

Opasraportti

FTech - Geosciences (2020 - 2021)

University's new study guide for academic year 2020-2021 is published at <https://opas.peppi oulu.fi>

The study guide includes information on degrees, curriculums, courses and course timetables. Course registrations are still done in Oodi.

If you have questions on information in the study guide, please contact the study field's Academic Affairs Service Team <https://www oulu.fi/forstudents/faculty-study-affairs>

MASTER OF SCIENCE, GEOSCIENCES, 120 ECTS CR

In the 2-year Master's Programme in Geosciences (national, or the respective international programme Mineral Resources and Sustainable Mining) there are two optional majors (study options): Specialization for Quaternary Geology, and Specialization for Economic Geology.

The Master's degree includes the next studies:

MSc, Geosciences, 120 op	cr	Year & term
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Compulsory advanced studies of the, 60 op:

- Master's Thesis 772666S	30	2nd Autumn - 2nd Spring
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- Maturity Test 770690S	0	2nd Spring
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- Other advanced level geosciences studies, 6*5 cr	30	1st Autumn - 2nd Spring
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Compulsory studies in the chosen study option, 30 cr:

- Specialization for Quaternary Geology	30	1st Autumn - 2nd Spring
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OR

- Specialization for Economic Geology	30	1st Autumn - 2nd Spring
Optional free choice courses, 30 cr	30	1st Autumn - 2nd Spring
Total	120	

Tutkintorakenteet

Geosciences, Master of Science 2020-21

Tutkintorakenteen tila: published

Lukuvuosi: 2020-21

Lukuvuoden alkamispäivämäärä: 01.08.2020

Master of Science in Geosciences 120 cr (vähintään 120 op)

Select the compulsory advanced major studies 60 credits. These include 30 cr of courses, and 772666S Master's Thesis 30 cr and 770690S Maturity Test 0 cr.

Also select the studies in your major, i.e. either "Specialization for Quaternary Geology Studies" 30 cr, or "Specialization for Economic Geology Studies" 30 cr. The studies of your major, i.e. study option, are compulsory.

Also recommended are other advanced level courses in geosciences or mining. So choose optional courses up to 120 credits, so that the minimum extent 120 cr of the MSc degree cr is reached.

Advanced Major Studies minimally 60 cr

773633S: Advanced Course of Surficial Geology in Ore Exploration, 5 op

772699S: Bedrock geology of Fennoscandia, 5 op

772640S: Excursion, 5 op

772691S: Exploration and mining - global to local perspectives, 5 op

774636S: Geochemistry of Mining Environment, 5 op

772666S: Master's thesis, 30 op

770690S: Maturity test, 0 op

773655S: Sedimentology, 5 op

Specialization for Quaternary Geology Studies 30 credits

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

773631S: Biostratigraphy, 5 op

494303A: Hydrology in geosciences, 5 op

772696S: Quantitative Evaluation of Minerals in Sediments and Rocks, 5 op

773300A: Quaternary Stratigraphy, 5 op

773348A: Technical properties of sediments II, 5 op

Specialization for economic geology studies 30 credits

772675S: Geophysics in economic geology, 5 op
 774639S: Isotope geochemistry for economic geologists, 5 op
 772695S: Magmatic ore deposits, 5 op
 772697S: Microscopic study of rocks, 5 op
 772632S: Regional ore geology of Fennoscandia, 5 op
 772667S: Seminar in ore geology, 5 op

Other recommended and optional free choice courses

Geosciences, Bachelor of Science 2020-21

Tutkintorakenteen tila: published

Lukuvuosi: 2020-21

Lukuvuoden alkamispäivämäärä: 01.08.2020

General Studies 8 cr (vähintään 8 op)

In the BSc in Geosciences degree (180 ECTS cr) are these general studies, 8 cr, compulsory to all. But, the language courses can be replaced with other courses with the same contents and sizes, but different codes.

902002Y: English 1 (Reading for Academic Purposes), 2 op
 902004Y: English 2 (Scientific Communication), 2 op
 030005P: Information Skills, 1 op
 770001Y: Orientation course for new students, 1 op
 901055Y: Second Official Language (Swedish), Oral Skills (OMS), 1 op
 901054Y: Second Official Language (Swedish), Written Skills (OMS), 1 op

Major Studies in Geosciences 98 cr (vähintään 98 op)

In the BSc Geosciences BSc Degree the major studies (in total 98 cr) include 30 cr of basic level studies and 68 cr of intermediate level studies, which are all compulsory to all geosciences students.

Basic Studies in Geosciences 30 cr

771117P: Basic course in mineralogy, 5 op
 771113P: Introduction to Geology I, 5 op
 771114P: Introduction to Geology II, 5 op
 771116P: Introduction to Quaternary deposits of Finland and their resources, 5 op
 771115P: Introduction to bedrock geology of Finland and ore geology, 5 op
 491102P: Introduction to solid earth geophysics, 5 op

Geosciences, compulsory intermediate level studies 68 ECTS

774311A: A Basic Course in Geochemistry, 5 op
 774304A: Analytical methods in geochemistry, 5 op
 771309A: Bachelor of Science thesis and seminar, 8 op
 773344A: Basics of glacial geology, 5 op
 773346A: Environmental geology, 5 op
 494302A: GIS and spatial data, 5 op
 772310A: General mineralogy, 5 op
 772351A: Geological mapping, 5 op
 494301A: Geophysical research methods of rock and soil, 5 op
 772335A: Introduction to ore mineralogy, 5 op
 770690S: Maturity test, 0 op

772348A: Optical Mineralogy, 5 op
 772386A: Ore Geology and Society, 5 op
 773322A: Surficial geology in ore exploration, 5 op

Compulsory minor subject courses minimally 25 cr (vähintään 25 op)

This compulsory Minor Subject in Mining includes minimally 25 cr of basic and intermediate level courses in environmental engineering, industrial engineering and management, and in mining engineering and mineral processing. This minor is compulsory to all geosciences BSc students.

Compulsory minor subject courses minimally 25 cr

555225P: Basics of industrial engineering and management, 5 op
 488142A: Environmental legislation and EIA, 5 op
 491101P: Introduction to mining, 5 op
 555265P: Occupational Safety and Health Management, 5 op
 493300A: Principles of mineral processing, 5 op

Other compulsory minor studies 19 cr (vähintään 19 op)

Other compulsory minor studies 19 cr include studies in chemistry, mathematics, statistics, and in engineering communication. All courses are compulsory to all.

780120P: Basic Principles in Chemistry, 5 op
 802158P: Mathematics for Economic Sciences, 7 op
 031021P: Probability and Mathematical Statistics, 5 op
 900060A: Technical Communication, 2 op

Optional Major or Minor Studies 30 op (vähintään 30 op)

You must choose minimally 15 cr of courses to Optional Major Studies

Recommended studies for **quaternary geology** specialization line (study option) are the next:

- 773347A Technical properties of sediments I
- 492300A Rock mechanics
- 494303A Hydrology in geosciences
- 772344A Sedimentary Petrology
- 494403A Seismology

Recommended studies for **economic geology** specialization line (study option) are the next:

- 772350A Metamorphic petrology
- 772349A Igneous petrology
- 772344A Sedimentary Petrology
- 772316A Structural geology
- 494403A Seismology
- 494303A Hydrology in geosciences
- 493302A Chemical phenomena in mineral processes
- 492300A Rock mechanics
- 477013A Introduction to Process and Environmental Engineering

H327009: Optional major studies in geology, 0 - 100 op

Other studies

Other optional studies can include such courses, supporting the degree and the study option, which are not part of the major and minor subject entities, and so much that the (minimum) extent of the degree 180 cr is reached.

Opintojaksojen kuvaukset

Tutkintorakenteisiin kuuluvien opintokohteiden kuvaukset

773633S: Advanced Course of Surficial Geology in Ore Exploration, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opettajat: Pertti Sarala

Opintokohteen kielet: English

ECTS Credits:

5 ECTS.

Language of instruction:

English or Finnish.

Timing:

4th or 5th year.

Learning outcomes:

Upon completion of the course, the student knows and understand:

Mode of the element occurrence in surficial sediments

Research methods of the element occurrences

Analytical techniques: chemical and mineralogical

Mineral fractions and different concentration techniques

Heavy minerals and indicator minerals in ore exploration

Advanced surficial geochemical and biogeochemical sampling and analysis methods

Contents:

To describe and explain broadly and analytically the modes of element occurrence in surficial sediments (mainly in glaciated terrain), their analysis methods and the use of indicator minerals and advanced surficial geochemical techniques in ore exploration with an emphasis of conventional and modern approach.

Mode of delivery:

Face to face teaching.

Learning activities and teaching methods:

The implementation methods of the course vary and will be agreed on together with the students for each course.

There will be 24 hours of guided teaching and visits, and about 20 hours of teaching without guidance either privately or in groups.

Target group:

Students in the 4th or 5th (periods 1 or 2) year, international students.

Prerequisites and co-requisites:

The prerequisite is the completion of the following courses prior to enrolling for the course: Geologian peruskurssi II (771114P), Johdatus Suomen maaperägeologiaan ja maaperän raaka-ainevaroihin (771116P) and Maaperägeologinen malminetsintä (773322A) or similar knowledge.

Recommended optional programme components:

The course is an independent entity and does not require additional studies carried out at the same time.

Recommended or required reading:

McClenaghan, M., Bobrowsky, P.T., Hall, G.E.M. & Cook, S.J., (2001) Drift Exploration in Glaciated Terrain, Geological Society Special Publication N:o 185, 350 p., Other materials delivered during the course.

The availability of the textbooks can be checked [via this link](#).

Assessment methods and criteria:

Participation in the lectures, activity in private or group works, final examination. The assessment of the course is based on the learning outcomes of the course. The more detailed assessment criteria are available on the Noppa Study Portal. Read more about assessment criteria at the University of Oulu webpage.

Grading:

Grading 1-5/fail.

Person responsible:

Pertti Sarala

Working life cooperation:

The course could include visits to the companies or guest lectures of the course's subject.

772699S: Bedrock geology of Fennoscandia, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS.

Language of instruction:

The language of instruction is English.

Timing:

The course is held in the autumn semester, during period II. It is recommended to complete the course at the 4th or 5th autumn semester.

Learning outcomes:

Upon completion of this course, the student will have a good overview of the Finnish Precambrian bedrock and its evolution through time.

Contents:

The main geological units of the Finnish bedrock as part of the evolution of the Fennoscandian Shield. Magmatism, sedimentology and metamorphism and geochronology of the Finnish bedrock.

Mode of delivery:

Face to face teaching.

Learning activities and teaching methods:

36 h lectures.

Target group:

All students in geosciences.

Prerequisites and co-requisites:

It is recommended that the student has completed studies equivalent to the Bachelor's degree in geology.

Recommended optional programme components:

The course is an independent entity and does not require additional studies carried out at the same time.

