Opasraportti

Courses in English for Exchange Students 2015-16 (2015 - 2016)

Tutkintorakenteisiin kuulumattomat opintokokonaisuudet ja -jaksot

781656S: Aquatic Chemistry, 5 op
781650S: Atomic Spectrometric Techniques, 5 op
782641S: Catalysis, 5 op
782638S: Chemistry in Industrial Applications, 5 op
783652S: Chemistry of Organic Polymer Materials, 5 op
781657S: Experimental Design, 5 op
783650S: Introduction to Chemistry, 2 op
783651S: Introduction to Wood and Paper Chemistry, 5 op
781627S: Main Group Chemistry, 5 op
781651S: Metrological Fundamentals of Analytical Chemistry, 5 op
780601S: Project work, 12 op
784640S: Structural Chemistry I, 5 op
781658S: Surface Analytical Techniques, 5 op
782637S: Surface Chemistry, 5 op
781655S: X-Ray Crystallography, 5 op

Opintojaksojen kuvaukset

Tutkintorakenteisiin kuulumattomien opintokokonaisuuksien ja -jaksojen kuvaukset

781656S: Aquatic Chemistry, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Chemistry
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

ECTS Credits:
5 credits /134 hours of work
Language of instruction:

Finnish/English on demand
Timing:
4th or 5th spring. The course is lectured every other year, next time during the spring 2016.
Learning outcomes:
After this course the student should understand chemistry of natural waters: chemical equilibrium and reaction rates in them. Models of natural waters, influences of pollution on them.
Contents:
Atmosphere-water-solid-interactions and regulation of the chemical composition of natural waters.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
32 hours of lectures, 102 hours self-study
Target group:
Chemistry, optional
Prerequisites and co-requisites:
Introduction to Analytical Chemistry (780111P or 780119P)
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:
Stumm, W. and Morgan, J.J.: Aquatic Chemistry - Chemical Equilibria and Rates in Natural Waters, 3rd ed., John Wiley & Sons, New York, 1995, Chapters 1, 2.1-2, 3-10, 15; Recommended: Buffle, J.: Complexation Reactions In Aquatic Systems: An Analytical Approach, Ellis Horwood Limited, Chichester, 1988.
Assessment methods and criteria:
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:
Lecturer Leena Kaila

Working life cooperation:
No
Other information:
No

781650S: Atomic Spectrometric Techniques, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Chemistry

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
5 credits /134 hours of work
Language of instruction:
Finnish. English on demand.
Timing:
4th or 5th spring. The course is lectured every other year, next time during the spring 2016.
Learning outcomes:
Upon completion of the course, student should have acquired knowledge and understanding of AAS (especially ETAAS) and plasma based techniques (ICP-OES, ICP-MS), their theoretical background and modern instrumentation. Student is also able to describe the advantages and “weak points” of the techniques in the point of view of elements and samples to be analyzed. In addition, knowledge is acquired on the ptimization of measurement procedures and interference effects and their elimination.
Contents:
Origin of atomic absorption, atomic emission and atomic mass spectra. Instrument components and their properties, optimization of the determination procedures (incl. interference effects and their correction), and instrument diagnostics. Special sample introduction techniques and hyphenated techniques.
Mode of delivery:

Face-to-face teaching
Learning activities and teaching methods:
30 hours of lectures and seminars + 103 hours of self-study incl. practical project work
Target group:
Chemistry, optional
Prerequisites and co-requisites:
Instrumental Analysis (780328A or 781308A)
Recommended optional programme components:
Previous 781637S Atomispektometric Methods 4 credits and 781638S ICP-MS Workshop 3 credits

Recommended or required reading:
Lajunen, L.H.J. and Perämäki, P.: Spectrochemical Analysis by Atomic Absorption and Emission, 2 nd ed., The Royal Society of Chemistry, 2004
Assessment methods and criteria:
Final examination or home assignment. 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:
Prof. Paavo Perämäki
Working life cooperation:
No
Other information:
No

782641S: Catalysis, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Chemistry

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
5 credits /134 hours of work
Language of instruction:
Finnish/English on demand
Timing:
4th or 5th year. The course is lectured next time during the autumn 2015.
Learning outcomes:
Upon successful completion students should have a basic understanding of the theory of catalysis. Thermodynamic and kinetic background will be studied, including mechanisms of the most important catalytic reactions. Applications, preparation, characterisation and structure of homogenous, heterogeneous and enzymatic catalysts will be discussed.
Contents:
Principles of catalysis, homogeneous catalysis in solutions, polymer catalysis, zeolites, heterogeneous catalysis on surfaces.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
40 hours of lectures, 94 hours of self-study
Target group:
Chemistry, optional
Prerequisites and co-requisites:
Physical Chemistry I (780347A)
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:
Examination is based on the lectures.
Assessment methods and criteria:
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:
Prof. Jouni Pursiainen
Working life cooperation:
No
Other information:
No

782638S: Chemistry in Industrial Applications, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Chemistry
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

782338A	Chemistry in Industrial Applications	5.0 op
ay782638S	Chemistry in Industrial Applications (OPEN UNI)	5.0 op

ECTS Credits:
5 credits /134 hours of work
Language of instruction:
Finnish/English on demand
Timing:
4th or 5th spring. The course is lectured every other year, next time during the spring 2016.
Learning outcomes:
Upon completion of the course, the student will be able to explain several chemical applications in process and environmental technology. In particular, the student knows the novel applications in which chemistry is used.
Contents:
Catalytic applications in water purification, catalytic oxidation, preparation of biofuels from biomass, biomass gasification and the utilisation of biogas, chemistry and chemical reactions in mining processes etc. (visiting lecturers from the companies)
Mode of delivery:
Face-to-face teaching and seminars
Learning activities and teaching methods:
40 hours of lectures, 10 hours of seminars, 84 hours of self-study
Target group:
Chemistry, optional
Prerequisites and co-requisites:
Physical Chemistry I and Physical Chemistry II
Recommended optional programme components:
The course is an independent entity and does not require additional studies carried out at the same time.
Recommended or required reading:
Material given by the lecturer, scientific review papers
Assessment methods and criteria:
Final examinations. 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:
Prof. Ulla Lassi
Working life cooperation:
No
Other information:
No

