Opasraportti

Open University - Engineering, manufacturing and construction (2020 - 2021)

Tutkintorakenteisiin kuulumattomat opintokokonaisuudet ja -jaksot

485115S: Advanced topics on concrete technology, 5 op
466106S: Advanced topics on design of steel structures, 6 op
ay466106S: Advanced topics on design of steel structures (OPEN UNI), 6 op
462113S: Advanced topics on mechatronics and machine diagnostics, 5 - 10 op
ay462113S: Advanced topics on mechatronics and machine diagnostics (OPEN UNI), 5 op
771117P: Basic course in mineralogy, 5 op
771117P-01: Basic mineralogy, lectures, 0 op
771117P-02: Basic mineralogy, mineral identification, 0 op
485202S: Building information modeling, 5 op
ay780397A: Chemistry for Teachers (OPEN UNI), 5 op
ay782338A: Chemistry in Industrial Applications (OPEN UNI), 5 op
477128S: Circular Bioeconomy, 5 op
ay477128S: Circular Bioeconomy (OPEN UNI), 5 op
477624S: Control System Methods, 5 op
466105S: Design of Steel Structures, 6 op
ay466105S: Design of Steel Structures (OPEN UNI), 6 op
ay488231S: Environmental Chemistry and Ecology (OPEN UNI), 5 op
ay781309A: Environmental Chemistry for Chemistry Teachers, 5 op
488143S: Environmental Impact Assessment, 5 op
485308S: Foundation Engineering, 5 op
485302A: Foundation Engineering, 5 op
ay485302A: Foundation Engineering (OPEN UNI), 5 op
485304S: Fundamentals of Civil Engineering, 5 op
780117P: General and Inorganic Chemistry A, 5 op
ay780117P: General and Inorganic Chemistry A (OPEN UNI), 5 op
780118P: General and Inorganic Chemistry B, 5 op
ay780118P: General and Inorganic Chemistry B (OPEN UNI), 5 op
485306S: Geoenvironmental Engineering, 5 op
477416S: High temperature processes, 5 op
ay477416S: High temperature processes (OPEN UNI), 5 op
451535P: History of Architecture I, lecture course, 4 op
ay451535P: History of Architecture I, lecture course (OPEN UNI), 4 op
451537A: History of Architecture II, lecture course, 3 op
ay451537A: History of Architecture II, lecture course (OPEN UNI), 3 op
451504A: History of Architecture III, 3 op
ay451504A: History of Architecture III (OPEN UNI), 3 op
451513S: History of Interior Design / Historical interiors, 5 op
488102A: Hydrological Processes, 5 op
ay488102A: Hydrological Processes (OPEN UNI), 5 op
450547A: InDesign Basics, 1 op
ay450547A: InDesign Basics (OPEN UNI), 1 op
ayA440190: Industrial Engineering and Management (IEM) Minor Subject Studies (OPEN UNI), 25 op
Compulsory
ay555225P: Basics of industrial engineering and management (OPEN UNI), 5 op
ay555285A: Project management (OPEN UNI), 5 op
ay555286A: Process and quality management (OPEN UNI), 5 op
ay555264P: Managing well-being and quality of working life (OPEN UNI), 5 op
ay555242A: Product development (OPEN UNI), 5 op
771113P: Introduction to Geology I, 5 op
ay771113P: Introduction to Geology I (OPEN UNI), 5 op
771113P-02: Introduction to Geology I, Rock identification, 0 op
771113P-01: Introduction to Geology I, lectures, 0 op
771114P: Introduction to Geology II, 5 op
780116P: Introduction to Organic Chemistry, 5 op
ay780116P: Introduction to Organic Chemistry (OPEN UNI), 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
491101P: Introduction to mining, 5 op
491102P: Introduction to solid earth geophysics, 5 op
ay477221A: Material and Energy Balances (OPEN UNI), 5 op
ay477231A: Material and Energy Balances I (OPEN UNI), 2 op
ay477232A: Material and Energy Balances II (OPEN UNI), 3 op
452561S: Modern Wood Architecture, 15 op
485109A: Numerical methods in structural engineering, 5 op
450541A: Photoshop, Advanced Photomanipulation, 2 op
ay450541A: Photoshop, Advanced Photomanipulation (OPEN UNI), 2 op
493300A: Principles of mineral processing, 5 op
ay493300A: Principles of mineral processing (OPEN UNI), 5 op
477524S: Process Optimization, 5 op
ay477524S: Process Optimization (OPEN UNI), 5 op
477501A: Process dynamics, 5 op
ay477501A: Process dynamics (OPEN UNI), 5 op
492300A: Rock mechanics, 5 op
461102A: Statics, 5 op
ay461102A: Statics (OPEN UNI), 5 op
455511P: Visual Arts I, 5 op
455512P: Visual Arts II, 3 op

Opintokokonaisuuksien kuvaukset

Tutkintorakenteisiin kuulumattomien opintokokonaisuuksien ja -jaksojen kuvaukset

485115S: Advanced topics on concrete technology, 5 op

Voimassaolo: 01.08.2020 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Civil Engineering field
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:
466110S  Advanced topics on concrete technology  5.0 op
460156S-01  Advanced Course in Concrete Technology I, examination  0.0 op
460156S-02  Advanced Course in Concrete Technology I, laboratory exercises  0.0 op
**ECTS Credits:**
5 ECTS credits / 132 hours of work

**Language of instruction:**
Finnish

**Timing:**
Autumn semester, periods 1-2

**Learning outcomes:**
After completing the course the student is able to manage the goal of the subject by broadening the knowledge to new concrete types and their design methods, testing and application conditions and also on concrete with special properties such as e.g. high-quality, high strength and self-compressing. He can also explain how to assess the structural condition of concrete.

**Contents:**

**Mode of delivery:**
Face-to-face and distance learning

**Learning activities and teaching methods:**
Lectures, exercises, case studies, laboratory sessions and self directed learning

**Target group:**
Students studying structural engineering

**Prerequisites and co-requisites:**
466109S Concrete technology

**Recommended optional programme components:**

**Assessment methods and criteria:**
Passed laboratory exercises and exam

**Grading:**
Numerical grading scale 1-5. Grade 0 stands for a fail.

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**466106S: Advanced topics on design of steel structures, 6 op**

**Voimassaajo:** 01.08.2015 -

**Opiskelumuoto:** Advanced Studies

**Laji:** Course

**Vastuuysikkö:** Field of Mechanical Engineering

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

**Opettajat:** Kangaspuoskari, Matti Johannes

**Opintokohteen kielet:** Finnish

**Leikkaavuudet:**
- ay466106S Advanced topics on design of steel structures (OPEN UNI) 6.0 op
- 460128S-01 Advanced Course in Design of Steel Structures I, examination 0.0 op
- 460128S-02 Advanced Course in Design of Steel Structures I, exercise work 0.0 op
- 460128S Advanced Topics on Design of Steel Structures I 4.0 op

**ECTS Credits:**
6 ECTS

**Language of instruction:**
Finnish

**Timing:**
Periods 3 and 4

**Learning outcomes:**
The student can explain the basics of fatigue design of a welded structure. The student is able to design sheet metal structures and welded plate beam structures. He / she is able to analyze and design steel structures and their joints. They are able to analyze dynamically loaded structures and to evaluate the effect of vibrations on the functionality and usability of structures.

Contents:

Mode of delivery:
Face-to-face.

Learning activities and teaching methods:
Lectures and exercises 52 h. Self-study 110 h. Total 162 h = 6 ECTS Credits.

Target group:
Degree students who study steel structure design.

Prerequisites and co-requisites:

Recommended or required reading:

Assessment methods and criteria:
Three midterm exams or one final exam is required. One design exercise is required.

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

Person responsible:
Matti Kangaspuoskari

ay466106S: Advanced topics on design of steel structures (OPEN UNI), 6 op

Voi massaolo: 01.08.2017 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyskikko: University of Oulu, Open University
Arvostelu: 1 - 5, pass, fail
Opetus suunnattu: University of Oulu, Open University
Opettajat: Kangaspuoskari, Matti Johannes
Opintokohteen kielet: Finnish
Leikkaavuudet:
   466106S  Advanced topics on design of steel structures  6.0 op

462113S: Advanced topics on mechatronics and machine diagnostics, 5 - 10 op

Voi massaolo: 01.12.2016 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyskikko: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:
   ay462113S  Advanced topics on mechatronics and machine diagnostics (OPEN UNI)  5.0 op

Voidaan suorittaa useasti: Kyllä

Person responsible:
Toni Liedes
ay462113S: Advanced topics on mechatronics and machine diagnostics (OPEN UNI), 5 op

Voimassaolo: 01.08.2019 - 
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: University of Oulu, Open University
Arvostelu: 1 - 5, pass, fail
Opetustuote: University of Oulu, Open University
Opintokohteen kielet: Finnish
Leikkaavuudet:
  - 462115S  Tolerance Design  5.0 op
  - 462113S  Advanced topics on mechatronics and machine diagnostics  5.0 op

771117P: Basic course in mineralogy, 5 op

Voimassaolo: 01.08.2017 - 
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuysikkö: Oulu Mining School
Arvostelu: 1 - 5, pass, fail
Opettajat: Pekka Tuisku
Opintokohteen kielet: Finnish

ECTS Credits:
5 ects
Person responsible:
Pekka Tuisku

771117P-01: Basic mineralogy, lectures, 0 op

Voimassaolo: 01.08.2017 - 
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuysikkö: Oulu Mining School
Arvostelu: 1 - 5, pass, fail
Opettajat: Pekka Tuisku
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

771117P-02: Basic mineralogy, mineral identification, 0 op

Voimassaolo: 01.08.2017 - 
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuysikkö: Oulu Mining School
Arvostelu: 1 - 5, pass, fail
Opettajat: Jukka-Pekka Ranta
Opintokohteen kielet: Finnish
485202S: Building information modeling, 5 op

Voimassaolo: 01.08.2020 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Civil Engineering field
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Leikkaavuudet:
466114S Building information modeling 5.0 op

ECTS Credits:
5 ECTS credits / 132 hours of work

Language of instruction:
Finnish

Timing:
Autumn semester, periods 1-2

Learning outcomes:
After completing the course the student is able to make 3D models of buildings and detail the connections between building elements and components. He can model different building materials and is familiar with one commercial software.

Contents:

Mode of delivery:
Face-to-face

Learning activities and teaching methods:
Lectures, exercises and self directed learning

Target group:
Students studying structural engineering

Recommended or required reading:
The material that is in English will be distributed at the lectures

Assessment methods and criteria:
Participation to lectures and exercises

Grading:
Pass or fail.