Recommended or required reading:

Lehtinen, M., Nurmi, P. and Rämö, T. (2005) Precambrian Geology of Finland. 736 p. Elsevier. Additional material delivered during the course.

The availability of the textbooks can be checked via [this link](#).

Assessment methods and criteria:

Written essay.

Grading:

In the theory exam grade and final grade, the course utilizes a numerical grading scale of 1-5. Zero stands for a fail.

Person responsible:

Prof. Kari Strand and prof. Shenghong Yang

Working life cooperation:

No

772640S: Excursion, 5 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 cr

Language of instruction:

English

Timing:

4th or 5th year

Learning outcomes:

The objective is to widen the student's field experience in ore geology. Through visiting important mineral deposits in different tectonic setting, and field work practice, students will learn the regional ore geology, and related mineral exploration in Finland.

Contents:

Introduction to Finnish or foreign geological field targets. Excursions typically last 1-2 weeks and consist of visits to field outcrops, as well as discussion of exposed structures and rocks.

Contents on 2020: Excursion 2020, Ore Geology, Finland

Pre-excursion introduction

2.44 Ga layered intrusions related Cr-PGE mineralization, including the Kemi intrusion, mafic dikes, PGE mineralized

Penikat, Portimo complex

Rompas Au-Co exploration project in the Peräpohja Belt

Otänmaki V-Ti deposit

Jormua ophiolite

Archean greenstone

After excursion seminar

Teachers: For both lectures and field trips, the teachers are prof. Shenghong Yang and Kimmo Kärenlampi

Mode of delivery:

Face to face in field or mine.

Learning activities and teaching methods:

Pre-excursion seminar, field techniques, excursion.

Target group:

Master and PhD students in geology

Recommended or required reading:

Reading materials will be informed separately depending on excursion destination

Assessment methods and criteria:

Pre-excursion seminar, field protocol

Grading:

Pass/fail

Person responsible:

Teachers 2020: For both lectures and field trips, the teachers are prof. Shenghong Yang and Kimmo Kärenlampi

772691S: Exploration and mining - global to local perspectives, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 cr

Language of instruction:

English

Timing:

4th or 5th year

Learning outcomes:

Upon completion of the course the students should know the structure of the mining and exploration industry. This includes the major players in a variety of commodity spaces, such as copper, gold, iron ore, base metals, etc., the concepts of value chain and variable business models. In particular, the differences between resources and reserves and economic drivers of the industry (demand and supply, changes in applications, commodity speculation) will be discussed. Furthermore, strategies and methods for exploration suitable for certain ore deposits types will be reviewed.

Contents:

Based on global and regional scale examples and developments an understanding will be developed for the dynamics of the business cycle in the raw materials industry.

Mode of delivery:

Face to face

Learning activities and teaching methods:

Lectures 30 h, hand-specimen examination, home work on reserve and resource calculations, and ore values. Also, group assignment and presentations on a subject such as mining company profiles, exploration methodologies etc.

Target group:

Masters students and PhD students in geoscience or related fields. Course is also suitable for interested geography or economics students with a background/interest in geosciences and natural resources.

Prerequisites and co-requisites:

Ore geology and society (Intermediate level course: 772386A)

Recommended optional programme components:

493301A Mining geophysics

774636S Geochemistry of mining environment

772632S Regional Ore Geology of Fennoscandia

774637S Isotope geochemistry for economic geologists

772694S Geometallurgy and mineral processing

Recommended or required reading:

Crowson, P. (2008) Mining unearthed. Aspermont, 423 p.

Wellmer, F.W., Dalheimer, M., Wagner, M. (2008) Economic valuations in exploration. Springer 174 p.

Eilu P (Ed.) (2012) Mineral deposits and metallogeny of Fennoscandia. Geological Survey of Finland, Special Paper 53, 401 p.,

Maier, W., O'Brien, H., Lahtinen, R. (Eds.) (2015) Ore Deposits of Finland. Elsevier, 792 p.

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

Assessment methods and criteria:

Examination

Grading:

5-1/fail

Person responsible:

Prof. Shenghong Yang

774636S: Geochemistry of Mining Environment, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 cr

Language of instruction:

The language of instructions is Finnish or English, depending on the participants.

Timing:

The course is held in the spring semester, during period 4. It is recommended to complete the course at the 4th or 5th spring semester.

Learning outcomes:

Upon completion of this course, the student will:

- can describe and assess environmental problems associated with metal mining,
- is familiar with the chemical and mineralogical phenomena related to acid mine drainage, and
- know how to test the acid-producing or acid-neutralizing capacity of rock types.

Contents:

Oxidation of sulphidic ores, formation of secondary minerals, water chemistry in mining environment, acid neutralisation capacity of rocks waste and its determination, factors involved in acid mining drainage (AMD) and its mitigation.

Mode of delivery:

Face to face teaching

Learning activities and teaching methods:

28 h lectures

Target group:

All students in geosciences

Prerequisites and co-requisites:

Completion of 774301A Basic Course in Geochemistry and other studies equivalent to Bachelor's degree are recommended

Recommended optional programme components:

The course is an independent entity and does not require additional studies carried out at the same time

Recommended or required reading:

Articles (informed separately) from the following books: Jambor, J. L., Blowes, D. W., Ritchie, A. I. M. (Eds.) (2003) Environmental Aspects of Mine Wastes, Mineralogical Association of Canada, Short Course Series, Vol. 31, 430 s., Plumlee, G.S., Logsdon, M.J. (Eds.) (1999) The Environmental Geochemistry of Mineral Deposits. Reviews in Economic Geology, Vol. 6A., Blowes et al. (2014) The Geochemistry of Acid Mine Drainage, Treatise in Geochemistry, Vol. 9.

Assessment methods and criteria:

Written essay

Grading:

In the theory exam grade and final grade, the course utilizes a numerical grading scale of 1-5. Zero stands for a fail.

Person responsible:

Prof. Kari Strand, prof. Pertti Sarala

772666S: Master's thesis, 30 op

Opiskelumuoto: Advanced Studies

Laji: Diploma thesis

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

35 credits

Language of instruction:

Finnish, English

Timing:

5th year

Learning outcomes:

Upon completing a Master's thesis, students will gain advanced understanding on a subject belonging economic geology or geology and mineralogy in generally. They will be able to use and apply pertinent research methods and theoretical knowledge of their research field, make independent inferences from their observations and measurements, and utilise effectively scientific literature.

Mode of delivery:

Students carry out a personal research project, which is normally based field and/or laboratory work, and they write a Master's thesis (pro gradu) on the results. The topic of the thesis is agreed with the supervisor from the department and with other potential internal or external supervisors. Personal guidance is given by the supervisor(s) during the research and writing stage. The official reviewers of the thesis are decided by the chair of the educational programme board of the department after the proposal of the professor of the discipline and the thesis is accepted and rated by the educational programme board.

Target group:

All Master's level geoscience students.

Prerequisites and co-requisites:

Sufficient amount of intermediate- and advanced-level courses to enable the student to start independent research work.

Recommended or required reading:

Reading is decided separately in each case.

Assessment methods and criteria:

Thesis

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

5-1/fail

Person responsible:

Professors, lecturers

Working life cooperation:

Yes (commonly)

770690S: Maturity test, 0 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

773655S: Sedimentology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Strand

Opintokohteen kielet: Finnish, English

ECTS Credits:

5 credits

Language of instruction:

Finnish (optionally English)

Timing:

4th or 5th study year

Learning outcomes:

Upon completion of the course, the student will be able to explain how different sediment bedforms and sedimentary associations are related to different sedimentary environments. The student will also be able link individual observations to various sedimentary processes and their products, understand facies analysis method and explain the fundamental concepts used in sequence stratigraphy.

Contents:

The topics that are introduced in the course are: sedimentary environments their processes and products, basin analysis and sequence stratigraphy.

Mode of delivery:

Face to face

Learning activities and teaching methods:

30 h lectures

Target group:

Advanced-level geology students.

Prerequisites and co-requisites:

Bachelor of Science degree

Recommended or required reading:

Applicable parts of Reading, H.G. (1996) Sedimentary Environments. Blackwell Science Ltd. 688 s. and Coe, A.L. (2005) The Sedimentary Record of Sea-level Change. Cambridge University Press. 287 p. Lecture notes.

Assessment methods and criteria:

Examination

Grading:

5-1/fail

Person responsible:

Kari Strand

Working life cooperation:

No

773616S: Aerial photo interpretation in surficial geology, 5 op**Opiskelumuoto:** Advanced Studies**Laji:** Course**Vastuuyksikkö:** Oulu Mining School**Arvostelu:** 1 - 5, pass, fail**Opintokohteen kielet:** Finnish**ECTS Credits:**

5 ECTS / 133 hours of work

Language of instruction:

Finnish or English

Timing:

4th or 5th study year (IV period)

Learning outcomes:

Upon completion of the course, students should be able to identify and interpret basic landforms from air photographs.

Contents:

Introduction to the principles of remote sensing techniques. Geomorphological mapping using Digital elevation models (DEMs). In practicals students produce surficial geological and glaciodynamic maps based on DEM interpretation of landforms.

Mode of delivery:

Face to face in class

Learning activities and teaching methods:

20 h lectures, 30 h exercises

Target group:

Master's level geoscience students

Prerequisites and co-requisites:

Quaternary geology of Finland (773306A), Basics of glacial geology (773344A)

Assessment methods and criteria:

Pre-examination, exercises and written examination

Grading:

5-1/fail

Person responsible:

Juha Pekka Lunkka

Working life cooperation:

No

773631S: Biostratigraphy, 5 op**Voimassaolo:** 01.08.2017 -**Opiskelumuoto:** Advanced Studies**Laji:** Course**Vastuuyksikkö:** Oulu Mining School**Arvostelu:** 1 - 5, pass, fail**Opintokohteen kielet:** English**ECTS Credits:**

5 cr

Language of instruction:

Finnish (English on demand)

Timing:

4th or 5th year (periods 1 and 2), every other year

Learning outcomes:

Upon completion of the course, the student will be able to identify pollen, spores and diatoms common in Finland and to understand the use of microfossils as useful tools for reconstructing past environments

Contents:

Common pollen, spores and diatoms, other microfossil groups

Mode of delivery:

Face to face teaching

Learning activities and teaching methods:

Lectures, exercises, group work, independent work

Target group:

Master's students in geology (advanced-level geology students)

Recommended or required reading:

Announced separately

Assessment methods and criteria:

Exercises, groupwork, written report

Grading:

Pass/fail

Person responsible:

Tiina Eskola

Working life cooperation:

No

Other information:

The course is held every other year

494303A: Hydrology in geosciences, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opettajat: Moisio, Kari Juhani

Opintokohteen kielet: Finnish

ECTS Credits:

5 credits

Language of instruction:

Finnish (It is possible to do the course in English, although all the lectures and exercises will be given in Finnish).

