York, 1983, 365 pages. Sawkins, F.J.: Metal deposits in relation to plate tectonics. 2nd ed., SpringerVerlag, 461 pages, and other selected readings.

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

E. Hanski

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

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:

Tucker, M.E.: Sedimentary Petrology: an Introduction to the Origin of Sedimentary Rocks, Blackwell Publishing, 3th ed., 2001, 262 p.

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

N. N.

773647S: Sedimentology, 6 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: 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:

Reading, H. G. 1996. Sedimentary Environments. Blackwell Science Ltd. 688 pp. And Coe, A. L. 2005. The Sedimentary Record of Sea-level Change. Cambridge University Press. 287 pp.

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

J. P. Lunkka

774316A: Seminar in environmental geochemistry, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: 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

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:

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

Vastuuyksikkö: 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

772607S: Seminar in ore geology, 4 op**Voimassaolo:** - 31.07.2010**Opiskelumuoto:** Advanced Studies**Laji:** Course**Vastuuyksikkö:** Department of Geosciences**Arvostelu:** 1 - 5, pass, fail**Opettajat:** Maier, Wolfgang Derek, Eero Hanski**Opintokohteen kielet:** Finnish**ECTS Credits:**

4 credits

Language of instruction:

english

Timing:

4th or 5th year

Learning outcomes:

The course will enhance students' ability to construct and deliver a scientific presentation and deepen their knowledge on different ore types.

Contents:

Students write a 20-page paper on a subject in the field of ore geology. The paper is presented in a seminar meeting with someone acting as an opponent. Each student acts as an opponent to a paper in their turn.

Learning activities and teaching methods:

20 h seminars

Recommended optional programme components:

Ore geology (772385A)

Assessment methods and criteria:

oral presentation and acting as an opponent

Grading:

pass /fail

Person responsible:

W. Maier

772658S: Special issues in geology and mineralogy, 1 - 9 op**Opiskelumuoto:** Advanced Studies

Laji: Course

Vastuuyksikkö: 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

Vastuuyksikkö: 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:

Park, R.G. 1989. Foundations of Structural Geology, Blackie, Glasgow, 202 s. tai Pollard, D. D. & Fletcher, R. C. 2005, Fundamentals of Structural geology, Cambridge University Press, Cambridge. 500 s.

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:

Structural geology (772316A), Digital modeling and geological information systems in geosciences (771302A)

Recommended or required reading:

McClay: The Mapping of Geological Structures. 1991. Open University Press, Milton Keynes, 168 pages.
Rowland: Structural Analysis and Synthesis. 1986. Blackwell Sci. Publ. 208 pages. Lisle: Geological Strain Analysis. 1985. Pergamon Press. 99 pages.

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

A. Kärki

773615S: Studia Generalia -lectures, 2 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: 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

Vastuuyksikkö: 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

Vastuuyksikkö: 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

Vastuuyksikkö: 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, glacial 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:

Menzies, J. (ed.), Past Glacial Environments. Sediments, Forms and Techniques. Glacial Environments Vol 2. Butterworth & Heinemann, 1996, 598 p. G.J.S. Govett (ed.), Handbook of Exploration Geochemistry, Vol. 6: Drainage Geochemistry. Elsevier, 1994, 766 p.

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

V. Peuraniemi

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; glacial 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

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 (773322A)

Recommended or required reading:

McClenaghan, M., Bobrowsky, P.T., Hall, G.E.M. & Cook, S.J., Drift Exploration in Glaciated Terrain, Geological Society Special Publication n:o 185, 2001, 350 p.

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

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 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**Vastuuyksikkö:** Department of Geosciences**Arvostelu:** 1 - 5, pass, fail**Opettajat:** Holappa, Kauko Einari**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:

A handout. Velde, B: Introduction to Clay Minerals, Chemistry, Origins, Uses and Environmental Significance. Chapman & Hall, London, 198 pages. Rantamäki, Jääskeläinen & Tammirinne: Geotekniikka. pp. 31-161, 249-274, Otakustantamo, 1984.

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**Vastuuyksikkö:** 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 resources; 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

Vastuuyksikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Holappa, Kauko Einari

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:

Opetusmoniste. Rantamäki, Jääskeläinen & Tammirinne: Geotekniikka, ss. 31-161, 249-274, Otakustantamo, 1984. Velde., Velde, B: Introduction to Clay Minerals, Chemistry, Origins, Uses and Environmental Significance. Chapman & Hall, London, 198 s.

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

Vastuuyksikkö: 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

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:

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:

Condie K. C. 1997, Plate tectonics and Crustal Evolution. Butterworth - Heineman, Oxford, 282 p. tai Moores, M. E. & Twiss, R. J., 1995, Tectonics, W.H. Freeman and Company, 415 p. tai R.G. Park, Geological Structures and Moving Plates, 1988, Blackie, Glasgow, 337 p.

Assessment methods and criteria:

examination

Grading:

1-5/fail

Person responsible:

A. Kärki

771100P: The Earth in Universe, 2 op

Voimassaolo: - 31.07.2012

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: 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

773622S: Utilization of peat, 4 op

Voimassaolo: 01.08.2009 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Department of Geosciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Holappa, Kauko Einari

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

4 credits

Language of instruction:

finnish

Timing:

4th or 5th year

Learning outcomes:

After the course students knows the methods of peat inventory, peat production and different peat utilization, environmental impacts.

Contents:

Peat resources; classification and making an inventory; peat production; different utilization methods and improvement of peat. Introduction to peat production and utilization in different establishments. A field trip to a peat production area or peat refining or utilizing plant.

Learning activities and teaching methods:

20 h lectures, 20 h exercises

Recommended or required reading:

Lappalainen, E. 1996. (Ed.). Global Peat Resources. International Peat Society, Finland., Vasander, H. 1996. (Ed.) Peatlands. Finnish Peatland Society, Helsinki, Finland., Joosten, H. & Clarke, D. 2002. Wise Use of Mires and Peatlands Background and Principles Including a Framework for Decision-Making International Mire Conservation Group and International Peat Society., Korhonen, R., Korpela, L. & Sarkkola, S. (Ed.). Finland - Fenland: Research and sustainable utilization of mires and peat. IPS. 2008. 288 p.

Assessment methods and criteria:

examination

Grading:

5-1/fail

Person responsible:

K. Holappa

773345A: Work practice 2, 4 - 5 op

Opiskelumuoto: Intermediate Studies

Laji: Practical training

Vastuuyksikkö: 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

772338A: Work practice II, 4 - 5 op

Opiskelumuoto: Intermediate Studies

Laji: Practical training

Vastuuyksikkö: 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:

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

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:

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