Person responsible:
Rauno Heikkilä

ay780397A: Chemistry for Teachers (OPEN UNI), 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: University of Oulu, Open University
Arvostelu: 1 - 5, pass, fail
Opetus suunnattu: University of Oulu, Open University
Opintokohteen kielet: Finnish

Leikkaavuudet:
780397A Chemistry for Teachers 5.0 op

ECTS Credits:
5 credits / 135 hours of work

Language of instruction:
Timing:
2nd – 5th year, spring

Learning outcomes:
After this course the student should understand the importance of the experiments in the teaching of chemistry. Student should also be able to design demonstrations and laboratory experiments suitable in different levels of learning.

Contents:
The course familiarize the students with the experimental works in the schools. Basic concepts in chemistry are revised in the same time.

Mode of delivery:
Face-to-face teaching, compulsory.

Learning activities and teaching methods:
30 hours of laboratory work (compulsory), 105 hours self-study.

Target group:
Students in the teacher specialization lines, optional

Prerequisites and co-requisites:
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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:
Material handed out by the teacher.

Assessment methods and criteria:
Practical laboratory work and home work done and reported.

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

Person responsible:
Teija Kangas

Working life cooperation:
No

ay782338A: Chemistry in Industrial Applications (OPEN UNI), 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: University of Oulu, Open University
Arvostelu: 1 - 5, pass, fail
Opetus suunnattu: University of Oulu, Open University
Opintokohteen kielet: Finnish
Leikkaavuudet:
   ay782338A  Chemistry in Industrial Applications  5.0 op

Ei opintojaksokuvauksia.

477128S: Circular Bioeconomy, 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Field of Process and Environmental Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Elisa Koivuranta
Opintokohteen kielet: English
Leikkaavuudet:
   ay477128S  Circular Bioeconomy (OPEN UNI)  5.0 op
ECTS Credits: 5 cr
Language of instruction: English
Timing: Implementation in the spring period 3.
Learning outcomes: Upon completion of the course, a student should be able to recognize the incentives for the recycling of bioproducts and residues from forest industry. Student is familiarized with circular bioeconomy at the state-of-art level. Student is able to identify the challenges (properties, transportation etc.) of raw materials and their processing, can propose solutions and has ability to review the sustainability of final products.
Contents: Reuse, recycling and utilization of bioproducts and side streams of forest industry in accordance with principles of circular bioeconomy. The properties and processing of raw material. Novel applications in circular bioeconomy.
Mode of delivery: Lectures, group meetings and project work.
Learning activities and teaching methods: Work load in the course is totally 133h. The number of lectures can vary but project working is main activities in the course.
Target group: Students interested in circular bioeconomy.
Prerequisites and co-requisites: 488052A Introduction to Bioproduct and Bioprocess Engineering is recommended.
Recommended or required reading: Lecture materials and other materials that will be announced at the lectures.
Assessment methods and criteria: The assignment and seminar. More information about assessment methods is given during the course.
Grading: The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible: Elisa Koivuranta
Working life cooperation: Visiting lecturers from the industry, when feasible.
Other information: This Course replace course 477125S Recycling of bioproducts, 5 cr.

ay477128S: Circular Bioeconomy (OPEN UNI), 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: University of Oulu, Open University
Arvostelu: 1 - 5, pass, fail
Opetus suunnatu: University of Oulu, Open University
Opintokohteen kielet: English
Leikkaavuudet:
   477128S   Circular Bioeconomy   5.0 op

Ei opintojaksokuvauksia.

477624S: Control System Methods, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Field of Process and Environmental Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: István Selek
Opintokohteen kielet: Finnish
Leikkaavuudet:

477614S  Control System Methods  3.0 op
477605S  Digital Control Theory  4.0 op

ECTS Credits:
5 ECTS / 135 hours of work
Language of instruction:
English

Timing:
Period 1 (autumn term)

Learning outcomes:
After completing the course, one understands the relevance and building blocks of model-based control design and system analysis. Relying on data-driven approaches, this course provides strong foundations for digital control design considering real-life applications.

Contents:

Mode of delivery:
Regular lectures

Learning activities and teaching methods:
Lectures and exercises including guided computer simulations

Target group:
M.Sc. students in process and environmental engineering

Prerequisites and co-requisites:
The courses 477621A Control system analysis and 477622A Control system design are recommended beforehand.

Recommended or required reading:
Lecture handout;
Dorf, R. (2010) Modern Control Systems. Prentice-Hall, New York, 1104 s,

Assessment methods and criteria:
Completion of homeworks and final (written) exam.

Grading:
Numerical grading scale 1-5 or fail.

Person responsible:
István Selek

Working life cooperation:
No

466105S: Design of Steel Structures, 6 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Kangaspuoskari, Matti Johannes
Opintokohteen kielet: Finnish

Leikkaavuudet:

485118S  Design of Steel Structures  5.0 op
485108A  Design of Steel Structures and Steel Construction  5.0 op
ay466105S Design of Steel Structures (OPEN UNI)  6.0 op
460127S-01 Design of Steel Structures, examination  0.0 op
460127S-02 Design of Steel Structures, exercise work  0.0 op
460125A  Introduction to Design of Steel Structures  4.0 op
460125A-01 Introduction to Design of Steel Structures, examination  0.0 op
460125A-02 Introduction to Design of Steel Structures, exercise work  0.0 op
460127S  Design of Steel Structures  4.0 op

ECTS Credits:
6 ECTS

Language of instruction:
Finnish

Timing:
Periods 1 and 2
Course 485108A replaces this course in academic year 2021-2022.

Learning outcomes:
After completing the course the student is able to explain the basic nature of the crystalline structure of steel and its elastomeric material model. He / she is able to evaluate the effect of alloys, heat treatment and welding on the mechanical properties of steel. He / she can explain what happens to steel in the event of a fire and the basics of fire design. The student is able to design the joints of a steel structure frame and can dimension the steel structure under different load combinations. He / she is able to analyze stability problems and can explain inaccuracies and second order effects.

Contents:

Mode of delivery:
Face-to-face.

Learning activities and teaching methods:
Lectures and exercises 52 h. Self-study 110 h. Total 162 h = 6 ECTS Credits.

Target group:
Degree students who study steel structure design.

Prerequisites and co-requisites:

Recommended or required reading:

Assessment methods and criteria:
Three midterm exams or one final exam is required. One design exercise is required.

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

Person responsible:
Matti Kangaspuoskari

ay466105S: Design of Steel Structures (OPEN UNI), 6 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Advanced Studies
ay488231S: Environmental Chemistry and Ecology (OPEN UNI), 5 op

Voimassaolo: 01.01.2019 -
Opiskelumuoto: Advanced Studies

ECTS Credits:
5 ECTS credits / 135 hours of work

Language of instruction:
English

Timing:
A 10 week intensive course is arranged twice per year: in the autumn semester and in the spring semester. For further information concerning the schedule please contact the teachers.

Learning outcomes:
Upon completion of the course, the student has an understanding of the multidisciplinary nature and concept of the current environmental problems through the lens of (1) environmental chemistry and (2) environmental ecology. In addition, the student is able to consider how the circular economy tools can be applied to prevent and minimize environmental impacts.

Contents:
A project work focusing on four major environmental concerns is done in groups of 4-5 students. In addition to the project work, there are individual course tasks.

Mode of delivery:
Online studies.

Learning activities and teaching methods:
Project work 100 h / Self-study 35 h

Target group:
Students in all disciplines

Assessment methods and criteria:
Project work and individual tasks will be assessed. Assessment criteria are based on the learning outcomes of the course. Read more about the course assessment and grading systems of the University of Oulu at www.oulu.fi/english/studying/assessment.

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

Person responsible:
University lecturer Minna Tiainen and university teacher Virpi Väisänen

ay781309A: Environmental Chemistry for Chemistry Teachers, 5 op

Voimassaolo: 01.08.2020 -
Opiskelumuoto: Intermediate Studies
488143S: Environmental Impact Assessment, 5 op

Voimassaolo: 28.11.2016 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Field of Process and Environmental Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Hannu Marttila
Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits/133 hours of work

Language of instruction:
English

Timing:
The course is held in the autumn semester during the period 1

Learning outcomes:
The student will acquire a broad and multidisciplinary and sustainable approach to environmental impact assessment (EIA). The student will know the all steps in EIA process and the different methods used in environmental impact assessment. During the course students develop their working life skills (e.g. writing, communication skills) and the ability to review environmental problems. They also learn how to resolve extensive environmental projects related problems, causes and consequences.

Contents:
EIA process and legislation, environmental change, principles and assessment methods in ecology, hydrology, economics, energy issues and social sciences.

Mode of delivery:
Face-to-face teaching, video lectures and project works.

Learning activities and teaching methods:
The amount of lecture hours can varied depending teaching resources in every year but independent project working is the main activities in the course. Work load in the course is totally 133 h. The project work is completed as group or individual work.

Target group:
Only master students in Water resources and environmental engineering major in the Environmental Engineering Master Program.

Recommended or required reading:

Assessment methods and criteria:
The assignment (100 %). More information about assessment methods is given during the course.

Grading:
The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
Apulaisprofessori Hannu Marttila

Working life cooperation:
The course includes the video guest lectures from local companies and authorities. The assignment is based on case studies that are real on-going or passed EIA projects.

Other information:
Maximum number of the students in the course is 20.

485308S: Foundation Engineering, 5 op

Voimassaolo: 01.08.2020 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Civil Engineering field
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

485302A: Foundation Engineering, 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Civil Engineering field
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:
ay485302A  Foundation Engineering (OPEN UNI)  5.0 op
488129S  Foundation Engineering  5.0 op

ECTS Credits:
5 ECTS credits / 135 hours of work
Language of instruction:
Finnish
Timing:
The course unit is held in the autumn semester during period 2
Learning outcomes:
After completing the course, students know the basics of base construction plan, can identify geotechnical dimensioning limit states and use partial factor method. Student can describe different foundation methods, types and principles of typical foundation piles, excavation types, risks and principles of risk management, radon. Student knows the principles of foundation drainage and frost protection. Student knows the basics of how to design piled foundation. Student knows ultimate bearing capacity formula for shallow foundation (Eurocode).
Contents:
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures and exercises (28 h), self-study (107 h)
Target group:
Students in bachelor's program of civil engineering
Prerequisites and co-requisites:
485301A basics of Geotechnics
Recommended optional programme components:
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Recommended or required reading:
Assessment methods and criteria:
Exam and assignment(s)

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

Person responsible:
Veikko Pekkala

Working life cooperation:
No

Other information:
This course will replace course 488129S Foundation Engineering.

ay485302A: Foundation Engineering (OPEN UNI), 5 op

Voimassaolo: 01.08.2020 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: University of Oulu, Open University
Arvostelu: 1 - 5, pass, fail
Opetus suunnattu: University of Oulu, Open University
Opettajat: Veikko Pekkala
Opintokohteen kielet: Finnish

Leikkaavuudet:
- 485302A Foundation Engineering 5.0 op
- 488129S Foundation Engineering 5.0 op

ECTS Credits:
5 ECTS credits / 135 hours of work

Language of instruction:
Finnish

Timing:
The course unit is held in the autumn semester during period 2

Learning outcomes:
After completing the course, students know the basics of base construction plan, can identify geotechnical dimensioning limit states and use partial factor method. Student can describe different foundation methods, types and principles of typical foundation piles, excavation types, risks and principles of risk management, radon. Student knows the principles of foundation drainage and frost protection. Student knows the basics of how to design piled foundation. Student knows ultimate bearing capacity formula for shallow foundation (Eurocode).