Timing:

Spring term

Learning outcomes:

Upon the completion of the course, a student

- can define the concept of a water cycle, can name the elements of the cycle, can identify their physical basis and can estimate the magnitude of different components using the water balance equation
- can name and distinguish the principles of the methods used to observe evaporation, precipitation and runoff, and summarize their spatial and temporal variation in Finland
- can describe the behavior of underground water in vadoze zone and aquifers and can define how the groundwater is formed and how it flows
- can identify different types of aquifers and can describe their relationship with structures of soil and bedrock
- owns basics of hydrogeology (groundwater geology)
- can name major geological and geophysical methods used in groundwater research and exploration

Contents:

Introduction to hydrology and hydrological processes in geosciences. Properties and behaviour of water in hydrosphere including hydrological cycle, its different components (evaporation, precipitation and runoff) and their relationship, observations and spatial and temporal variation of each hydrological component in Finland. Properties and behaviour of underground water including geohydrological and hydrogeophysical aspects of water and hydrogeology. Behaviour and properties of water in soil, superficial deposits and bedrock, particularly in Finland. Groundwater flow, aquifers, groundwater quality, geological and geophysical research methods in hydrogeology

Mode of delivery:

Face to face

Learning activities and teaching methods:

50 h lectures and exercises

Target group:

Mining engineering and Mineral processing/ option Applied geophysics, geoscience students, other students of the University of Oulu.

Prerequisites and co-requisites:

Recommended: I494301A Geophysical research methods of rock and soil

Recommended optional programme components:

No alternative course units or course units that should be completed simultaneously.

Recommended or required reading:

Handouts and lecture notes.

Selected parts from:

Applied Hydrogeology. C.W. Fetter (2001 fourth edition)

Physical and Chemical Hydrogeology. P.A Domenico & F.W. Schwartz, 1997 second edition.

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:

Varying assessment and evaluation methods.

Grading:

1-5/fail

Person responsible:

Kari Moisio

Working life cooperation:

No work practice

772696S: Quantitative Evaluation of Minerals in Sediments and Rocks, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 cr

Language of instruction:

English

Timing:

4th or 5th study year

Learning outcomes:

Upon completion of the course, the student will be able to do quantitative mineral evaluations for sediments and rocks. Optical microscopy, electron microprobe (EMPA), scanning electron microscopy (SEM) and QEMSCAN studies of specific samples are learned to identify useful minerals e.g. ore indicator minerals and quantify their relative abundances especially when looking for base metals or critical metals and minerals. Automated mineralogy systems are introduced to let you obtain data about your samples, such as mineralogical composition, mineral grain`s composition, rock minerals distribution, minerals elements distribution and includes in minerals.

Contents:

The topics that are introduced in the course are: what is a quantitative mineral evaluation, what materials can be studied and for what purposes, analytical equipments needed, examples of research results and own learning exercise.

Mode of delivery:

Face to face

Learning activities and teaching methods:

24 h lectures and exercise

Target group:

Advance level geoscience students

Prerequisites and co-requisites:

Bachelor of Science degree

Recommended or required reading:

Announced separately

Assessment methods and criteria:

Attending lectures and written examination

Grading:

5-1/fail

Person responsible:

Kari Strand

Working life cooperation:

No

773300A: Quaternary Stratigraphy, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opettajat: Pertti Sarala

Opintokohteen kielet: Finnish

ECTS Credits:

5 credits.

Language of instruction:

Finnish.

Timing:

4th year.

Learning outcomes:

Upon completion of the course, the student knows and understand:

identification of stratigraphical units in vertical deposition context

lateral stratigraphical correlation (horizontal)

chronostratigraphy including dating methods, age estimation and depositional timing

classical glacial stages

quaternary geological stages in Finland

Contents:

During the course students learn main concepts and research methods of the Quaternary stratigraphy. Furthermore, students learn main changes of climate and environment in global and Finnish scale during Quaternary.

Mode of delivery:

Face to face teaching.

Learning activities and teaching methods:

24 hours of guided teaching.

Target group:

Students in the 4th or 5th year.

Prerequisites and co-requisites:

The prerequisite is the completion of the following courses prior to enrolling for the course: Geologian peruskurssi II (771114P), Johdatus Suomen maaperägeologiaan ja maaperän raaka-aineväriin (771116P) and Glasiaaligeologian perusteet (773344A) or similar knowledge.

Recommended or required reading:

Ehlers, J. 1996: Quaternary and Glacial Geology, applicable parts (chapters 9-16), Wiley & Sons, New York. ; Lowe, J.J. & Walker, M.J.C. 1997: Reconstructing Quaternary Environments, (chapters 1, 3, 5, 6, 7), Longman, Hong Kong, 2. Edition, and Stratigraphic Guide, International Commission on Stratigraphy, electronic source, available at <http://www.stratigraphy.org/>. Other materials delivered during the course.

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

Assessment methods and criteria:

Participation in the lectures, activity in private or group works and final examination. The assessment of the course is based on the learning outcomes of the course. The more detailed assessment criteria are available on the Noppa Study Portal. Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5/fail.

Person responsible:

Pertti Sarala

Working life cooperation:

No.

773348A: Technical properties of sediments II, 5 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 cr

Language of instruction:

Finnish

Timing:

4th or 5th year (periods 3 and 4), every other year.

Learning outcomes:

Upon completion of the course, the student will be able to name and implement the fundamental methods to analyse physical and geotechnical properties of sediments.

Contents:

Permeability, shear strength of soils, consolidation settlement

Mode of delivery:

Face to face teaching

Learning activities and teaching methods:

Integrated lectures and exercises

Target group:

Advanced-level geology students

Prerequisites and co-requisites:

Technical properties of sediments I (773347A) or respective knowledge

Recommended or required reading:

Announced separately. Applicable parts of Rantamäki, Jääskeläinen & Tamminen (2009): Geotekniikka. Otatieto, Helsinki, 307 pp.

Assessment methods and criteria:

Attending lectures and exercises, written reports

Grading:

5-1/fail

Person responsible:

Tiina Eskola

Working life cooperation:

Ei

Other information:

This course is held every other year

772675S: Geophysics in economic geology, 5 op

Voimassaolo: 01.08.2012 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opettajat: Elena Kozlovskaya

Opintokohteen kielet: English

ECTS Credits:

5 credits

Language of instruction:

English

Timing:

4th or 5th year

Learning outcomes:

The students comprehend the main techniques used in exploration geophysics and have become familiar with a number of case studies. They should be able to interpret basic geophysical data and their importance in target evaluation.

Contents:

Geophysical methods in exploration and their use in exploration targeting.

Mode of delivery:

Face to face

Learning activities and teaching methods:

30 h lectures, data interpretation exercises.

Target group:

Master's students and PhD students in geology.

Prerequisites and co-requisites:

Bachelor's degree.

Recommended or required reading:

Reynolds, J.M. (2011) An Introduction to Applied and Environmental Geophysics, Wiley-Blackwell

Everett M.E. (2013) Near-Surface Applied Geophysics. Cambridge University Press.

Kearey, P., Brooks, M., Hill, I. (2002) An Introduction to Geophysical Exploration. Blackwell Science.

Geophysical methods, in: Moon et al. (2009) Introduction to Mineral Exploration, Blackwell

The availability of the literature can be checked from "[this link](#)".

Assessment methods and criteria:

Examination

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

5-1/fail

Person responsible:

Elena Kozlovskaya

Working life cooperation:

No

Other information:

-

774639S: Isotope geochemistry for economic geologists, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 cr

Language of instruction:

English

Timing:

The course is held in the spring semester, during periods 3-4. It is recommended to complete the course at the 4th or 5th spring semester.

Learning outcomes:

Upon completion of this course, the student can interpret and assess geological literature where isotopes have been utilized, is able to calculate ages of rocks using given isotope measurements of different isotopic systems, can make inferences on the origin of different rock types, including ore deposits, based on measured isotope ratios.

Contents:

Mechanisms of radioactive disintegration; mass spectrometry; different radiogenic and stable isotope systems (e.g., Rb-Sr, Sm-Nd, Re-Os, Lu-Hf, Sm-Nd and U-Pb and Pb-Pb; S and C isotopes); examples of the use of isotopes in the research of ore deposits.

Mode of delivery:

Face to face teaching

Learning activities and teaching methods:

32 h lectures, 16 h computer exercises

Target group:

All students in geosciences

Prerequisites and co-requisites:

It is recommended that the student has completed studies equivalent to the Bachelor's degree in geology

Recommended optional programme components:

The course is an independent entity and does not require additional studies carried out at the same time

Recommended or required reading:

White, W.M. (2015) Isotope Geochemistry. Wiley-Blackwell, 496 p. or Dickin, A.P. (2005) Radiogenic Isotope Geology, 2nd edition, Cambridge University Press, 492 p. Journal articles given during the course.

Assessment methods and criteria:

Theory exam, and excel calculations as home study tasks.

Grading:

In the theory exam grade and final grade, the course utilizes a numerical grading scale of 1-5. Zero stands for a fail.

Calculations are graded as pass/fail.

Person responsible:

Prof. Shenghong Yang

772695S: Magmatic ore deposits, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opettajat: Shenghong Yang

Opintokohteen kielet: English

ECTS Credits:

5 credits

Language of instruction:

English

Timing:

4th or 5th year

Learning outcomes:

After completion of the course students should have knowledge of the occurrence and ore-formation processes of magmatic ore deposits, and will thus gain an improved capability to contribute to exploration for magmatic ore deposits.

Contents:

The most important magmatic ore deposit types:

Layered intrusions related PGE, Cr, V-Ti,

Cu-Ni sulfide mineralization in mafic-ultramafic igneous rocks,

Massif anorthosite related Ti,

Kimberlite related diamond,

Alkaline and carbonatite related REE,

Pegmatite related Li, Cs, Ta,

Kiruna type iron oxide apatite,

Podiform type chromitite in ophiolite

Typical examples of these types of magmatic mineral deposits will be introduced. In the practical part, typical rock and ore samples and thin section will be observed. The exploration methods for specific deposit types will also be discussed.

Mode of delivery:

Face to face

Learning activities and teaching methods:

Lectures 30 h, hand-specimen examination, microscopy sessions, exploration modelling.

Target group:

Masters students and PhD students in geology.

Prerequisites and co-requisites:

Igneous Petrology (772341A).

Recommended optional programme components:

Other courses in the International Master's course.

Recommended or required reading:

Hedenquist JW et al. (2005) Economic Geology 100 th Anniversary volume, Society of Economic Geologists, 1136 p.

Other review papers regarding different types of ore deposits will be provided during the course.

Assessment methods and criteria:

Examination

Grading:

5-1/fail

Person responsible:

Shenghong Yang

Working life cooperation:

No

772697S: Microscopic study of rocks, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 ESTC /40 h face to face + 40 students own work

Language of instruction:

Finnish or English

Timing:

spring semester period 3 or 4

Learning outcomes:

Upon completion of the course the student will:

have a competence to study major rock types with petrographic microscope and has a good understanding on their classification and textures

Contents:

classification of major rock types, their textures and their study with petrographic microscope

Mode of delivery:

Face to face and self-acting studies of samples (thin sections)

Learning activities and teaching methods:

face to face practicals 40 h and self-acting microscopy 40 h

Target group:

all students in geosciences

Prerequisites and co-requisites:

Petrology of Igneous rocks, Petrology of Sedimentary Rocks, Petrology of Metamorphic Rocks, Optical Mineralogy

Recommended optional programme components:

The course does not require other studies to be carried simultaneously

Recommended or required reading:

Handbooks situated in the course room according to separate list

Assessment methods and criteria:

report of the practical studies of given samples

Grading:

pass/fail

Person responsible:

Pekka Tuisku

Working life cooperation:

not currently

772632S: Regional ore geology of Fennoscandia, 5 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opettajat: Shenghong Yang

Opintokohteen kielet: English

ECTS Credits:

5 credits

Language of instruction:

English

Timing:

4th or 5th year

Learning outcomes:

After the course students should have an understanding of the occurrence and petrogenesis of the most important ore deposits in Fennoscandia, and their main analogues in a global context. Students will thus have gained an improved capability to contribute to mineral exploration in Finland.

Contents:

Factors that control temporal and spatial distribution of ores, with particular focus on Finnish and Fennoscandian ore deposits, including the Finnish VMS (Pyhäsalmi, Outokumpu), chromite (Kemi), PGE (Portimo, Penikat, Konttijärvi), vanadium (Mustavaara, Koitelainen), Fe (Kolari district, Otanmäki), gold (Suurikuusikko, Pahtavaara, Pampalo), and Ni deposits (Kevitsa, Talvivaara, Vammala-Kotalahti belt), the Swedish Kiruna and Skelefteå districts, the Pechenga deposit of Russia, and the Norwegian Fe-Ti deposits.

Mode of delivery:

Face to face

Learning activities and teaching methods:

Lectures 30 h, handspecimen examination

Target group:

Masters students and PhD students in geology.

Prerequisites and co-requisites:

Ore Geology (772385A), Igneous Petrology (772341A), Metamorphic Petrology (772345A), Introduction to Ore Mineralogy (772335A).

Recommended optional programme components:

Other courses of the International Master programme.

Recommended or required reading:

Eilu P (Ed.) (2012) Mineral deposits and metallogeny of Fennoscandia . Geological Survey of Finland, Special Paper 53. 401 p., Maier, W., O'Brien, H., Lahtinen, R. (Eds.) (2015) Ore Deposits of Finland. Elsevier.

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

Assessment methods and criteria:

Examination

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

5-1/fail

Person responsible:

N.N.

Working life cooperation:

No

772667S: Seminar in ore geology, 5 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 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. Students will be able to summarize the geology and petrogenesis of selected ore deposits and present these data to a specialist audience.

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.

Mode of delivery:

Face to face

Learning activities and teaching methods:

Independent literature studies, oral presentations by students, seminars c. 20 h.

Target group:

Masters and PhD students.

Prerequisites and co-requisites:

Bachelor's degree

Recommended or required reading:

Journal papers and Eilu P (Ed.) (2012) Mineral deposits and metallogeny of Fennoscandia. Geological Survey of Finland, Special Paper 53. 401 p.

Assessment methods and criteria:

Oral presentation and acting as an opponent

Grading:

Pass/fail

Person responsible:

Prof. Shenghong Yang

902002Y: English 1 (Reading for Academic Purposes), 2 op

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Proficiency level:

B2-C1

Status:

This course is mandatory for students who choose English as their foreign language in the following B.Sc. degree programmes:

Faculty of Natural Sciences

- Biology
- Mathematical and Physical Sciences.

Faculty of Technology

- Chemistry
- Geosciences.

Note:

Please consult your faculty's Study Guide to establish the language requirements for your own degree program.

Required proficiency level:

English must have been the A1 or A2 language at school, or equivalent skills in English must have been otherwise acquired. If you need to take English, but lack the background, please get in touch with the Languages and Communication contact teacher to discuss individual solutions.

ECTS Credits:

2 ECTS / 53 hours of work

Language of instruction:

English

Timing:

Biology: 1st year spring term (periods 3 and 4)

Mathematical and Physical Sciences: 1st year autumn term (periods 1 and 2)

Chemistry: 1st year autumn term (periods 1 and 2)

Geosciences: 1st year spring term (periods 3 and 4)

Learning outcomes:

By the end of the course, you are expected to demonstrate the ability to:

utilize your knowledge of word formation, text structure, and cohesion markers to understand the vocabulary and content of academic texts,

use effective reading strategies and techniques for studying vocabulary, and summarize texts both orally or in writing.

Contents:

The course will focus on reading strategies; these include recognising how texts are organised, identifying key points in a text, and understanding words in context. Vocabulary work in the course will focus on: a) academic vocabulary, as used in formal scientific writing, and b) using your knowledge of the meanings of parts of words (affixes) to infer meaning.

Mode of delivery:

The course is implemented using blended methods, which may include web-based teaching and face-to-face teaching. The course utilizes the Moodle learning environment.

Learning activities and teaching methods:

The English 1 course is adapted to accommodate many different fields of study, and thus the materials and implementation methods of the course vary. There will be 26 hours of guided teaching events and 28 hours of independent study, either individually or in a group.

Target group:

Faculty of Natural Sciences: 1st-year students of Biology, Mathematical & Physical Sciences

Faculty of Technology: 1st-year students of Chemistry, Geosciences

Prerequisites and co-requisites:

Post-requisite Students are also required to take [English 2 902004Y](#) following completion of this course.

Recommended optional programme components:

None

Recommended or required reading:

Course materials used will be available from the library or online.

Assessment methods and criteria:

Continuous assessment takes into account active and regular participation in classroom sessions and successful completion of all homework tasks, There are three monthly tests on material covered so far. The assessment of the course is based on the learning outcomes listed above.

Grading:

The course utilises a grading scale of Pass/Fail.

Person responsible:

Karen Niskanen

Working life cooperation:

The course does not contain working life cooperation.

Other information:

N.B. Students with grades laudatur or eximia in their A1 English school-leaving examination can be exempted from this course and will be granted the credits by your faculty. Contact the faculty for information.

902004Y: English 2 (Scientific Communication), 2 op

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Leikkaavuudet:

ay902004Y English 2 (Scientific Communication) (OPEN UNI) 2.0 op

Proficiency level:

B2 - C1

Status:

This course is mandatory for students who choose English as their foreign language in the following B.Sc. degree programs:

Faculty of Natural Sciences:

Biology

Mathematical & Physical Sciences.

Faculty of Technology:

Chemistry

Geoscience.

Required proficiency level:

Students taking this course must have had English as the A1 or A2 language at school or have equivalent skills.

ECTS Credits:

2 ECTS credits / 53 hours of work.

Language of instruction:

English

Timing:

Biology: 2nd year autumn term (periods 1 and 2)

Mathematic and Physical Sciences 1st year spring term (periods 3 and 4)

Chemistry: 2nd year spring term (periods 3 and 4)

Geosciences: 2nd year spring term (periods 3 and 4)

Learning outcomes:

By the end of the course, you are expected to have demonstrated the ability to:

use appropriate strategies and techniques for communicating effectively in English in an academic context in your own field

prepare and present scientific subjects from your own field of studies to your classmates, using appropriate field-related vocabulary.

Contents:

In the classroom, you will practice the skills of listening, speaking and presenting topics in your own field. The emphasis is on working in pairs and small groups. In addition, you will complete independent homework assignments to support the classroom learning.

Mode of delivery:

The course is implemented using blended methods, which may include distance teaching, classroom instruction and activities in the Moodle learning environment.

Learning activities and teaching methods:

The English 2 course is tailored to the needs of students in different fields of study, and thus the materials and implementation methods of the course vary between groups. The teacher will provide a more detailed schedule and list of homework tasks. There will be 26 hours of guided teaching events and 28 hours of independent work, including both individual and group work.

Target group:

2nd year students of Biology, Chemistry, Geoscience

1st year students of Mathematical and Physical Sciences

Prerequisites and co-requisites:

Prerequisite course: 902002Y English 1, unless exempted

Recommended optional programme components:

Recommended or required reading:

Materials will be provided in electronic format or are available from the library.

Assessment methods and criteria:

Continuous assessment is based on regular attendance, active participation in all lessons and the successful completion of all homework tasks. The assessment of the course is based on the learning outcomes of the course.

Grading:

Pass / fail.

Person responsible:

Karen Niskanen

Working life cooperation:

-

Other information:

-

030005P: Information Skills, 1 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Technology

Arvostelu: 1 - 5, pass, fail

Opettajat: Ursula Heinikoski

Opintokohteen kielet: Finnish

Leikkaavuudet:

030004P Introduction to Information Retrieval 0.0 op

ECTS Credits:

1 ECTS credit / 27 hours of work

Language of instruction:

Finnish

Timing:

Architecture 3. spring semester, period III;
 biochemistry 3. autumn semester;
 biology 3. autumn semester, period I;
 chemistry 3. autumn semester, period I;
 civil engineering 2. spring semester, period IV;
 computer science and engineering 2. spring semester, period IV;
 electronics and communications engineering 3. spring semester;
 geosciences 2. spring semester, period IV;
 geography 3. semester, periods I and III;
 industrial engineering and management 3. year;
 information processing sciences 1. or 3. year;
 mathematics and physics 1. spring semester, period III;
 mechanical engineering 3. year;
 mining engineering and mineral processing 3. year;
 process and environmental engineering 2. year, period II;
 Master's degree students in industrial engineering and management 1st year.

Learning outcomes:

Upon completion of the course, the students:

- can search scientific information,
- can use the most important databases of their discipline,
- know how to evaluate search results and information sources,
- can use the reference management tool.

Contents:

Scientific information retrieval process, the most important databases and publication channels of the discipline, evaluation of the reliability of information sources and reference management tool.

Mode of delivery:

Blended teaching: classroom training, web-based learning material and exercises, a group assignment.

Learning activities and teaching methods:

Training sessions 8 h, group working 7 h, self-study 12 h

Target group:

Compulsory for all bachelor degree students of Faculty of information technology and electrical engineering, Faculty of Technology and Faculty of science. Compulsory also for those Master's degree students in Industrial Engineering and Management who have no earlier studies in the information skills. Optional for the students of biochemistry.

Recommended optional programme components:

In biochemistry the course is completed as a part of 740376A Bachelor's Thesis.

Recommended or required reading:

Web learning material [Tieteellisen tiedonhankinnan opas](#)

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:

Ursula Heinikoski

770001Y: Orientation course for new students, 1 op

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

1 cr

Language of instruction:

Finnish/English

Timing:

1st year autumn

Learning outcomes:

Students are familiar with the university environment and practical issues of their studies and are able find appropriate of advice if needed.

Contents:

Students are tutored to the study system of the university and given information on the contents and goals of the degree programme of the Geosciences.