Contents:

Mode of delivery:
Face-to-face teaching.

Learning activities and teaching methods:
Lectures and exercises (28 h), self-study (107 h)

Target group:
Students in bachelor's program of civil engineering

Prerequisites and co-requisites:
485301A Basics of Geotechnics

Recommended optional programme components:

Recommended or required reading:
Materials delivered in lectures

Assessment methods and criteria:
Exam and assignment(s)

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

Person responsible:
Veikko Pekkala
485304S: Fundamentals of Civil Engineering, 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuysikkö: Civil Engineering field
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:
488121S Fundamentals of Civil Engineering 5.0 op

ECTS Credits:
5 ECTS credits / 135 hours of work
Language of instruction:
Finnish
Timing:
The course unit is held in the autumn semester, during period 1
Learning outcomes:
The student understand how geotechnical design is joined to a part of society’s decision-making processes. He or she can prepare an assessment of foundation properties and design reinforcement. He or she understands specialties of railway construction and vibration problems. He or she gets the knowledge of property and surface drainage methods, how to lower groundwater table and what kind of risks are included to earth slopes and how to reinforce those.
Contents:
Norms and instructions, basis of geotechnical design, earth and road structures, soil improvement, property and surface drainage, lowering of groundwater table, pipeline construction, specialties of railway construction and vibration problems, geotechnical monitoring and measurements, earthworks
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures (34 h) and design and calculation exercises (10 h) also self-study (91 h)
Target group:
Master students in the Civil Engineering program
Prerequisites and co-requisites:
Prerequisites: 485301A Basic of Geotechnics (former 488115A Geomechanics), 485201A Building information modeling and CAD (or similar AutoCAD knowledge)
Recommended optional programme components:
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Recommended or required reading:
Lecture handout and other materials delivered in lectures
Assessment methods and criteria:
Examination and homeworks
Grading:
The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
University teacher Anne Tuomela
Working life cooperation:
The course includes guest lectures from various sectors of civil engineering.
Other information:
This course will replace course 488121S Fundamentals of Civil Engineering in Academic year 2020-21.

780117P: General and Inorganic Chemistry A, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Chemistry
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:
  780120P  Basic Principles in Chemistry  5.0 op
  ay780117P  General and Inorganic Chemistry A (OPEN UNI)  5.0 op
  780115P  General and Inorganic Chemistry II  6.0 op
  780114P  General and Inorganic Chemistry I  6.0 op
  780113P  Introduction to Chemistry  12.0 op
  780102P  Introduction to Inorganic Chemistry  5.0 op
  780109P  Basic Principles in Chemistry  4.0 op

ECTS Credits:
5 credits / 134 hours of work

Language of instruction:
Finnish

Timing:
1st autumn

Learning outcomes:
After this course, the student:
- can explain organic and inorganic chemistry fundamentals, basic concepts and terminology.
- understand basic concepts of chemistry as described in international general chemistry curriculum.

Contents:
Basic concepts of chemistry, chemical formula, chemical reaction, chemical equation, oxidation-reduction reactions, stoichiometry, gases, chemical equilibrium, acids and bases, additional aspects of acid-base equilibria, solubility and complex-ion equilibria.

Mode of delivery:
Face-to-face teaching

Learning activities and teaching methods:
30 hours of lectures and applications, 20 hours of exercises and 85 hours of self-study.

Target group:
Biochemistry, Chemistry compulsory. In the entity of 25 credits (minor studies), compulsory. Physical sciences, Mathematical sciences, optional.

Prerequisites and co-requisites:
Upper secondary school chemistry.

Recommended optional programme components:
-

Recommended or required reading:

Assessment methods and criteria:
Two intermediate examinations or one final examination.
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:
Johanna Havía

Working life cooperation:
No

Other information:
No

ay780117P: General and Inorganic Chemistry A (OPEN UNI), 5 op

Voimassaolo: 01.01.2016 -
Opiskelumuoto: Basic Studies
Laji: Course

Vastuuysikkö: University of Oulu, Open University
Arvostelu: 1 - 5, pass, fail
Opetus suunnattu: University of Oulu, Open University
Opintokohteen kielet: Finnish

Leikkaavuudet:

- 780117P General and Inorganic Chemistry A 5.0 op
- 780114P General and Inorganic Chemistry I 6.0 op
- 780115P General and Inorganic Chemistry II 6.0 op
- 780113P Introduction to Chemistry 12.0 op
- 780101P Introduction to Physical Chemistry 7.0 op
- 780102P Introduction to Inorganic Chemistry 5.0 op
- 780109P Basic Principles in Chemistry 4.0 op

ECTS Credits:
5 credits /134 hours of work

Language of instruction:
Finnish

Timing:
1st autumn

Learning outcomes:
After this course the student should understand basic concepts of chemistry as described in international general chemistry curriculum.

Contents:
Basic concepts of chemistry, chemical formula, chemical reaction, chemical equation, oxidation-reduction reactions, stoichiometry, gases, chemical equilibrium, acids and bases, additional aspects of acid-base equilibria, solubility and complex-ion equilibria.

Mode of delivery:
Face-to-face teaching

Learning activities and teaching methods:
32 hours of lectures and applications, 20 hours of exercises and 82 hours of self-study

Target group:
Biochemistry, Chemistry compulsory. In the entity of 25 credits (minor studies), compulsory. Physical sciences, Mathematical sciences, optional.

Prerequisites and co-requisites:
Upper secondary school 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:

Assessment methods and criteria:
Two intermediate examinations or one final examination. 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:
N.N.

Working life cooperation:
No

Other information:
No

780118P: General and Inorganic Chemistry B, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Basic Studies
**Course:** General and Inorganic Chemistry B (OPEN UNI), 5.0 op

**Unit of Study:**

- ay780118P General and Inorganic Chemistry B (OPEN UNI) 5.0 op
- 780114P General and Inorganic Chemistry I 6.0 op
- 780115P General and Inorganic Chemistry II 6.0 op
- 780113P Introduction to Chemistry 12.0 op
- 780101P Introduction to Physical Chemistry 7.0 op
- 780102P Introduction to Inorganic Chemistry 5.0 op

**ECTS Credits:**

5 ECTS credits / 134 hours of work

**Language of Instruction:**

Finnish

**Timing:**

1st autumn

**Learning outcomes:**

After this course, the student:
- can explain inorganic chemistry fundamentals, basic concepts and terminology
- understand basic concepts of chemistry as described in international general chemistry curriculum.

**Contents:**

Thermodynamics, reaction kinetics, electrochemistry, electrons in atoms, periodic table, chemical bond, intermolecular forces.

**Mode of delivery:**

Face-to-face teaching

**Learning activities and teaching methods:**

32 hours of lectures and applications, 18 hours of exercises, 85 hours of self-study.

**Target group:**

Biochemistry, Chemistry, compulsory. In the entity of 25 credits (minor studies), compulsory. Physical sciences, Mathematical sciences, optional.

**Prerequisites and co-requisites:**

Upper secondary school chemistry.

**Recommended optional programme components:**

- 

**Recommended or required reading:**


**Assessment methods and criteria:**

Two intermediate examinations or one final examination.

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:**

Matti Niemelä

**Working life cooperation:**

No

**Other information:**

No

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ay780118P: General and Inorganic Chemistry B (OPEN UNI), 5 op
Arvostelu: 1 - 5, pass, fail
Opetus suunnattu: University of Oulu, Open University
Opintokohteen kielet: Finnish
Leikkaavuudet:

<table>
<thead>
<tr>
<th>Course Code</th>
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<tr>
<td>780102P</td>
<td>Introduction to Inorganic Chemistry</td>
<td>5.0 op</td>
</tr>
</tbody>
</table>

ECTS Credits: 5 credits /134 hours of work

Language of instruction: Finnish

Timing: 1st autumn

Learning outcomes:
After this course the student should understand basic concepts of chemistry as described in international general chemistry curriculum.

Contents:
Thermodynamics, reaction kinetics, electrochemistry, electrons in atoms, periodic table, chemical bond, intermolecular forces.

Mode of delivery:
Face-to-face teaching

Learning activities and teaching methods:
36 hours of lectures and applications, 22 hours of exercises, 82 hours of self-study

Target group:
Biochemistry, Chemistry, compulsory. In the entity of 25 credits (minor studies), compulsory. Physical sciences, Mathematical sciences, optional.

Prerequisites and co-requisites:
Upper secondary school chemistry

Recommended optional programme components:

Recommended or required reading:

Assessment methods and criteria:
Two intermediate examinations or one final examination. 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:
N.N.

Working life cooperation:
No

Other information:
No

485306S: Geoenvironmental Engineering, 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Civil Engineering field
Arvostelu: 1 - 5, pass, fail
Opettajat: Tuomela, Anne Marika
Opintokohteen kielet: Finnish
Leikkaavuudet:
488131S Geoenvironmental Engineering 5.0 op

ECTS Credits:
5 ECTS credits / 135 hours of work

Language of instruction:
Finnish

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

Learning outcomes:
The student knows norms and instruction which are related to contaminated sites. The students can choose the suitable remediation technique for contaminated soil. The student can calculate contaminant transport in soils. The student can also design geotechnical structures of industrial and domestic landfills and evaluate the needs for remediation of contaminated soils. Student knows how to use by-products from industry in different soil construction applications.

Contents:
Norms and instructions, a project work where student will discover a contaminated soil and make a proposal for remediation technique, properties of soil materials and industrial by-products, basis of geotechnical design for landfill environment, structures of dams and impoundments, geoenvironmental challenges in mining, remote sensing as a tool for geoenvironmental applications.

Mode of delivery:
Face-to-face teaching

Learning activities and teaching methods:
Lectures (44 h), group work (60 h) and independent work (31 h)

Target group:
Master students in the Civil Engineering program

Prerequisites and co-requisites:
485301A Basics of Geotechnics

Recommended optional programme components:
-

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

Assessment methods and criteria:
Written exam and exercises

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

Person responsible:
University teacher Anne Tuomela

Working life cooperation:
The course includes a visit to a site decided later and also guest lectures from professionals in industry and administration.

Other information:
This course will replace course 488131S Geoenvironmental Engineering

477416S: High temperature processes, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Field of Process and Environmental Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Eetu-Pekka Heikkinen
Opintokohteen kielet: Finnish
Leikkaavuudet:
477427A High temperature processes 5.0 op
ay477416S High temperature processes (OPEN UNI) 5.0 op

ECTS Credits:
5 cr / 135 hours of work.

**Language of instruction:**
Finnish

**Timing:**
The course is held in the autumn semester, during period I. It is recommended to complete the course at the 4th autumn semester.

**Learning outcomes:**
Students passing the course are familiar with the metal production processes and metallurgical unit operations. Additionally, students know how to evaluate high temperature processes from different perspectives (energy and reductants, refractory materials, slags and ashes, waste and emissions as well as automation, measurements and modelling).

**Contents:**
The most important pyrometallurgical unit operations and other high temperature processes as well as things that need to be taken into account when considering high temperature processes (e.g. energy and reductants, refractory materials, slags and ashes, waste and emissions as well as automation, measurements and modelling).

**Mode of delivery:**
Classroom education

**Learning activities and teaching methods:**
Lectures (approximately 45 hours) supporting the exercises that are made during the course. Only in Finnish.

**Target group:**
Students of process metallurgy.

**Prerequisites and co-requisites:**
Knowledge and skills corresponding the knowledge and skills that are obtained from the Bachelor-level-studies in the programme of process or environmental engineering are recommended as prerequisites. In order to get credits from this course, bachelor thesis must be completed.

**Recommended optional programme components:**
This course is one of the courses of pyrometallurgy in the module of process metallurgy.

**Recommended or required reading:**
Material will be distributed during lectures and exercises. It is also available via courses www-site. Each student is required to search additional material for the exercises when necessary.

**Assessment methods and criteria:**
Continuous assessment consisting of exercises that are made during the course. Please note that the course is organised only in Finnish.

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

**Person responsible:**
University lecturer Eetu-Pekka Heikkinen

**Working life cooperation:**
The course includes a seminar day organized together with industry.

**Other information:**
Although it is not required to participate on lectures, it is highly recommended that the students are active and do the required exercises from the very beginning of the course due to continuous assessment used in this course.

**ay477416S: High temperature processes (OPEN UNI), 5 op**

**Voimassaolo:** 01.08.2019 -
**Opiskelumuoto:** Advanced Studies
**Laji:** Course
**Vastuuysikkö:** University of Oulu, Open University
**Arvostelu:** 1 - 5, pass, fail
**Opetus suunnattu:** University of Oulu, Open University
**Opintokohteen kielet:** Finnish

**Leikkaavuudet:**
477416S High temperature processes 5.0 op

**ECTS Credits:**
5 cr / 135 hours of work.
Language of instruction:
Finnish

Timing:
The course is held in the autumn semester, during period I. It is recommended to complete the course at the 4th autumn semester.

Learning outcomes:
Students passing the course are familiar with the metal production processes and metallurgical unit operations. Additionally, students know how to evaluate high temperature processes from different perspectives (energy and reductants, refractory materials, slags and ashes, waste and emissions as well as automation, measurements and modelling).

Contents:
The most important pyrometallurgical unit operations and other high temperature processes as well as things that need to be taken into account when considering high temperature processes (e.g. energy and reductants, refractory materials, slags and ashes, waste and emissions as well as automation, measurements and modelling).

Mode of delivery:
Classroom education

Learning activities and teaching methods:
Lectures (approximately 45 hours) supporting the exercises that are made during the course. Only in Finnish.

Target group:
Students of process metallurgy.

Prerequisites and co-requisites:
Knowledge and skills corresponding the knowledge and skills that are obtained from the Bachelor-level-studies in the programme of process or environmental engineering are recommended as prerequisites. In order to get credits from this course, bachelor thesis must be completed.

Recommended optional programme components:
This course is one of the courses of pyrometallurgy in the module of process metallurgy.

Recommended or required reading:
Material will be distributed during lectures and exercises. It is also available via courses www-site. Each student is required to search additional material for the exercises when necessary.

Assessment methods and criteria:
Continuous assessment consisting of exercises that are made during the course. Please note that the course is organised only in Finnish.

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

Person responsible:
university lecturer Eetu-Pekka Heikkinen

Working life cooperation:
The course includes a seminar day organized together with industry.

Other information:
Due to continuous assessment used in this course, it is highly recommended that the students are present already in the first lecture.

451535P: History of Architecture I, lecture course, 4 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuysikkö: Oulu School of Architecture
Arvostelu: 1 - 5, pass, fail
Opettajat: Petri Vuojala
Opintokohteen kielet: Finnish
Leikkaavuudet:
ay451535P History of Architecture I, lecture course (OPEN UNI) 4.0 op

ECTS Credits:
4 ECTS
Language of instruction:
**Timing:**
Autumn term I and 2

**Learning outcomes:**
After completing the course the student can evaluate the interaction between style periods of European architectural history, technical development and social changes. The student can classify the different eras and recognize their most significant buildings and architects. After the course the student can interpret the classical language of architecture the classical grammar of architecture, as well as recognize the historical layers of built environment.

**Contents:**
Lectures discuss the general history of architecture and discipline of styles from prehistory until the end of 18th century and introduce old building methods like brickwork bonds and traditional vault constructions.

**Mode of delivery:**
Lectures, additionally independent studies

**Learning activities and teaching methods:**
Lessons 50 hrs

**Target group:**
1st year Bachelor level students

**Prerequisites and co-requisites:**
-

**Recommended optional programme components:**
Course is combined to exercises (451536P)

**Recommended or required reading:**
Handouts, digital slides. A literature list will be delivered during the course.

**Assessment methods and criteria:**
Assessment is based on attendance, learning diary or written examination.

**Grading:**
1-5. Learning diary or written examination.

**Person responsible:**
Dos. Petri Vuojala

**Working life cooperation:**
-

**Other information:**
-

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ay451535P: History of Architecture I, lecture course (OPEN UNI), 4 op

**Voimassaolo:** 01.08.2019 -
**Opiskelumoto:** Basic Studies

**Laji:** Course

**Vastuuysikkö:** University of Oulu, Open University

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

**Opetus suunnattu:** University of Oulu, Open University

**Opintokohteen kielet:** Finnish

**Leikkaavuudet:**
451535P History of Architecture I, lecture course 4.0 op

**ECTS Credits:**
4 ECTS

**Language of instruction:**
Finnish

**Timing:**
Autumn term I and 2

**Learning outcomes:**
After completing the course the student can evaluate the interaction between style periods of European architectural history, technical development and social changes. The student can classify the different eras and recognize their most significant buildings and architects. After the course the student can interpret the classical language of architecture the classical grammar of architecture, as well as recognize the historical layers of built environment.

**Contents:**
Lectures discuss the general history of architecture and discipline of styles from prehistory until the end of 18th century and introduce old building methods like brickwork bonds and traditional vault constructions.

**Mode of delivery:**
Lectures, additionally independent studies

**Learning activities and teaching methods:**
Lessons 56 hrs

**Target group:**
1st year Bachelor level students

**Prerequisites and co-requisites:**

**Recommended optional programme components:**
Course is combined to exercises (451536P)

**Recommended or required reading:**
Handouts, digital slides. A literature list will be delivered during the course.

**Assessment methods and criteria:**
Assessment is based on attendance, learning diary or written examination.

**Grading:**
1-5

**Person responsible:**
Professor Anna-Maija Ylimaula, University lecturer N.N.

**Working life cooperation:**
-

**Other information:**
-

**451537A: History of Architecture II, lecture course, 3 op**

**Voimassaolo:** 01.08.2015 -

**Opiskelumuoto:** Intermediate Studies

**Laji:** Course

**Vastuuksikkö:** Oulu School of Architecture

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

**Opettajat:** Petri Vuojala

**Opintokohteen kielet:** Finnish

**Leikkaavuudet:**
ay451537A History of Architecture II, lecture course (OPEN UNI) 3.0 op

**ECTS Credits:**
3

**Language of instruction:**
Finnish (literature partly in English)

**Timing:**
Spring term I and 2

**Learning outcomes:**
During the course the student learns to recognize the historical roots of the contemporary architecture and recount the development up to today. Having completed the course, the student recognizes the most essential phenomena and styles of 19th and 20th century architecture and can reflect own personal views on contemporary architecture.

**Contents:**
Course discusses the general history of architecture of 19th and 20th centuries.

**Mode of delivery:**
Lectures, additionally independent studies.

**Learning activities and teaching methods:**
Lessures 48 hrs

**Target group:**
1st year Bachelor’s level students

**Prerequisites and co-requisites:**
History of architecture I, lecture course (451535P)

**Recommended optional programme components:**
Course is combined to practices (451538A)
Recommended or required reading:
Handouts, digital slides. A literature list will be handed out during the course

Assessment methods and criteria:
Assessment is based on attendance, learning diary or written examination

Grading:
1-5

Person responsible:
Dos. Petri Vuojala

Working life cooperation:
-

Other information:
-

ay451537A: History of Architecture II, lecture course (OPEN UNI), 3 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuykysikkö: University of Oulu, Open University
Arvostelu: 1 - 5, pass, fail
Opetus suunnattu: University of Oulu, Open University
Opintokohteen kielet: Finnish
Leikkaavuudet:
451537A History of Architecture II, lecture course 3.0 op

ECTS Credits:
3

Language of instruction:
Finnish (literature partly in English)

Timing:
Spring term I and 2

Learning outcomes:
During the course the student learns to recognize the historical roots of the contemporary architecture and recount the development up to today. Having completed the course, the student recognizes the most essential phenomena and styles of 19th and 20th century architecture and can reflect own personal views on contemporary architecture.

Contents:
Course discusses the general history of architecture of 19th and 20th centuries.

Mode of delivery:
Lectures, additionally independent studies.

Learning activities and teaching methods:
Lectures 48 hrs

Target group:
1st year Bachelor's level students

Prerequisites and co-requisites:
History of architecture I, lecture course (451535P)

Recommended optional programme components:
Course is combined to practices (451538A)

Recommended or required reading:
Handouts, digital slides. A literature list will be handed out during the course

Assessment methods and criteria:
Assessment is based on attendance, learning diary or written examination

Grading:
1-5

Person responsible:
Professor Anna-Maija Ylimaula, University lecturer N.N.