Mode of delivery:

Face to face

Learning activities and teaching methods:

15 to 18 h of tutoring

Target group:

1st year geosciences students

Assessment methods and criteria:

Participation in team tutoring, etc., and preparing a Personal Study Plan (PSP) for the degree programme studies.

Grading:

Pass/fail

Person responsible:

Tutor Teachers

901055Y: Second Official Language (Swedish), Oral Skills (OMS), 1 op

Voimassaolo: 01.08.2014 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Opintokohteen kielet: Swedish

901054Y: Second Official Language (Swedish), Written Skills (OMS), 1 op**Voimassaolo:** 01.08.2014 -**Opiskelumuoto:** Language and Communication Studies**Laji:** Course**Vastuuyksikkö:** Languages and Communication**Opintokohteen kielet:** Swedish**771117P: Basic course in mineralogy, 5 op****Voimassaolo:** 01.08.2017 -**Opiskelumuoto:** Basic Studies**Laji:** Course**Vastuuyksikkö:** Oulu Mining School**Arvostelu:** 1 - 5, pass, fail**Opettajat:** Pekka Tuisku**Opintokohteen kielet:** Finnish**ECTS Credits:**

5 ects

Person responsible:

Pekka Tuisku

771113P: Introduction to Geology I, 5 op**Voimassaolo:** 01.08.2015 -**Opiskelumuoto:** Basic Studies**Laji:** Course**Vastuuyksikkö:** Oulu Mining School**Arvostelu:** 1 - 5, pass, fail**Opettajat:** Kari Strand**Opintokohteen kielet:** Finnish**Leikkaavuudet:**

ay771113P Introduction to Geology I (OPEN UNI) 5.0 op

ECTS Credits:

5 credits

Language of instruction:

Finnish

Timing:

1st year autumn

Learning outcomes:

Students have an understanding of the basic concepts of the Earth, from its composition and internal *structure* to the geological *processes* that has led to its evolution the present Earth as part of the solar system. They can tell how endogenic processes in the mantle and crust produce magmas and how magmas produce different igneous rock type upon emplacement below and on the Earth's surface. Students are able to recognise and classify common igneous rocks based on their mineral composition and are familiar with common metamorphic rocks and know the metamorphic facies concepts. They can relate deformation and metamorphism of the rocks to plate tectonic processes.

Contents:

Evolution of the Earth as part of the solar system, structure and composition of the Earth. Classification of igneous rocks, magmatism, origin and crystallisation of magmas, volcanism, metamorphism and formation of metamorphic rocks, plate tectonics and deformation structures.

Mode of delivery:

Face to face

Learning activities and teaching methods:

36 h lectures, 6 h exercises

Target group:

1st year geoscience students. The course is a good minor subject course for others.

Prerequisites and co-requisites:

Basic course in mineralogy (771102P) is parallel to this course.

Recommended optional programme components:

This course is intended as an introduction to the scope and methods of igneous and metamorphic petrology.

Recommended or required reading:

Martti Lehtinen, Pekka Nurminen and Tapani Rämö (1998) Suomen kallioperä – 3000 vuosimiljoonaa. Suomen Geologinen Seura, Gummerus Jyväskylä, ISBN 952-90-9260-1, Chapters 2-3. John Grotzinger & Thomas H. Jordan (2010 or 2014) Understanding Earth, 6th or 7th edition, Chapters 1-4, 6-7, 9-10, 12.

Assessment methods and criteria:

Written examination and identification test of rock types.

Grading:

5-1/fail

Person responsible:

Kari Strand

Working life cooperation:

No

771114P: Introduction to Geology II, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opettajat: Juha Pekka Lunkka

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS / 133 hours of work

Language of instruction:

Finnish

Timing:

1st year autumn

Learning outcomes:

Upon completion of the course, students should have acquired basic knowledge on the concepts and processes of surficial geology. Students should also be able to identify basic sediment types and soils.

Contents:

Basic concepts of surficial physical geology, weathering, erosion, sedimentation, and sediment types, soils and geological processes forming sedimentary deposits.

Mode of delivery:

Face to face teaching

Learning activities and teaching methods:

16 h lectures, 8 h exercises

Target group:

1st year Geoscience students. The course is a good minor subject course for others.

Prerequisites and co-requisites:

No

Recommended or required reading:

Handouts and John Grotzinger & Thomas H. Jordan (2010 or 2014) Understanding Earth, 6th or 7th edition, Chapters 5, 8, 15-21.

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

Assessment methods and criteria:

Obligatory exercises and written examination

Grading:

5-1/fail

Person responsible:

Juha Pekka Lunkka and Tiina Eskola

Working life cooperation:

No

771116P: Introduction to Quaternary deposits of Finland and their resources, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opettajat: Juha Pekka Lunkka

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS / 133 hours of work

Language of instruction:

Finnish

Timing:

1st year spring

Learning outcomes:

Students can describe the main features and raw material resources of the Finnish Quaternary deposits.

Contents:

Main features and raw material resources of the Finnish Quaternary deposits and their origin.

Mode of delivery:

Face to face teaching

Learning activities and teaching methods:

22 h lectures. In addition, a one-day field trip is organized in May for major subject students.

Target group:

1st year Geoscience students. The course is a good minor subject course for others.

Prerequisites and co-requisites:

Introduction to Geology II (771114P) or equivalent knowledge

Recommended or required reading:

Veli-Pekka Salonen, Matti Eronen, Matti Saarnisto (2002) Käytännön maaperägeologia, 236 s.

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

Assessment methods and criteria:

Written examination

Grading:

5-1/fail

Person responsible:

Juha Pekka Lunkka

Working life cooperation:

No

771115P: Introduction to bedrock geology of Finland and ore geology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Strand

Opintokohteen kielet: Finnish

ECTS Credits:

5 credits

Language of instruction:

Finnish

Timing:

1st year spring

Learning outcomes:

Students can describe and recognise the main geological units of the Finnish bedrock and name them based on their stratigraphic position and age relations. They can connect the major geological units to the main stages of the plate tectonic evolution. Students are familiar with most common ore types and industrial minerals occurring in the bedrock and the principal processes leading to their formation and how they are explored.

Contents:

Lithostratigraphical units, the Archaean and Palaeoproterozoic bedrock of Finland and younger rock formations. Mineral resources, their classification and origin, exploration methods.

Mode of delivery:

Face to face

Learning activities and teaching methods:

24 h lectures. In addition, a one-day field trip is organized in May for major subject students.

Target group:

Major and minor subject students starting studies in geology.

Prerequisites and co-requisites:

Basic course in mineralogy (771102P), Introduction to Geology I (771113P), Introduction to Geology II (771114P) or equivalent knowledge.

Recommended or required reading:

Material given during the lectures and Lehtinen, M., Nurmi, P., Rämö, T. (1998) Suomen kallioperä – 3000 vuosimiljoonaa. Suomen Geologinen Seura, Gummerus Jyväskylä, ISBN 952-90-9260-1, p. 94-324 (available on webpages of Suomen Geologisen Seura). Parts of Craig, J.R., Vaughan, D.J. & Skinner, B.J. (1996) Resources of the Earth - Origin, Use, and Environmental Impact. Prentice Hall, 472 p.

Assessment methods and criteria:

Written examination.

Grading:

5-1/fail

Person responsible:

Eero Hanski

Working life cooperation:

No

491102P: Introduction to solid earth geophysics, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Basic Studies**Laji:** Course**Vastuuyksikkö:** Oulu Mining School**Arvostelu:** 1 - 5, pass, fail**Opettajat:** Moisio, Kari Juhani**Opintokohteen kielet:** Finnish**Timing:**

Spring semester, period 3. Recommended at 1st or 2nd year of the Bachelor studies.

Learning outcomes:

Upon the completion of the course, a student can describe the position and role of geophysics in the field of the Earth system sciences, can describe the structure of the Earth and its neighbouring environment in space (spheres), their internal geophysical properties and the interactions between different spheres, can describe large scale transfer (movement) of rock material inside the Earth and on its surface (convection, plate tectonics) and can name most common geophysical research methods.

Contents:

An overview of geophysics. Solid Earth geo-physics and Earth Sciences. Properties, structure and dynamics of the Earth. Earth as a planet: shape, size, rotation, revolution. Earth's gravitational field. Isostasy. Deformation and rheology. Seismology: seismic waves and the internal structure of the Earth. Earth's geomagnetic field. Geothermics. Electric and electromagnetic methods.

Learning activities and teaching methods:

A specific target group is written in this field.

Prerequisites and co-requisites:

No specific prerequisites.

Recommended or required reading:

Lecture materials. U. Borén, E. Hjelt, S.-E., Karjalainen, T. ja Sirviö, J., 20014. Geofysiikka, Tunne maapallosi. WSOY, 191 p. Additional recommended reading: Musset, A.E. and Aftab Khan, M., 2000: Looking into the Earth: an introduction to geological geophysics. Cambridge University Press, 470 pp. ja Lowrie, W., 1997. Fundamentals of geophysics. Cambridge University press, 354 p.

Assessment methods and criteria:

Variable grading and evaluation methods

Grading:

1-5/fall

Person responsible:

Kari Moisio

Working life cooperation:

No working life cooperation

774311A: A Basic Course in Geochemistry, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 cr

Language of instruction:

The language of instruction is Finnish. The course can also be completed in English as a book examination.

Timing:

The course is held in the spring semester, during period 3

Learning outcomes:

Opintojakson suoritettuaan opiskelija:

- osaa määritellä geokemian eri osa-alueet,
- omaa yleiskuvan siitä, kuinka alkuaineiden käyttäytymistä luonnossa säätelevät fysiko-kemialliset prosessit ja alkuaineiden elektronirakenteet erot ovat aikojen kuluessa saaneet aikaan maapallon erilaistumisen eri kehiin ja vaikuttavat alkuaineiden käyttäytymiseen geologisissa prosessissa,
- osaa muuttaa geokemiallista analyysiaineistoa muodosta toiseen (esim. painoprosenteista molekyyliosuuksiksi), osaa sijoittaa analyysiaineistoa erilaisille diagrammeille, ja
- kykenee suorittamaan yksinkertaisia laskuja koskien massatasapainoa ja mineraalien saostumis- ja liukenemisreaktioita.

Contents:

Geochemistry as a field of science; history of geochemistry; tasks and fields of geochemistry; origin and electron configuration of chemical elements; origins and structure of the Earth; meteorites; the geochemical classification of the elements; composition of earth's different spheres; geochemical differentiation; composition of magmas; dissolution and precipitation of minerals; pH-Eh-diagrams; introduction to isotope geochemistry.

Mode of delivery:

Face to face teaching

Learning activities and teaching methods:

32 h lectures, 12 h exercises

Target group:

All students in geosciences, and mining engineering and mineral processing

Prerequisites and co-requisites:

A basic course in chemistry

Recommended optional programme components:

The course is an independent entity and does not require additional studies carried out at the same time

Recommended or required reading:

Gill, Robin (1996) Chemical Fundamentals of Geology, Chapman & Hall, London, 298 p. Additional material will be given during the lectures.

Assessment methods and criteria:

Examination in both theory and calculations

Grading:

The course utilizes a numerical grading scale 1-5. The grade is calculated as the average of the marks of two exams. Zero stands for a fail.

Person responsible:

Pertti Sarala

774304A: Analytical methods in geochemistry, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 cr

Language of instruction:

The language of instruction is Finnish or English, depending on the participants

Timing:

The course is held in the autumn semester, during period 2

Learning outcomes:

Upon completion of this course, the student will:

- know which kind of sample pre-treatment and analysis methods are used for geological samples
- is aware of different factors that need to be taken into account when planning a geochemical research project.

Contents:

Detection limits and errors in analysis, presentation of analytical results, sampling, sample pre-treatment, sample digestion (melts, solutions), silicate analysis theories and practice of different instrumental methods (AAS, XRF, ICP-AES, ICP-MS, TIMS), a visit to a chemical laboratory.

Mode of delivery:

Face to face teaching

Learning activities and teaching methods:

24 h lectures, visit to a facility for sample pre-treatment and a chemical laboratory

Target group:

Students in geosciences, and mining engineering and mineral processing

Prerequisites and co-requisites:

The recommended prerequisite is the completion of 774311A Basic Course in Geochemistry prior to enrolling for the course

Recommended optional programme components:

The course is an independent entity and does not require additional studies carried out at the same time

Recommended or required reading:

Gill, Robin (Ed.) (1997) Modern Analytical Geochemistry: An Introduction to Quantitative Chemical Analysis for Earth, Environmental and Materials Scientists, Harlow, Longman, 329 p. & Sawyer, Clair N., McCarty, Perry L., Parkin, Gene F. (2003) Chemistry for Environmental Engineering and Science, Boston, McGraw-Hill, p. 410-451.

Assessment methods and criteria:

Written examination.

Grading:

The course utilizes a numerical grading scale 1-5. Zero stands for a fail.

Person responsible:

Paavo Perämäki

771309A: Bachelor of Science thesis and seminar, 8 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

8 ECTS cr / 213 hours of student's work

Language of instruction:

Finnish

Timing:

3rd study year, autumn and spring semesters, according to a separately agreed schedule

Learning outcomes:

A bachelor's thesis is a written research report in which a student demonstrates that he or she has the knowledge and skills required for a bachelor's degree. The Bachelor's Thesis and Seminar course is intended for all Bachelor of Science in Geosciences degree students who already have a topic for the thesis or who wish to obtain a topic. The purpose of the course is to provide the ability to prepare a scientific papers based on scientific sources, as well as to present the paper orally, give feedback and receive it. The completed bachelor's thesis will be presented orally at a separately agreed time.

Contents:

Principals and practices of scientific writing and information retrieval. Agreeing on seminar topics and presentation times. Preparation of one's own written thesis using scientific source materials on a given or student's own topic, oral presentation of the work in a seminar and active participation in other seminars. Finalization of the thesis manuscript and submitting it as a bachelor's thesis for evaluation.

Learning activities and teaching methods:

Participation in contact teaching and seminars, for which the code of conduct will be agreed at the first meetings in the autumn. Written seminar work (bachelor's thesis) and participation in the discussion. Thesis completion and return for examination.

Target group:

All Bachelor of Science in Geosciences degree students

Prerequisites and co-requisites:

Previous and concurrent other studies included in the Bachelor of Geosciences degree

Recommended optional programme components:

See Prerequisites and co-requisites

Recommended or required reading:

Lecture materials and literature to be provided separately. Scientific (and other) literature required for the preparation of the student's own bachelor's thesis.

Grading:

Passed / Failed

Person responsible:

Jukka-Pekka Ranta

773344A: Basics of glacial geology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opettajat: Juha Pekka Lunkka

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS / 133 hours of work

Language of instruction:

Finnish

Timing:

2nd or 3rd study year (1 period)

Learning outcomes:

Upon completion of the course, students should have acquired basic knowledge of glaciogenic sediment types and of morphological landforms and can present theories of how glaciers are formed.

Contents:

A review to history of glacial research and its methods; theories of how glaciers are generated and factors that affect 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.

Mode of delivery:

Face to face teaching

Learning activities and teaching methods:

26 h lectures.

Target group:

2nd and 3rd year geoscience students

Prerequisites and co-requisites:

Introduction to Geology II (771114P) or equivalent knowledge, Introduction to Quaternary deposits of Finland and their resources (771116P)

Recommended or required reading:

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

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

Assessment methods and criteria:

Written examination

Grading:

5-1/fail

Person responsible:

Juha Pekka Lunkka

Working life cooperation:

No

773346A: Environmental geology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

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:

Upon completion of the course, the student knows and understand:

main environmental concepts

environmental effects of the use of geological resources

geological risk factors

environmental effects of human and urban activity

acidification of soil and water

Contents:

After the course students knows and can describe environment geological concepts and can use them in estimation of the effect of natural geological processes and anthropogenic activities for the environment and nature.

Mode of delivery:

Face to face teaching.

Learning activities and teaching methods:

24 hours of guided teaching, teaching without guidance either privately or in groups and visits.

Target group:

Students in the 2nd or 3rd year.

Prerequisites and co-requisites:

The prerequisite is the completion of the following courses prior to enrolling for the course: Geologian peruskurssi II (771114P) and Johdatus Suomen maaperägeologiaan ja maaperän raaka-ainevaroihin (771116P) or similiar knowledge.

Recommended or required reading:

Niini, H., Uusinoka, R. & Niinimäki, R. 2007. Geologia ympäristötoiminnassa. Rakennusgeologinen yhdistys - Byggnadsgeologiska föreningen r.y., 354 p. and Murck, B.W., Skinner, B.J. & Porter, S.C., 1996: Environmental Geology, John Wiley & Sons, 535 p., Other materials delivered during the course.

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

Assessment methods and criteria:

Participation in the lectures, activity in private or group works and final examination. The assessment of the course is based on the learning outcomes of the course. The more detailed assessment criteria are available on the Noppa Study Portal. Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5/fail.

Person responsible:

Pertti Sarala

Working life cooperation:

Working life cooperation The course could include visits to the companies or guest lectures of the course's subject.

494302A: GIS and spatial data, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opettajat: Moisio, Kari Juhani

Opintokohteen kielet: Finnish

Leikkaavuudet:

485023A GIs and geoinformatics 5.0 op

ECTS Credits:

5 credits

Language of instruction:

Finnish

Timing:

Autumn term

Learning outcomes:

After completion the student collects the basics of spatial data and geographical information systems (GIS) including especially the most important coordinate systems, map projections, Finnish map coordinates and satellite positioning, and knows how to visualise spatial data in various different ways.

Contents:

Geoscientific observations and measurements are always tied to spatial location of the data. The course provides basic information about the presentation and handling of spatially dependent geoscientific data and geographic information systems (GIS). The course considers the basics of spatial data, coordinate systems, map projections and map coordinates, satellite positioning, processing and visualisation of spatial data. Computer exercises demonstrate preparation and visualisation of geoscientific data in practice.

Mode of delivery:

Face to face

Learning activities and teaching methods:

Lectures and exercises totalling 40 h plus independent study 93 h.

Target group:

Students of Oulu Mining School, and the Faculties of Science and Technology. Obligatory to geosciences students in B.Sc. degree and Mining engineering and mineral processing/ Applied geophysics students in BSc (Tech) degree.

Prerequisites and co-requisites:

No specific prerequisites.

Recommended optional programme components:

No alternative course units or course units that should be completed simultaneously.

Recommended or required reading:

Lecture notes and Löytönen, M., Toivonen, T. & Kankaanrinta, I., (Eds.) 2003: Globus GIS.

Assessment methods and criteria:

Examination and computer test.

Grading:

5-1/fail

Person responsible:

Kari Moisio

Working life cooperation:

No work practise.

Other information:

[Course website](#)

772310A: General mineralogy, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opettajat: Pekka Tuisku

Opintokohteen kielet: Finnish

ECTS Credits:

5 credits

Language of instruction:

Finnish

Timing:

2nd or 3rd study 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.

Mode of delivery:

Face to face

Learning activities and teaching methods:

26 h lectures

Target group:

2nd and 3rd year geosciences students.

Prerequisites and co-requisites:

Basic course in Mineralogy 771106P.

Recommended or required reading:

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

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

Assessment methods and criteria:

Written examination

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

5-1/fail

Person responsible:

Pekka Tuisku, Jukka Pekka Ranta, Tiina Eskola

Working life cooperation:

No

772351A: Geological mapping, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 ETCS cr

Language of instruction:

Finnish or English

Timing:

2nd year (Spring)

Learning outcomes:

Upon completion of the course, the student knows the principles of bedrock and Quaternary mapping

Contents:

Basic methods of geological mapping and introduction to map production

Mode of delivery:

Face to face teaching in classroom and at field. Practical work.

Learning activities and teaching methods:

30 hours of lectures and field work.

Target group:

All students in geosciences

Prerequisites and co-requisites:

Basic studies in geosciences

Recommended or required reading:

Virkkala, K. 1972, Maaperäkartoituksen maasto-opas, Geological Survey of Finland, Espoo, Finland.

Haavisto-Hyvärinen, M. & Kutvonen, H. 2007, Maaperäkartan käyttöopas, Geological Survey of Finland, Espoo, Finland.

Laitakari, I & Matisto, A. 1974 Kallioperäkartoitus, Geological Survey of Finland, Espoo, Finland.

Assessment methods and criteria:

Participation to the lectures and field work. Construction of a bedrock and Quaternary map and a graphic log of a sediment succession.

Grading:

Pass/Fail

Person responsible:

Person responsible: Kari Strand

Teachers: Kari Strand, Juha Pekka Lunkka, Kirsi Luolavirta, Tiina Eskola

494301A: Geophysical research methods of rock and soil, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opettajat: Moisio, Kari Juhani

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS cr

Language of instruction:

Finnish

Timing:

2nd year, spring term

Learning outcomes:

After the course, the student can explain the use of geophysical methods in investigating bedrock and soil structure. The student can describe theoretical basics and the measuring techniques of the different geophysical methods and has an understanding how to apply these methods in various important economical and civil targets.

Contents:

The aim of the course is to learn the principles of applying different geophysical methods for various economical and civil targets. Geophysical subjects in sediments and bedrock and basics for their exploration. Basics of petrophysical properties. Gravity methods, magnetic methods, resistivity methods, IP method, electromagnetic methods, radiometric methods and seismic methods: the physical principles, devices and measuring in practice.

Aerogeophysical methods. Borehole measurements.

Mode of delivery:

Face to face teaching

Learning activities and teaching methods:

Lectures and exercises 50 h, plus independent study.

Target group:

Students of Oulu Mining School, and the Faculties of Science and Technology

Prerequisites and co-requisites:

No particular pre-requisites

Recommended optional programme components:

No alternative course units or course units that should be completed simultaneously.