Working life cooperation:
-

Other information:
-
451504A: History of Architecture III, 3 op

Voimassaolo: 01.08.2011 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Oulu School of Architecture
Arvostelu: 1 - 5, pass, fail
Opettajat: Petri Vuojala
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay451504A History of Architecture III (OPEN UNI) 3.0 op

ECTS Credits:
3
Language of instruction:
Finnish (literature in English and Swedish)

Timing:
Autumn term 2 and spring term I

Learning outcomes:
The aim is to provide basic knowledge on the history of the Scandinavian and Finnish architecture from the prehistory until the 20th century.
After completing the course the student masters the historical background of the architecture of Finland and Scandinavia starting from pre-historical times. The student recognizes the temporal and stylistic layers of the history of our building tradition and is able to explicate features of Finland’s architectural evolution in a relation with the international development and especially in correlation to Sweden and the other Nordic countries.

Contents:
Lecture discusses the history of architecture in Scandinavia and especially in Finland from prehistory till 20th C.

Mode of delivery:
Lectures, additionally independent studies.

Learning activities and teaching methods:
Lectures 36 h

Target group:
3rd year Bachelor level students.

Prerequisites and co-requisites:
History of architecture I and II, lecture courses (451535P and 451537A)

Recommended optional programme components:
The course is related to the History of Architecture III, practices course (451505A). Together with the Architecture III, practices course, this course can form the Bachelor's diploma work (8 ECTS) of the Bachelor's degree.

Recommended or required reading:
Handouts, digital slides. A literature list will be handed out during the course.

Assessment methods and criteria:
Assessment is based learning diary or written examination.

Grading:
1-5

Person responsible:
Dos. Petri Vuojala

Working life cooperation:
-

Other information:
-

ay451504A: History of Architecture III (OPEN UNI), 3 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: University of Oulu, Open University
**Arvostelut:** 1 - 5, pass, fail

**Opetus suunnattu:** University of Oulu, Open University

**Opintokohteen kielet:** Finnish

**Leikkaavuudet:**

451504A History of Architecture III 3.0 op

**ECTS Credits:**
3

**Language of instruction:**
Finnish (literature in English and Swedish)

**Timing:**
Autumn term 2 and spring term I

**Learning outcomes:**
The aim is to provide basic knowledge on the history of the Scandinavian and Finnish architecture from the prehistory until the 20th century. After completing the course the student masters the historical background of the architecture of Finland and Scandinavia starting from pre-historical times. The student recognizes the temporal and stylistic layers of the history of our building tradition and is able to explicate features of Finland's architectural evolvement in a relation with the international development and especially in correlation to Sweden and the other Nordic countries.

**Contents:**
Lecture discusses the history of architecture in Scandinavia and especially in Finland from prehistory till 20th C.

**Mode of delivery:**
Lectures, additionally independent studies.

**Learning activities and teaching methods:**
Lectures 36 h

**Target group:**
3rd year Bachelor level students.

**Prerequisites and co-requisites:**
History of architecture I and II, lecture courses (451535P and 451537A)

**Recommended optional programme components:**
The course is related to the History of Architecture III, practices course (451505A). Together with the Architecture III, practices course, this course can form the Bachelor's diploma work (8 ECTS) of the Bachelor's degree.

**Recommended or required reading:**
Handouts, digital slides. A literature list will be handed out during the course.

**Assessment methods and criteria:**
Assessment is based learning diary or written examination.

**Grading:**
1-5

**Person responsible:**
Professor Anna-Maija Ylimaula, University lecturer N.N.

**Working life cooperation:**
-

**Other information:**
-

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**451513S: History of Interior Design / Historical interiors, 5 op**

**Opiskelumuoto:** Advanced Studies

**Laji:** Course

**Vastuuyksikkö:** Oulu School of Architecture

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

**Opettajat:** Virpi Harju

**Opintokohteen kielet:** Finnish

**Leikkaavuudet:**

ay451513S History of Interior Design and Historical interiors (OPEN UNI) 5.0 op

**Voidaan suorittaa useasti:** Kyllä

Ei opintojaksokuvauksia.
**488102A: Hydrological Processes, 5 op**

**Opiskelumuoto:** Intermediate Studies

**Laji:** Course

**Vastuuysikkö:** Field of Process and Environmental Engineering

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

**Opintokohteen kielet:** Finnish

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

**ECTS Credits:**
5 ECTS credits / 133 hours of work

**Language of instruction:**
Finnish, but also option to complete the course in English.

**Timing:**
The course is held in the autumn semester during the period 1. It is recommended to complete the course at the 1st autumn semester of the international master program of environmental engineering.

**Learning outcomes:**
After the course, the student understands and can describe the main hydrological processes, water movements and hydraulics phenomenon quantitatively through mathematical methods. The student also understands and quantifies the relation between state and flow with relation to snowmelt, evaporation, infiltration and groundwater flow.

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

**Mode of delivery:**
Face-to-face teaching and independent work with two assignment reports.

**Learning activities and teaching methods:**
Lectures 24 h, exercises 16 h and independent work 93 h. Totally 133 h.

**Target group:**
Students in international master programs of environmental engineering

**Prerequisites and co-requisites:**
The recommended prerequisite is the completion of the following course or having corresponding knowledge prior to enrolling for the course unit: 477201A Material and Energy Balances and 477052A Fluid mechanics.

**Recommended optional programme components:**
The course is a prerequisite for most of master level studies.

**Recommended or required reading:**

**Assessment methods and criteria:**
The assignments must be returned and passed with threshold of 50% in order to get final examination. The final grade of the course is weighted average of assignment reports (80%) and examination (20%).

**Grading:**
The assignments must be returned and passed with threshold of 50% in order to get final examination. The final grade of the course is weighted average of assignment reports (80%) and examination (20%).

**Person responsible:**
University Lecturer Anna-Kaisa Ronkanen

**Working life cooperation:**
Examples solev in the lectures based on real problems

**Other information:**
The English version of the course is organized parelle to Finnish version of the course.
ay488102A: Hydrological Processes (OPEN UNI), 5 op

**Voimassaolo:** 01.08.2020 -

**Opiskelumuoto:** Intermediate Studies

**Laji:** Course

**Vastuuysikkö:** University of Oulu, Open University

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

**Opetus suunnattu:** University of Oulu, Open University

**Opettajat:** Anna-Kaisa Ronkanen

**Opintokohteen kielet:** Finnish

**Leikkaavuudet:**

488102A  Hydrological Processes  5.0 op

**ECTS Credits:**

5 ECTS credits / 133 hours of work

**Language of instruction:**

Finnish, but also option to complete the course in English.

**Timing:**

The course is held in the autumn semester during the period 1. It is recommended to complete the course at the 1st autumn semester of the international master program of environmental engineering.

**Learning outcomes:**

After the course, the student understands and can describe the main hydrological processes, water movements and hydraulics phenomenon quantitatively through mathematical methods. The student also understands and quantifies the relation between state and flow with relation to snowmelt, evaporation, infiltration and groundwater flow.

**Contents:**

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

**Mode of delivery:**

Face-to-face teaching and independent work with two assignment reports.

**Learning activities and teaching methods:**

Lectures 24 h, exercises 16 h and independent work 93 h. Totally 133 h.

**Target group:**

Students in international master programs of environmental engineering

**Prerequisites and co-requisites:**

The recommended prerequisite is the completion of the following course or having corresponding knowledge prior to enrolling for the course unit: 477201A Material and Energy Balances and 477052A Fluid mechanics.

**Recommended optional programme components:**

The course is a prerequisite for most of master level studies.

**Recommended or required reading:**


**Assessment methods and criteria:**

The assignments must be returned and passed with threshold of 50% in order to get final examination. The final grade of the course is weighted average of assignment reports (80%) and examination (20%).

**Grading:**

The assignments must be returned and passed with threshold of 50% in order to get final examination. The final grade of the course is weighted average of assignment reports (80%) and examination (20%).

**Person responsible:**

University Lecturer Anna-Kaisa Ronkanen

**Working life cooperation:**

Examples solev in the lectures based on real problems

**Other information:**

The English version of the course is organized parelle to Finnish version of the course.
450547A: Indesign Basics, 1 op

Voimassaolo: 01.08.2011 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Oulu School of Architecture
Arvostelu: 1 - 5, pass, fail
Opettajat: Asko Leinonen
Opintokoheen kielet: Finnish
Leikkaavuudet:
ay450547A Indesign Basics (OPEN UNI) 1.0 op

ECTS Credits:
1
Language of instruction:
Finnish
Timing:
-
Learning outcomes:
Students master the basic page layout features and understand the possibilities of the software. Students are able to produce pages ready for release combining visual and textual material from various sources.
Contents:
Placing formatted text and pictures, page layout and PDF publishing.
Mode of delivery:
Lectures and course work.
Learning activities and teaching methods:
-
Target group:
The bachelor students of Oulu School of Architecture
Prerequisities and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
Software help files and handouts.
Assessment methods and criteria:
Based on a project work (the presentation material of a design course at the Department of Architecture or an equivalent work).
Grading:
Pass / fail
Person responsible:
n.n.
Working life cooperation:
Students will learn to use the basic skills of Adobe InDesign publishing software and apply those skills in practical work. Students can use style settings in InDesign to make well controlled text and graphic layouts in hands-on work.
Other information:
Basic features of page layout in Indesign. The course is intended for the students of Oulu school of Architecture only.

ay450547A: Indesign Basics (OPEN UNI), 1 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: University of Oulu, Open University
ECTS Credits: 1

Language of instruction: Finnish

Timing:
workshop-type weekend course, the course is organized at most once per academic year.

Learning outcomes:
Students master the basic page layout features and understand the possibilities of the software. Students are able to produce pages ready for release combining visual and textual material from various sources.

Contents:
Placing formatted text and pictures, page layout and PDF publishing.

Mode of delivery:
workshop

Learning activities and teaching methods:
Contact teaching 16 h, independent exercises 11 h.

Target group:
-

Prerequisites and co-requisites:
-

Recommended optional programme components:
-

Recommended or required reading:
Software help files

Assessment methods and criteria:
Based on a project work (the presentation material of a design course at the Oulu School of Architecture or an equivalent work).

Grading:
1-5

Person responsible:
n.n.

Working life cooperation:
Students will learn to use the basic skills of Adobe InDesign publishing software and apply those skills in hands-on work. Students can use style settings in InDesign to make well controlled text and graphic layouts.