Recommended or required reading:

Material given during lectures, Peltoniemi, M. (1988) Maa- ja kallioperän geofysikaaliset tutkimusmenetelmät and Reynolds, J.M. (2011) Principles of Applied Geophysics. Applicable parts of the following textbooks: Milsom, J. (1989) Field Geophysics; Telford, W.M., Geldart, T.M. & Sheriff, R.E. (1990) Applied Geophysics; Kearey, P., Brooks, M. & Hill, I. (2002) An Introduction to Geophysical Exploration; Parasnis, D.S. (1997) Principles of Applied Geophysics; Sharma, P.V., (1997) Environmental and Engineering Geophysics.

Assessment methods and criteria:

Varying assessment and evaluation methods.

Grading:

5-1/fail

Person responsible:

Kari Moisio

Working life cooperation:

No

Other information:

This is the same course as 490301A

772335A: Introduction to ore mineralogy, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opettajat: Eero Hanski

Opintokohteen kielet: English

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 ECTS

Language of instruction:

The language of instruction is English.

Timing:

The course is held in the autumn semester, during period I. It is recommended to complete the course at the 2nd or 3rd autumn semester.

Learning outcomes:

Upon completion of this course, the student will:

obtain basic knowledge on ore minerals and their mode of occurrence

learn to recognise the most common ore minerals and textures 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. Identification of ore minerals and ore mineral assemblages.

Mode of delivery:

Face to face teaching.

Learning activities and teaching methods:

14 h lectures, 21 h exercises.

Target group:

All students in geosciences and mining engineering and mineral processing.

Prerequisites and co-requisites:

The recommended prerequisite is the completion of the following courses prior to enrolling for the course: 771102P Basic mineralogy, 772339A Optical mineralogy.

Recommended optional programme components:

The course is an independent entity and does not require additional studies carried out at the same time.

Recommended or required reading:

Textbook: Craig, J.P. & Vaughan, D.J. (1994) Ore Microscopy and Ore Petrography. Wiley & Sons, 2nd ed. 434 p.
 Other handbook-type literature supporting the microscope exercises: Wiley & Sons, 2nd ed. 434 p. Ramdohr, P. (1980) The Ore Minerals and their Intergrowths, vol. 1 and 2. Pergamon Press, 1205 p. Spry P.G. & Gedlinski B.L. (1987) Tables for Determination of Common Opaque Minerals. Economic Geology Publishing Co. 52 p. Barnes H.L. (1997) Geochemistry of Hydrothermal Ore Deposits. John Wiley & Sons, Inc., New York, 3rd ed. 992 p. Nesse W.D. (2012) Introduction to Mineralogy, Oxford University Press. 480 p. Pracejus B. (2008) The ore minerals under the microscope – An optical guide. Atlases in Geosciences 3, Elsevier, 875 p.

The availability of the textbooks can be checked via [this link](#).

Assessment methods and criteria:

Examinations in both theory and calculations.

Grading:

In the theory exam grade and final grade, the course utilizes a numerical grading scale of 1-5. Zero stands for a fail. In the microscope exam, the course utilizes verbal grading pass/fail.

Person responsible:

Shenghong Yang

Working life cooperation:

No.

770690S: Maturity test, 0 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

772348A: Optical Mineralogy, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Person responsible:

Pekka Tuisku

772386A: Ore Geology and Society, 5 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

ECTS Credits:

5 ECTS cr

Language of instruction:

Finnish

Timing:

2nd or 3rd year, autumn semester

Learning outcomes:

Upon completion of the course, students should have a basic knowledge of the raw materials obtained by mining and their role in the modern society. Based on geological review of ore deposit types the dynamics of various commodity spaces will be examined with an emphasis on the dynamics of demand and supply fundamentals. Also, challenges to the mining industry regarding social acceptance will be discussed.

Contents:

The ore-forming processes, classification schemes for ore deposit, global distribution of mineral resources, discussion of economic, social and other constraints on exploration and mining.

Mode of delivery:

Contact teaching, materials in Moodle

Learning activities and teaching methods:

Lecture videos, assignments, contact teaching

Recommended or required reading:

Robb, L. (2005). Introduction to ore-forming processes. Blackwell Publishing, 373 p

Kesler, S., Simon, A. (2015) Mineral Resources, Economics and the Environment, Cambridge University Press, Second edition, 434 p.

Assessment methods and criteria:

Home exams in Moodle

Grading:

1-5/fail

Person responsible:

Jukka-Pekka Ranta

Working life cooperation:

No

773322A: Surficial geology in ore exploration, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 credits.

Language of instruction:

Finnish or English.

Timing:

2nd (periods 3 or 4) or 3rd year.

Learning outcomes:

Upon completion of the course, the student knows and understand:

main stages of surficial geological ore exploration process including basic knowledge of the use of glacial morphologies, ore boulders and till geochemistry in mineral exploration in the glaciated terrains elements' concentrations and the effect of their variability in different sediments sampling, sample processing and analytical methods

Contents:

Student learn main stages of surficial geological ore exploration process and the methods used.

In addition, main concepts of boulder hunting and geochemical dispersion in the glaciated terrains are studied.

Mode of delivery:

Face to face teaching.

Learning activities and teaching methods:

There will be 24 hours of guided teaching and teaching without guidance either privately or in groups.

Target group:

Students in the 2nd or 3rd year.

Prerequisites and co-requisites:

The prerequisite is the completion of the following courses prior to enrolling for the course: Geologian peruskurssi II (771114P), Johdatus Suomen maaperägeologiaan ja maaperän raaka-aineväriin (771116P) and Glasiaaligeologian perusteet (773344A) or similar knowledge.

Recommended optional programme components:

The course is an independent entity and does not require additional studies carried out at the same time.

Recommended or required reading:

Kujansuu, R. ja Saarnisto, M. (eds.): Glacial Indicator Tracing, A.A. Balkema, 1990, 252 s. ja Sarala, P. 2015. Surficial geochemical exploration methods. In: Mayer, W.D., Lahtinen, R. & O'Brien, H. (toim.), Mineral deposits of Finland. Chapter 10.1. Elsevier, Amsterdam. s. 711-731. Other materials delivered during the course.

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

Assessment methods and criteria:

Participation in the lectures, activity in private or group works, final examination. The assessment of the course is based on the learning outcomes of the course. The more detailed assessment criteria are available on the Noppa Study Portal. Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5/fail.

Person responsible:

Pertti Sarala

Working life cooperation:

The course could include visits to the companies or guest lectures of the course's subject.

555225P: Basics of industrial engineering and management, 5 op

Voimassaolo: 01.01.2014 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail

Opettajat: Elina Jääskä

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay555225P	Basics of industrial engineering and management (OPEN UNI)	5.0 op
555221P	Introduction to Production	2.0 op
555220P	Basic Course in Industrial Engineering and Management	3.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish. English material is also used.

Timing:

Period 1.

Learning outcomes:

Upon completion of the course, the student will be able to:

- describe what industrial engineering and management (or operations management) means
- explain the core concepts of business operations and utilise these concepts in describing and analysing operations of an organisation
- explain in general terms the factors that affect economic performance of organisations
- utilise the terminology used in industrial engineering and management (operations management), describe the financial processes of companies and based on this describe the use of cost accounting in organisational decision-making
- calculate unit costs in various simplified settings, calculate various alternatives, as well as perform planning and goal oriented calculations based on given data, and draw conclusions based on the calculation results

Contents:

Operations and productivity, operations strategy, forecasting, accounting and cost accounting, investments and financial planning, sustainability, capacity management, location decisions, layout strategies, human resources management, supply chain management, subcontracting, inventory management, production planning, MRP & ERP, production scheduling, Just-in-Time & Lean operations, maintenance.

Mode of delivery:

Web-based teaching 20 hours / practices 14 hours / Independent studying 100 hours.

Learning activities and teaching methods:

Web-based lectures 20 h / exercises 14 h / self-study 100 h.

Target group:

Industrial Engineering and Management students and other students taking Industrial Engineering and Management as minor.

Prerequisites and co-requisites:

No prerequisites exist.

Recommended optional programme components:

This course is part of the 25 ECTS module of Industrial engineering and management that also includes 555285A Project management, 555242A Product development, 555264P Managing well-being and quality of working life, and 555286A Process and quality management.

Recommended or required reading:

Lecture and exercise materials. Heizer, J. & Render, B. (2014) Operations management: sustainability and supply chain management, 11th ed. Pearson. In addition, recommended materials include Martinsuo, M. et al. (2016) Teollisuustalouden kehittyvässä liiketoiminnassa chapters 7-9, 16 and 26.

Assessment methods and criteria:

This course utilises continuous assessment. During the course, there are seven mandatory weekly assignments.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

MSc (Tech.) Elina Jääskä

Working life cooperation:

-

Other information:

Substitutes courses 555220P Basic Course in Industrial Engineering and Management 3 ECTS cr and 555221P Introduction to Production 2 ECTS cr.

488142A: Environmental legislation and EIA, 5 op

Voimassaolo: 28.11.2016 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Process and Environmental Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Anna-Kaisa Ronkanen, Liedes, Hannu Tapani, Heini Postila, Tarja Outila

Opintokohteen kielet: Finnish

Leikkaavuudet:

454541A Built Environment 5.0 op

485022A Fundamentals of built environment 5.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work

Language of instruction:

Finnish

Timing:

The course is held in the spring semester during the period 4.

Contents:

Finnish law, EU directives.

Mode of delivery:

Face-to-face teaching and independent work with selected projects.

Learning activities and teaching methods:

Lectures 16 h / seminars 16 h / independent work with project topic. Totally 133 h. The project work are completed as a group work.

Target group:

Students in the bachelor programs of process and environmental engineering, Civil engineering and Architecture.

Recommended or required reading:

Oikeusministeriön oikeudellisen aineiston julkinen Internet-palvelu Finlex soveltuvin osin. (<http://finlex.fi>).

Ympäristöoikeuden pääpiirteet (Ekroos, Kumpula 2010, ISBN: 9789510361283) soveltuvin osin. Maankäyttö- ja

rakennuslaki 2000. Opas 10 (ISBN 951-731-249-0 (PDF), URN:ISBN:9513739767) soveltuvin osin. Maankäyttö- ja rakennuslaki 2000. Opas 11 (ISBN 951-731-250-4 (PDF), URN:ISBN:9513739775) soveltuvin osin. Maankäyttö- ja rakennuslaki 2000. Opas 12. (ISBN 951-731-251-2 (PDF), URN:ISBN:9513739783) soveltuvin osin. soveltuvin osin. Luentomuistiinpanot.

Assessment methods and criteria:

Project report (40%), seminar presentation (40%) and learning diaries (20%).

Grading:

The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

University teacher Hannu Liedes, University Lecturer Anna-Kaisa Ronkanen and Professor Tarja Outila

Working life cooperation:

The selected project topic is relating to true environmental projects.