Other information:
Basic features of page layout in Indesign.
The course is intended for registered students of the Oulu School of Architecture only.
ay555225P: Basics of industrial engineering and management (OPEN UNI), 5 op

Voimassaolo: 01.01.2014 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuysikkö: University of Oulu, Open University
Arvostelu: 1 - 5, pass, fail
Opetus suunnattu: University of Oulu, Open University
Opettajat: Elina Jääskä
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay555285A: Project management (OPEN UNI), 5 op

Voimassaolo: 01.01.2014 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuysikkö: University of Oulu, Open University
Arvostelu: 1 - 5, pass, fail
Opetus suunnattu: University of Oulu, Open University
Opettajat: Kirsi Aaltonen
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay555286A: Process and quality management (OPEN UNI), 5 op

Voimassaolo: 01.01.2014 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: University of Oulu, Open University
Arvostelu: 1 - 5, pass, fail
Opetus suunnattu: University of Oulu, Open University
Opettajat: Osmo Kauppila
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay555264P: Managing well-being and quality of working life (OPEN UNI), 5 op

Voimassaolo: 01.01.2014 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuysikkö: University of Oulu, Open University
Arvostelu: 1 - 5, pass, fail
Opetus suunnattu: University of Oulu, Open University
Opintokohteen kielet: Finnish
ay555242A: Product development (OPEN UNI), 5 op

Voimassaolo: 01.01.2014 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: University of Oulu, Open University
Arvostelu: 1 - 5, pass, fail
Opetus suunnattu: University of Oulu, Open University
Opettajat: Kai Hänninen
Opintokohteen kielet: Finnish

Leikkaavuudet:
555242A  Product development  5.0 op

771113P: Introduction to Geology I, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuysikkö: 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 programme components:
This course is intended as an introduction to the scope and methods of igneous and metamorphic petrology.

Recommended or required reading:

Assessment methods and criteria:
Written examination and identification test of rock types.

Grading:
5-1/fail

Person responsible:
Kari Strand

Working life cooperation:
No

ay771113P: Introduction to Geology I (OPEN UNI), 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuysikkö: University of Oulu, Open University
Arvostelu: 1 - 5, pass, fail
Opetus suunnattu: University of Oulu, Open University
Opintokohteen kielet: Finnish
Leikkaavuudet:
771113P Introduction to Geology I 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 programme components:
This course is intended as an introduction to the scope and methods of igneous and metamorphic petrology.

Recommended or required reading:
Assessment methods and criteria:
Written examination and identification test of rock types.
Grading:
5-1/fail
Person responsible:
Eero Hanski
Working life cooperation:
No

771113P-02: Introduction to Geology I, Rock identification, 0 op
Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuysikkö: Oulu Mining School
Arvostelu: 1 - 5, pass, fail
Opettajat: Eero Hanski
Opintokohteen kielet: Finnish

771113P-01: Introduction to Geology I, lectures, 0 op
Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuysikkö: Oulu Mining School
Arvostelu: 1 - 5, pass, fail
Opettajat: Kari Strand
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

771114P: Introduction to Geology II, 5 op
Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuysikkö: 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:
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

780116P: Introduction to Organic Chemistry, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Chemistry
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:
ay780116P Introduction to Organic Chemistry (OPEN UNI) 5.0 op
780103P2 Organic Chemistry I 6.0 op
780108P Basic Course in Organic Chemistry 6.0 op
780112P Introduction to Organic Chemistry 4.0 op
780103P Introduction to Organic Chemistry 6.0 op

ECTS Credits:
5 ECTS credits / 134 hours of work
Language of instruction:
Finnish. Book-examination in English as well.
Timing:
1st spring
Learning outcomes:
After this course, the student:
- can recognize and name basic organic compounds and explain their properties.
- can explain organic chemistry basic concepts.
- can deduce basic reaction types and solve their mechanisms.
Contents:
Classification of organic compounds and their properties. Basic reactions of organic compounds: addition, elimination and substitution along with the reaction mechanisms. Basics of stereochemistry.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
38 hours of lectures plus 12 hours of exercises, 84 hours of independent self-study.
Target group:
Biochemistry, Chemistry, Biology, Process Engineering, Environmental Engineering and in the study entity of 25 credits, compulsory.
Physical Sciences, Geology, Geography, Mathematical Sciences, optional.
Prerequisites and co-requisites:
Upper secondary school 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:**

**Assessment methods and criteria:**
Two intermediate examinations or one final examination. 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:**
Johanna Kärkkäinen

**Working life cooperation:**
No

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**ay780116P: Introduction to Organic Chemistry (OPEN UNI), 5 op**

**Voimassaolo:** 01.08.2015 -
**Opiskelumuoto:** Basic Studies
**Laji:** Course
**Vastuuysikkö:** University of Oulu, Open University
**Arvostelu:** 1 - 5, pass, fail
**Opetus suunnattu:** University of Oulu, Open University
**Opintokohteen kielet:** Finnish

**Leikkaavuudet:**
780116P Introduction to Organic Chemistry 5.0 op

**ECTS Credits:**
5 credits /134 hours of work

**Language of instruction:**
Finnish. Book-examination in English as well.

**Timing:**
1st autumn and 1st spring

**Learning outcomes:**
After this course, the student can explain organic chemistry fundamentals, basic concepts and terminology, can use them for the description of organic chemistry phenomena. He/she can name organic structures, explain their properties, deduce basic reaction types and solve their mechanisms.

**Contents:**
Basic reactions of organic compounds, basic principles of stereochemistry and reaction mechanisms: Addition, elimination, substitution, including electrophilic aromatic substitution, reactions of carbonyl group. Applications.

**Mode of delivery:**
Face-to-face teaching

**Learning activities and teaching methods:**
42 hours of lectures plus 12 hours of exercises, 80 hours of independent self-study

**Target group:**
Biochemistry, Chemistry, Biology, Process Engineering, Environmental Engineering and in the study entity of 25 credits, compulsory. Physical Sciences, Geology, Geography, Mathematical Sciences, optional.

**Prerequisites and co-requisites:**
Upper secondary school 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:**

**Assessment methods and criteria:**
Two intermediate examinations or one final examination 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:
Dr. Johanna Kärkkäinen

Working life cooperation:
No

Other information:
No

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

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuysikkö: 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:
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
Vastuuksikkö: 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:

Assessment methods and criteria:
Written examination.
Grading:
5-1/fail
Person responsible:
Eero Hanski
Working life cooperation:
No

491101P: Introduction to mining, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuksikkö: Oulu Mining School
Arvostelu: 1 - 5, pass, fail
Opettajat: Saija Luukkanen
Opintokohteen kielet: Finnish

ECTS Credits: 5 cr
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

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**491102P: Introduction to solid earth geophysics, 5 op**

**Voimassaolo:** 01.08.2017 -  
**Opiskelumuoto:** Basic Studies  
**Laji:** Course  
**Vastuuysikkö:** 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 (convention, plate tectons) and can name most common geophysical research methods.

**Contents:**

**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:**

**Assessment methods and criteria:**
Variable grading and evaluation methods

**Grading:**
1-5/fail

**Person responsible:**
Kari Moisio

**Working life cooperation:**
No working life cooperation
ay477221A: Material and Energy Balances (OPEN UNI), 5 op

Voimassaolo: 01.08.2019 - 01.01.2020
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: University of Oulu, Open University
Arvostelu: 1 - 5, pass, fail
Opetus suunnattu: University of Oulu, Open University
Opintokohteen kielet: Finnish
Leikkaavuudet:
ay477231A Material and Energy Balances I (OPEN UNI) 2.0 op
ay477232A Material and Energy Balances II (OPEN UNI) 3.0 op
477221A Material and Energy Balances 5.0 op

ECTS Credits: 5 credits
Language of instruction: Finnish
Learning outcomes:
The student is able to formulate material and energy balances for a process by taking into account the restrictions set by reaction stoichiometry. The student knows how the created mathematical formulation can be exploited in process consideration.

Contents:
Formulation of material and energy balances by taking into account the effects of chemical reactions.
Mode of delivery: web-based course
Learning activities and teaching methods: web-based course
Prerequisites and co-requisites:
High school level chemistry, mathematics and physics.
Recommended or required reading:
Assessment methods and criteria:
During the course, there are scheduled exercise packages that must be passed.
Grading:
1 - 5, pass, fail

ay477231A: Material and Energy Balances I (OPEN UNI), 2 op

Voimassaolo: 01.01.2020 - 01.08.2020
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: University of Oulu, Open University
Arvostelu: 1 - 5, pass, fail
Opetus suunnattu: University of Oulu, Open University
Opintokohteen kielet: Finnish
Leikkaavuudet:
477231A Material and Energy Balances I 2.0 op
ay477221A Material and Energy Balances (OPEN UNI) 5.0 op
477221A Material and Energy Balances 5.0 op
**ay477232A: Material and Energy Balances II (OPEN UNI), 3 op**

**Voimassaolo:** 01.01.2020 -  
**Opiskelumuoto:** Intermediate Studies  
**Laji:** Course  
**Vastuuysikkö:** University of Oulu, Open University  
**Arvostelu:** 1 - 5, pass, fail  
**Opetus suunnattu:** University of Oulu, Open University  
**Opettajat:** Ahola, Juha Lennart  
**Opintokohteen kielet:** Finnish  

**Leikkaavuudet:**  
477232A  Material and Energy Balances II  3.0 op  
477221A  Material and Energy Balances  5.0 op  
ay477221A  Material and Energy Balances (OPEN UNI)  5.0 op

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**452561S: Modern Wood Architecture, 15 op**

**Voimassaolo:** 01.09.2020 -  
**Opiskelumuoto:** Advanced Studies  
**Laji:** Course  
**Vastuuysikkö:** Oulu School of Architecture  
**Arvostelu:** 1 - 5, pass, fail  
**Opettajat:** Matti Sanaksenaho  
**Opintokohteen kielet:** Finnish  

**Leikkaavuudet:**  
ay452561S  Modern Wood Architecture (OPEN UNI)  7.0 op

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**ECTS Credits:**  
15 ECTS  
**Language of instruction:**  
Finnish  
**Timing:**  
Autumn term I and II  
**Learning outcomes:**  
After completing the course the student understands special features related to massive-wood building in the context of different phases (from sketches to implementation) of the architectural design. The studied load-bearing structures dealt with are especially log and CLT, but also some most common structural massive-wood products, such as LVL and glue-free solutions are introduced. In addition to the basic questions related to the quality and characteristics of the massive-wood architecture, the student will learn about common structural systems, their dimensions and spans, principles for stiffening, possible restrictions, demands for the fire-safety, acoustics, thermal performance, moisture handling, visible joints and reservations for technical installations. Moreover, the student will understand the dimensions and weights of the prefabricated modules in relation to their production, transportation and construction.  
**Contents:**  
Massive-wood building products, and systems in architectural design. The process of architectural design from the sketches to the implementation design.  
**Mode of delivery:**  
Web-based teaching, launch seminar and final seminar as a contact teaching.  
**Learning activities and teaching methods:**  
Contact teaching (10 hours) / independent working (395 hours)  
**Target group:**  
Master-level students of architecture and building construction, graduated architects / construction architects and other professionals in the field.  
**Prerequisites and co-requisites:**  
Bachelor’s degree completed.
Recommended or required reading:
Web-based lectures and listed literature / materials.

Assessment methods and criteria:
The course consists of four modular tasks and preparation of a learning portfolio. Besides these the student will prepare two presentations and participates to the web-discussion. Moreover, the students will evaluate each other’s learning portfolios. The course is passed when these are completed.

Grading:
accepted/rejected

Person responsible:
Professors Anssi Lassila, Matti Sanaksenaho, Janne Pihlajaniemi, teacher/researcher Matti Lakkala

Working life cooperation:
Web lectures provided by the experts. The learning material provided by wood production industry.

485109A: Numerical methods in structural engineering, 5 op

Voimassaolo: 01.08.2019 - 31.07.2021
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Civil Engineering field
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Leikkaavuudet:

ECTS Credits:
5 ECTS / 135 hours of work

Language of instruction:
Lectures in Finnish. Lecture notes in English. Foreign students can participate by studying independently the material and by carrying out the exercise work and exam in English.

Timing:
The course is held in the spring semester, during periods 3 and 4. It is recommended to complete the course during the 4th year of studies.

Learning outcomes:
Ability to carry out structural analysis by using advanced numerical simulation technology. Knowledge of and ability to develop methods for verification of model data and accuracy of numerical solutions. Ability to present results of calculations in writing. Knowledge of different variational and energy principles of mechanics and ability to apply them in structural analysis. Knowledge of the properties of different structural models and ability to formulate an appropriate and validated mathematical model for specific problems. Knowledge of some special features concerning the analysis and dimensioning of steel, concrete and timber structures. Knowledge of special features of plate and shell structures from the viewpoint of structural design.

Contents:

Mode of delivery:
Face-to-face and independent study.

Learning activities and teaching methods:
Lectures and exercises 48 h, project work 24 h and independent work 63 h.

Target group:
Master level students in the study areas of structural engineering and engineering mechanics in the degree programs of civil and mechanical engineering, respectively.

Prerequisites and co-requisites:
Basic knowledge of statics, solid mechanics and differential & integral calculus.

Recommended optional programme components:
The course supports advanced courses in structural engineering and engineering mechanics.

Recommended or required reading:
Lecture notes and other electronic material.

Assessment methods and criteria:
The course is passed by partial exams during the course or by a final exam. A project work is also required.

Grading:
Numerical grading scale 1-5. Grade 0 stands for a fail.

Person responsible:
Senior research fellow Antti H. Niemi

Working life cooperation:
-

Other information:
-

450541A: Photoshop, Advanced Photomanipulation, 2 op

Voimassaolo: 01.08.2011 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastauyksikkö: Oulu School of Architecture
Arvostelu: 1 - 5, pass, fail
Opettajat: Asko Leinonen
Opintokohteen kielet: Finnish
Leikkaavuudet: ay450541A  Photoshop, Advanced Photomanipulation (OPEN UNI)  2.0 op

ECTS Credits:
2

Language of instruction:
Finnish

Timing:
-

Learning outcomes:
Students are able to complete image renderings from 3d modelling software and to supplement them by combining elements from photos for a photorealistic and expressive end-result.

Contents:
Color correction, perspective correction, layers.

Mode of delivery:
Workshop lectures and course work.

Learning activities and teaching methods:
Workshop

Target group:
The bachelor students of Oulu School of Architecture

Prerequisites and co-requisites:
-

Recommended optional programme components:
-

Recommended or required reading:
Software help files and handouts.

Assessment methods and criteria:
The student participates in the Photoshop workshop and completes the given course work.

Grading:
Pass / fail

Person responsible:
N.N.

Working life cooperation:
Students will learn to use the advanced skills of Adobe Photoshop software and apply those skills in hands-on work such as finishing conceptual drawing renderings.

Other information:
Adding a finishing touch in Photoshop to images produced with other rendering software. The course is intended for the students of Oulu School of Architecture only.

ay450541A: Photoshop, Advanced Photomanipulation (OPEN UNI), 2 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: University of Oulu, Open University
Arvostelu: 1 - 5, pass, fail
Opetus suunnattu: University of Oulu, Open University
Opintokohteen kielet: Finnish

Leikkaavuudet:
450541A  Photoshop, Advanced Photomanipulation  2.0 op

ECTS Credits:
2
Language of instruction:
Finnish
Timing:
workshop-type weekend courses, the course is organized once per academic year.

Learning outcomes:
Students are able to complete image renderings from 3d modelling software and to supplement them by combining elements from photos for a photorealistic and expressive end-result.

Contents:
Color correction, perspective correction.

Mode of delivery:
2 weekend workshop including lectures and exercises.

Learning activities and teaching methods:
Contact teaching 32 h, independent exercises 22 h.

Target group:
-

Prerequisites and co-requisites:
-

Recommended optional programme components:
-

Recommended or required reading:
Software help files and handouts.

Assessment methods and criteria:
Based on a project work (the presentation material of a design course at the Oulu School of Architecture or an equivalent work).

Grading:
1-5

Person responsible:
N.N.

Working life cooperation:
Students will learn to use the advanced skills of Adobe Photoshop software and apply those skills in hands-on work such as finishing conceptual drawing renderings.

Other information:
Adding a finishing touch in Photoshop to images produced with other rendering software. The course is intended for the students of the Oulu School of Architecture only

493300A: Principles of mineral processing, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: 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:
-

ay493300A: Principles of mineral processing (OPEN UNI), 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: University of Oulu, Open University
Arvostelu: 1 - 5, pass, fail
Opetus suunnattu: University of Oulu, Open University
Opintokohteen kielet: Finnish, English

Leikkaavuudet:
493300A Principles of mineral processing 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.
recoveris 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:

477524S: Process Optimization, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Field of Process and Environmental Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Aki Sorsa
Opintokohteen kielet: Finnish
Leikkaavuudet:
ay477524S Process Optimization (OPEN UNI) 5.0 op
477504S Process Optimization 4.0 op

ECTS Credits:
5 ECTS /135 hours of work

Language of instruction:
English

Timing:
Spring semester, the 3th period. Recommended for 1st year M.Sc. students.

Learning outcomes:
Student can use and apply standard unconstrained and constrained optimization methods. Student understands
the basic of evolutionary optimization algorithms and can use them. Student can define and identify optimization
problems. Student is able to summarize the role of optimization in process engineering.

Contents:
Basic concepts of optimization. Optimization of unconstrained and constrained functions. Linear programming,
Trajectory optimization. Evolutionary algorithms in optimization. Applications in process engineering.

Mode of delivery:
Face-to-face teaching and exercises.

Learning activities and teaching methods:
The amount of guided teaching is 40 hrs. Contact teaching includes, depending on situation, lectures, group work
and tutored group work. During self-study time student does independent or group work.

Target group:
M.Sc. students of process and environmental engineering and M.Sc. students interested in process optimization. Exchange and other international students.

**Prerequisites and co-requisites:**
No prerequisites but basic understanding on numerical methods and process modelling are useful.

**Recommended optional programme components:**
See prerequisites

**Recommended or required reading:**

**Assessment methods and criteria:**
This course uses continuous assessment that includes homework and classroom or home exams.

**Grading:**
The course unit uses a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

**Person responsible:**
Aki Sorsa

**Working life cooperation:**
No

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**ay477524S: Process Optimization (OPEN UNI), 5 op**

**Voimassaolo:** 01.08.2020 -

**Opiskelumuoto:** Advanced Studies

**Laji:** Course

**Vastuuyksikkö:** University of Oulu, Open University

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

**Opetus suunnattu:** University of Oulu, Open University

**Opettajat:** Aki Sorsa

**Opintokohteen kielet:** Finnish

**Leikkaavuudet:**

477524S  Process Optimization  5.0 op

**ECTS Credits:**
5 ECTS /135 hours of work

**Language of instruction:**
English

**Timing:**
Spring semester, the 3th period. Recommended for 1st year M.Sc. students.

**Learning outcomes:**
Student can use and apply standard unconstrained and constrained optimization methods. Student understands the basic of evolutionary optimization algorithms and can use them. Student can define and identify optimization problems. Student is able to summarize the role of optimization in process engineering.

**Contents:**

**Mode of delivery:**
Face-to-face teaching and exercises.

**Learning activities and teaching methods:**
The amount of guided teaching is 40 hrs. Contact teaching includes, depending on situation, lectures, group work and tutored group work. During self-study time student does independent or group work.

**Target group:**
M.Sc. students of process and environmental engineering and M.Sc. students interested in process optimization. Exchange and other international students.

**Prerequisites and co-requisites:**
No prerequisites but basic understanding on numerical methods and process modelling are useful.

**Recommended optional programme components:**
See prerequisites

**Recommended or required reading:**

**Assessment methods and criteria:**
This course uses continuous assessment that includes homework and classroom or home exams.

**Grading:**
The course unit uses a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

**Person responsible:**
Aki Sorsa

**Working life cooperation:**
No

**477501A: Process dynamics, 5 op**

**Voimassaolo:** 01.08.2015 -

**Opiskelumuoto:** Intermediate Studies

**Laji:** Course

**Vastuuysikkö:** Field of Process and Environmental Engineering

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

**Opettajat:** Aki Sorsa

**Opintokohteen kielet:** Finnish

**Leikkaavuudet:**

ay477501A  Process Control Engineering I  5.0 op

470431A  Process Control Engineering I  5.0 op

**ECTS Credits:**
5 ECTS /133 hours of work

**Language of instruction:**
Finnish/English. The main lecturing language is Finnish, but the course can also be taken in English with some special arrangements. Contact the responsible person.

**Timing:**
Negotiable (for the English version).

**Learning outcomes:**
After the course, the student understands the basic principles of dynamical behaviour of different processes, can write dynamic mass and energy balances for unit processes, and can solve these with the help of the transfer function approach. He knows also the connection between process control and process dynamics.

**Contents:**
Basics of process models and dynamics. Dynamic models. Lumped and distributed parameter models. Practical examples of different unit processes such as chemical reactors and heat exchangers. Modelling of large-scale processes.

**Mode of delivery:**
Negotiable (the course can be taken in English with some special arrangements - contact the responsible person).