Other information:

491101P: Introduction to mining, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opettajat: Saija Luukkanen

Opintokohteen kielet: Finnish

ECTS Credits:

5 cr

Language of instruction:

Finnish. Materials possibly partly in English.

Timing:

Autumn term, period 1

Learning outcomes:

After completing the course student can explain the various stages of mine value chain from exploration until the final concentrate. A student understands economical, social and environmental aspects of sustainable mining.

Contents:

Different stages of mine development: exploration, environmental aspects, geochemical and geophysical measurements, basics in mining engineering and mineral processing.

Mode of delivery:

Face to face teaching

Learning activities and teaching methods:

Lectures, practicals, final exam

Target group:

Bachelor's students in mining engineering and mineral processing, geosciences and process engineering

Recommended or required reading:

Online materials presented during the lectures

Assessment methods and criteria:

Final exam, practicals, activity

Grading:

5-1/failed

Person responsible:

Prof. Saija Luukkanen

555265P: Occupational Safety and Health Management, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail

Opettajat: Henri Jounila

Opintokohteen kielet: Finnish

Leikkaavuudet:

555263A Technology, Society and Work 2.0 op

555260P Basic Course in Occupational Safety and Wellbeing at Work 3.0 op

ECTS Credits:

5 ECTS credits.

Language of instruction:

Finnish. English material is also used.

Timing:

Periods 3-4.

Learning outcomes:

Upon completion of the course, the student will be able to:

- explain the basic terms of occupational safety and health
- assess the importance of occupational safety, health and well-being at work
- assess the significance of occupational safety in the improving of productivity and quality
- apply different safety analysis
- explain core issues of occupational safety and health management

Contents:

Occupational safety and health, safety management, safety culture, laws and standards, hazards and risks, occupational diseases and work accidents, safety analysis, occupational safety at shared industrial work sites, occupational safety card, HSEQ-assessment procedure, other current issues.

Mode of delivery:

The tuition will be implemented as face-to-face teaching.

Learning activities and teaching methods:

Lectures and assignments 26 h / group work 40 h / tasks and self-study 68 h.

Target group:

Industrial Engineering and Management, Mechanical Engineering, Process Engineering and Environmental Engineering students.

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Mertanen V. 2015. Työturvallisuuden perusteet. Helsinki: Työterveyslaitos. Lecture materials. Other materials will be defined during the course.

Assessment methods and criteria:

Group work 0-5, the assessment of the tasks will be informed at the beginning of the course.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

MSc Henri Jounila

Working life cooperation:

-

Other information:

Substitutes courses 555260P Basic Course in Occupational Safety and Wellbeing at Work + 555263A Technology, Society and Work.

493300A: Principles of mineral processing, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opettajat: Saija Luukkanen

Opintokohteen kielet: English, Finnish

Leikkaavuudet:

ay493300A Principles of mineral processing (OPEN UNI) 5.0 op

ECTS Credits:

5 ECTS / 133 hours of work

Language of instruction:

Finnish; material mainly in English

Timing:

2nd period in the autumn. Recommended for the 3rd year students.

Learning outcomes:

Upon completion the course the student can explain the main unit process used in ore beneficiation and understands the main chemical and mineralogical factors playing the key role in process development. The student is able to calculate the most relevant process related calculations, such as mass balances, concentrate recoveries and grindability. The student is aware of the environmental as well as H&S aspects of mineral processing.

Contents:

The main unit processes used in mineral processing. Understanding how the mineralogy and chemistry of the ore influences in the process development.

Mode of delivery:

Mainly face-to-face teaching

Learning activities and teaching methods:

Lectures, demonstrations, assignments

Target group:

Student with mineral processing as major; students of mining engineering, geosciences and process engineering

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

The material provided during the course. B.A. Wills: Mineral processing technology

Assessment methods and criteria:

Final exam, home works and practicals, energy

Grading:

1-5/fail

Person responsible:

Saija Luukkanen

Working life cooperation:

No

Other information:

-

780120P: Basic Principles in Chemistry, 5 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Chemistry

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

780117P General and Inorganic Chemistry A 5.0 op

780109P Basic Principles in Chemistry 4.0 op

ECTS Credits:

5 ECTS credits / 134 hours of work

Language of instruction:

Finnish

Timing:

The course is held in the autumn semester, during period 1

Learning outcomes:

Upon completion of the course, the student will be able to display an understanding of basic chemistry phenomenon; equilibrium of acids and bases, chemical equilibrium, redox reactions and stoichiometry.

Contents:

Introduction to chemistry, stoichiometry, redox reactions, chemical equilibrium, the equilibrium of acid and bases, buffer solutions, titration, thermodynamics.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

40 hours of lectures and 94 hours of self-study

Target group:

Biology, Geology, Process Engineering, Environmental Engineering compulsory.
Geography, optional.

Prerequisites and co-requisites:

The compulsory course in upper secondary school chemistry (1st course)

Recommended optional programme components:

The course is not included in the 25 ECTS credits entity of chemistry!

Recommended or required reading:

Tro, N.J., Principles of Chemistry. A Molecular Approach, Pearson, 3. edition, 2016

Assessment methods and criteria:

Final examination.

Grading:

The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail.

Person responsible:

Minna Tiainen

Working life cooperation:

No

802158P: Mathematics for Economic Sciences, 7 op

Voimassaolo: 01.06.2014 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Mathematics

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Myllylä

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay802158P Mathematics for Economic Sciences (OPEN UNI) 7.0 op

ECTS Credits:

7 ECTS credits

Language of instruction:

Finnish

Timing:

1. period. It is recommended to complete the course at the 1st autumn semester.

Learning outcomes:

After completing the course, student is able to:

- define and apply basic mathematical concept such as rationals, absolute value, power and root function
- handle different types of functions and knows their special properties
- solve different equations and inequalities
- define the concepts of limit and continuity of a function
- calculate limits in case of different functions
- calculate and apply derivative, and knows the relevance of the concept
- use all mathematical concepts covered by the course in different problems related to economics (interest, investments, optimization and indices)

Contents:

Course aims to build a solid background to mathematics in later economics courses. Course begins with a revision of concepts familiar from high school such as sequences, rationals, absolute value and powers. After that we focus on different types of functions such as polynomials, rational functions, exponential functions and logarithm. Different types of equations and inequalities, containing the functions mentioned above, are solved. Main concepts in the course are also limit of a function, continuity and derivative and their applications. Nämä käsitteet tullaan esittelemään kaikille kurssilla käsiteltäville funktiotyypeille.

After the more mathematical part, the focus is turned on economical applications (such as interests, optimization, investments, indexes).

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 40 h, exercises 20 h.

Target group:

Students in Oulu Business School

Prerequisites and co-requisites:

The course does not require additional studies carried out at the same time.

Recommended optional programme components:

After the course, student is able to continue other mathematics courses directed to the students in Oulu Business School.

Recommended or required reading:

Lecture notes

Assessment methods and criteria:

Mid-term exams and/or final exam

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Kari Myllylä / Erkki Laitinen

Working life cooperation:

-

031021P: Probability and Mathematical Statistics, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Applied Mathematics and Computational Mathematics

Arvostelu: 1 - 5, pass, fail

Opettajat: Jukka Kemppainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay031021P Probability and Mathematical Statistics (OPEN UNI) 5.0 op

ECTS Credits:

5 ECTS credits / 135 hours of work

Language of instruction:

Finnish

Timing:

Spring semester, period 3

Learning outcomes:

After completing the course the student

1. knows the key concepts of probability and the most important random variables,
2. will be able to use them in calculating probabilities and parameters of probability distributions,
3. is capable of analyzing statistical data by calculating interval and point estimates for the parameters,
4. will be able to formulate statistical hypotheses and test them,
5. knows the basics of linear regression.

Contents:

The key concepts of probability, random variable, parameters of probability distributions, estimation of parameters, hypothesis testing, regression analysis.

Mode of delivery:

Online teaching

Learning activities and teaching methods:

Lectures 28 h/Exercises 20 h/Self study 87 h.

Target group:

The students in the engineering sciences. Other students are welcome, too.

Prerequisites and co-requisites:

The recommended prerequisites are the course 031010P Calculus I and some parts of the course 031075P Calculus II.

Recommended optional programme components:

The course is an independent entity and does not require additional studies carried out at the same time.

Recommended or required reading:

Milton, J.S., Arnold, J.C. (1992): Introduction to Probability and Statistics.

Assessment methods and criteria:

Intermediate exams or a final exam. The exams are remote exams. It is possible to take exams also at the university.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail.

Person responsible:

Jukka Kempainen

Working life cooperation:

-

900060A: Technical Communication, 2 op

Voimassaolo: 01.08.2005 - 31.07.2021

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay900060A Technical Communication (OPEN UNI) 2.0 op

470218P Written and Oral Communication 3.0 op

Proficiency level:

This course is not offered in English. It is only Finnish-speaking students.

Status:

This course unit is compulsory for students of Electrical Engineering, Computer Science, Communications Technologies and Engineering Mechanical Engineering, Process and Environmental Engineering.

Required proficiency level:

-

ECTS Credits:

2 credits

Language of instruction:

Finnish

Timing:

1st year: Process and Environmental Engineering

2nd year: Communications Technologies

3rd year: Geoscience; Mechanical Engineering; Electrical Engineering, Computer Science and Engineering Technologies

Mode of delivery:

Multimodal teaching

Learning activities and teaching methods:

Contact hours ca. 20 h and independent group work or self-study ca. 34 h.

Target group:

Bachelors students of Electrical Engineering, Computer Science, Communications Technologies and Engineering Mechanical Engineering, Process and Environmental Engineering.

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Kauppinen, Anneli & Nummi, Jyrki & Savola, Tea: Tekniikan viestintä: kirjoittamisen ja puhumisen käsikirja (EDITA);
 Nykänen, Olli: Toimivaa tekstiä: Opas tekniikasta kirjoittaville (TEK) and material in Moodle study environment.

Assessment methods and criteria:

Active participation in contact teaching, independent study and completion of given assignments.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Pass / fail

Person responsible:

Kaija Oikarainen

Working life cooperation:

-

Other information:

All students are required to attend the first meeting of the course unit so the work groups can be formed and work started in a timely and efficient manner. When signing up for the course unit, you should keep in mind that completing it requires a responsible attitude and a strong commitment to the work because the teamwork-based exercises rely heavily on the participation and activity of the students.

If the student is involved in the University's student associations or functions in a position of trust in university government, student union administration or Oulun Teekkariyhdistys ry (or in its subordinate guilds), he/she may be relieved of some of the group communication exercises. These compensatory actions must always be agreed upon separately with the course unit's teacher. The student must present an official statement from a person in charge of the governing body or association, which details the student's tasks and involvement with that body or association. Participation that took place over five years ago does not entitle the student to any compensation.

H327009: Optional major studies in geology, 0 - 100 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Study module

Vastuuyksikkö: Oulu Mining School

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.