**Learning activities and teaching methods:**
Solving exercise problems; textbook.

**Target group:**
Exchange and other international students (for the English version).

**Prerequisites and co-requisites:**
No course requirements.

**Recommended optional programme components:**
The course forms a basis to the advanced courses in the field of control engineering.

**Recommended or required reading:**
Lecture handout and other material distributed at the lecture.

**Assessment methods and criteria:**
Homework and written/oral test

**Grading:**
The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail. Read more about assessment criteria at the University of Oulu webpage.

**Person responsible:**
Aki Sorsa

**Working life cooperation:**
ay477501A: Process dynamics (OPEN UNI), 5 op

Voimassaolo: 01.08.2020 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: University of Oulu, Open University
Arvostelu: 1 - 5, pass, fail
Opetus suunnattu: University of Oulu, Open University
Opettajat: Aki Sorsa
Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS /133 hours of work

Language of instruction:
Finnish/English. The main lecturing language is Finnish, but the course can also be taken in English with some special arrangements. Contact the responsible person.

Timing:
Negotiable (for the English version).

Learning outcomes:
After the course, the student understands the basic principles of dynamical behaviour of different processes, can write dynamic mass and energy balances for unit processes, and can solve these with the help of the transfer function approach. He knows also the connection between process control and process dynamics.

Contents:
Basics of process models and dynamics. Dynamic models. Lumped and distributed parameter models. Practical examples of different unit processes such as chemical reactors and heat exchangers. Modelling of large-scale processes.

Mode of delivery:
Negotiable (the course can be taken in English with some special arrangements - contact the responsible person).

Learning activities and teaching methods:
Solving exercise problems; textbook.

Target group:
Exchange and other international students (for the English version).

Prerequisites and co-requisites:
No course requirements.

Recommended optional programme components:
The course forms a basis to the advanced courses in the field of control engineering.

Recommended or required reading:
Lecture handout and other material distributed at the lecture.

Assessment methods and criteria:
Homework and written/oral test

Grading:
The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail. Read more about assessment criteria at the University of Oulu webpage.

Person responsible:
Aki Sorsa

Working life cooperation:
No

492300A: Rock mechanics, 5 op
ECTS Credits:
5 ECTS cr /133 hours of work

Language of instruction:
English

Timing:
Spring, period 3

Learning outcomes:
Upon completion of the course students should: (1) know the basic properties of rock; (2) be able to make stress or strain analysis to a rock sample and a rock structure; (3) be able to analyse rock failure under compression, shear and tension loads; (4) know which factors influence rock failure or fracture and know how those affect rock fracture; (5) know the basic principles and methods in rock support; (6) be able to do rock support design; (7) be able to apply rock mechanics theory to tunnelling, mining planning, rock drilling, rock excavation, slope engineering, and other rock-related engineering.

Contents:
The course will: (1) introduce basic properties and characteristics of rock and rock mass; (2) introduce stress analysis method; (3) present basic theory on rock failure or fracture; (4) introduce basic methods for measuring rock strengths (compressive, shear and tensile) in laboratory; (5) present methods for measuring in-situ stresses; (6) introduce methods for rock support; (7) give knowledge on how to apply rock mechanics to mining engineering and other types of rock engineering.

Mode of delivery:
Face to face teaching

Learning activities and teaching methods:
Lectures, seminars, written reports, and assignments (mine visit if available).

Target group:
Students from mining and mineral processing, geophysics and geology

Recommended or required reading:

Assessment methods and criteria:
Assessment methods include oral presentations, written reports, seminars, assignments and written examination. The total points gained from the above determine the final grade of the course, and it is given on the scale Fail-1-5.
• For grade 1, the student must be able to know and understand the basic knowledge in this course.
• For grade 2, the student must know how to make stress analysis and rock failure analysis.
• For grade 3 the student must be able to make a plan for rock support.
• For grade 4, the student must be able to make a plan for rock support and evaluate such a plan.
• For grade 5, the student must be able to apply the acquired knowledge to make a very good plan for mining and rock engineering operation by using rock mechanics. He or she must do an outstanding design in at least one aspect, e.g. he/she can find a problem related rock mechanics or rock fracture and know how to solve the problem or how to make improvement.

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

Person responsible:
Zongxian Zhang

461102A: Statics, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mechanical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Lahtinen, Hannu Tapio
Opintokohteen kielet: Finnish
Leikkaavuudet:
  ay461102A Statics (OPEN UNI)  5.0 op
  461016A-01 Statics, examination  0.0 op
  461016A-02 Statics, exercises   0.0 op
  461016A Statics               5.0 op

ECTS Credits:
5 ECTS / 149 hours of work

Language of instruction:
Lectures in finnish, foreign students follow the course by reading independently the books in english and taking part to the exercises and exams where all material is given in english.

Timing:
The course is held in the autumn semester, during periods 1 and 2. It is recommended to complete the course at the 1st autumn semester.

Learning outcomes:
After the course, the student can calculate forces and moments of loaded structures using equations of vector algebra and trigonometry. He/she can draw a free body diagram of the force system and then solve the unknown forces by using equations of equilibrium. He/she can determine resultants from uniformly distributed loads and apply Coulomb's law of friction in the problem equilibrium. The student can solve problems of internal and external forces of particle systems and rigid body systems in case of static equilibrium. Especially, he/she can draw shear force and bending moment diagrams for beam structures.

Contents:
Fundamental laws and concepts in statics. Force systems and their treatment. Equilibrium of particles and rigid bodies. Static forces in isostatic structures such as beams, frames, cables and trusses. Friction.

Mode of delivery:
Implemented as Face-to-face -teaching.

Learning activities and teaching methods:
Lectures 55 h / exercises 42 h / independent work of solving homework problems 52 h.

Target group:
Compulsory for candidate degree students of mechanical engineering programme.

Prerequisites and co-requisites:
Now prerequisites required.

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:

Assessment methods and criteria:
In the course acceptable homework and midterm exams / final exam are required. This course utilizes continuous assessment. There are four midterm exams, of which the last one is at the same time a final exam. Homework contain every week three problems that are marked. The student is allowed to participate to a final exam, when the homework is accepted.

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

Person responsible:
University teacher Hannu Lahtinen

Other information:
The course gives ability for understanding static equilibrium, ability for determining force balance in structures and readiness for later studies.

ay461102A: Statics (OPEN UNI), 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course

Vastuuysikkö: University of Oulu, Open University

Arvostelu: 1 - 5, pass, fail

Opetus suunnattu: University of Oulu, Open University

Opintokohteen kielet: Finnish

Leikkaavuudet:

- 461102A Statics 5.0 op
- 461016A-02 Statics, exercises 0.0 op
- 461016A-01 Statics, examination 0.0 op
- 461016A Statics 5.0 op

ECTS Credits:
5 ETCS / 149 hours of work

Language of instruction:
Lectures in finnish, foreign students follow the course by reading independently the books in english and taking part to the exercises and exams where all material is given in english.

Timing:
The course is held in the autumn semester, during periods 1 and 2. It is recommended to complete the course at the 1st autumn semester.

Learning outcomes:
After the course, the student can calculate forces and moments of loaded structures using equations of vector algebra and trigonometry. He/she can draw a free body diagram of the force system and then solve the unknown forces by using equations of equilibrium. He/she can determine resultants from uniformly distributed loads and apply Coulomb's law of friction in the problem equilibrium. The student can solve problems of internal and external forces of particle systems and rigid body systems in case of static equilibrium. Especially, he/she can draw shear force and bending moment diagrams for beam structures.

Contents:
Fundamental laws and concepts in statics. Force systems and their treatment. Equilibrium of particles and rigid bodies. Static forces in isostatic structures such as beams, frames, cables and trusses. Friction.

Mode of delivery:
Implemented as Face-to-face -teaching.

Learning activities and teaching methods:
Lectures 55 h / exercises 42 h / independent work of solving homework problems 52 h.

Target group:
Compulsory for candidate degree students of mechanical engineering programme.

Prerequisites and co-requisites:
Now prerequisites required.

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:

Assessment methods and criteria:
In the course acceptable homework and midterm exams / final exam are required. This course utilizes continuous assessment. There are four midterm exams, of which the last one is at the same time a final exam. Homework contain every week three problems that are marked. The student is allowed to participate to a final exam, when the homework is accepted.

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

Person responsible:
University teacher Hannu Lahtinen

Other information:
The course gives ability for understanding static equilibrium, ability for determining force balance in structures and readiness for later studies.

455511P: Visual Arts I, 5 op

Voimassaolo: 01.08.2005 -

Opiskelumuoto: Basic Studies
Learning outcomes:
To deal with different aspects of visual expression, to expand general knowledge relative to the various fields of art and to develop independent creative expression.
After completing the course the student is able to comprehend various sides of visual expression and can implement these skills in exercise work.

Contents:
Object and spatial drawing, classical model drawing, designing and modelling.

Mode of delivery:
Contact teaching and independent studying.

Learning activities and teaching methods:
Lectures and/or contact teaching 6 hours and contact teaching and/or group guidance 92 hours.

Target group:
1st year students.

Prerequisites and co-requisites:
-

Recommended or required reading:
Supplemental reading list will be supplied during the course.

Assessment methods and criteria:
Based on exercises.

Grading:
1-5

Person responsible:
Prof. Matti Sanaksenaho.

Working life cooperation:
Students are initiated in the artist’s work through guidance of a professional artist.

455512P: Visual Arts II, 3 op

Voimassaolo: 01.08.2005 -
Opiskelumuoto: Basic Studies

Laji: Course

Vastuuysikkö: Oulu School of Architecture

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:
ay455512P  Visual Arts II (OPEN UNI)  3.0 op

ECTS Credits:
3

Language of instruction:
Finnish

Timing:
Spring term 1-2

Learning outcomes:
To deal with different aspects of visual expression, to expand general knowledge relative to the various fields of art and to develop independent creative expression. After completing the course the student is able to comprehend various sides of visual expression and can implement these skills in exercise work.

**Contents:**
Classical model drawing and various applications of composition and colour theory. The relationship between architecture and colour as well as art and space is studied during the course.

**Mode of delivery:**
Contact teaching and independent studying.

**Learning activities and teaching methods:**
lectures and/ or contact teaching  hours and contact teaching and/ or group guidance  92 hours

**Target group:**
2.nd year students

**Prerequisites and co-requisites:**
-

**Recommended or required reading:**
Supplemental reading list will be supplied during the course.

**Assessment methods and criteria:**
Based on exercises.

**Grading:**
1-5

**Person responsible:**
Prof. Matti Sanaksenaho.

**Working life cooperation:**
Students are initiated in the artist's work through guidance of a professional artist.