783652S: Chemistry of Organic Polymer Materials, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Chemistry
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

ECTS Credits:
5 credits /134 hours of work
Language of instruction:
Finnish/English on demand
Timing:
4th or 5th year. The course is lectured every other year, next time during the spring 2016.
Learning outcomes:
After passing the course, the student can explain the most important technical quantities of polymeric materials including the mathematical background of the quantities. The student can also explain technical characteristics such as strength, modulus and heat deflection temperature of the most important polymeric materials.
Contents:
Polymer molecular weights, conformation of polymers, the visco-elastic behaviour of polymers, the conduction of heat and electricity in polymers.The chemistry of commodity plastics, engineering polymers, carbon fibre, aramid fibres, liquid crystalline polymers, heat stable polymers, epoxy resins.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
46 hours of lectures, 88 hours of self study
Target group:
Chemistry
Prerequisites and co-requisites:
Introduction to polymer chemistry (780326A)
Recommended optional programme components:
Previous courses 783620S Polymer Chemistry 3 cr and 783636S Polymer Chemistry in Materials Sciences 3 cr.

Recommended or required reading:
Elias, H-G: An Introduction to Plastics, VCH, Weinheim, 1993. Flinn, R.A. and Trojan, P.K., Engineering Materials and Their Applications, International Student Edition, Houghton Mifflin Comp., 4th ed., Boston 1990 (partly); Fawcett, A.H. (Editor): High Value Polymers, The Royal Society of Chemistry, Redwood Press Ltd., Melksham, 1991; Engineed Materials handbook, Part 1 and Part 2, ASM International, Metals Park, OH, 1993 (Part 1) and 1988 (Part 2) or newer books dealing with organic polymer materials
Assessment methods and criteria:
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:
Prof. Osmo Hormi
Working life cooperation:
No
Other information:
No

781657S: Experimental Design, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Chemistry
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

ECTS Credits:
5 credits /134 hours of work
Language of instruction:
Finnish. English on demand.
Timing:
4th or 5th spring. The course is lectured every other year, next time during the spring 2016.
Learning outcomes:
After this course student becomes aware of importance experimental design and is able to apply most common experimental designs in the field of chemistry.
Contents:
Factorial designs, mixture designs, D-optimal designs, response surface methodology. Computer programmes are applied during the course in the design and analysis of experiments.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
30 hours of lectures and exercises + 103 hours of self-study incl. computer aided analysis of experimental data
Target group:
Chemistry, optional
Prerequisites and co-requisites:
Metrological Fundamentals of Analytical Chemistry (781651S)
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:
Massart, D.L., Vandeginste, B.G.M., Buydens, L.M.C., De Jong, S., Lewi, P.J. and Smeyers-Verbeke, J.: Handbook of Chemometrics and Qualimetrics: Part A, Elsevier, 1997, partly.
Assessment methods and criteria:
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:
Prof. Paavo Perämäki
Working life cooperation:
No
Other information:
No

783650S: Introduction to Chemistry, 2 op

Voimassaolo: 01.08.2011 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Chemistry

Arvostelu: 1 - 5, pass, fail

Opettajat: Hormi Osmo

Opintokohteen kielet: Finnish

Leikkaavuudet:

780326A Introduction to Polymer Chemistry 2.0 op

ECTS Credits:
2 ECTS credits/ 53 hours of work
Language of instruction:
Finnish, English on demand
Timing:
4th or 5th spring
Learning outcomes:
After passing the course the student can explain the basics in chemistry of polymeric materials with emphasis on commodity plastics.
Contents:

Different classifications of polymeric materials, most important terms in polymer chemistry, basics in the nomenclature of polymers, most important molecular weights of polymers, additives, glass transition temperature, the chemistry involved in the preparation of commodity plastics.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
20 hours of lectures, 33 hours self-study
Target group:
Chemistry
Prerequisites and co-requisites:
Introduction to Organic Chemistry (780103P, 780116P, or 780112P)
Recommended optional programme components:
The contents and credits of this course are the same as in the course 780326A Introduction to Polymer Chemistry. The student can perform this course only once: 780326A Introduction to Polymer Chemistry or 783650S Introduction to Polymer Chemistry.
Recommended or required reading:
Stevens, M.P.: Polymer Chemistry, An Introduction, 3 rd ed, Oxford University Press, Oxford, 1999.
Assessment methods and criteria:
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:
Prof. Osmo Hormi
Working life cooperation:
No
Other information:
The course (780326A) is compulsory in the B.Sc. for those students who have started their studies before 1st August 2012.

783651S: Introduction to Wood and Paper Chemistry, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Chemistry

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
5 credits /134 hours of work
Language of instruction:
Finnish
Timing:
4th or 5th year. The course is lectured every other year, next time during the autumn 2015.
Learning outcomes:
: After passing the course the student can explain the chemical composition of wood and the chemistry involved in chemical pulping of wood. The student can classify the most important chemicals used in papermaking.
Contents:
The structure of wood, chemistry of carbohydrates, polysaccharides of wood, lignin, extractives, bark, pulping chemistry, bleaching. The fibre and its behaviour during papermaking, dry strength, wet strength, colloidal stability, retention and dewatering, water penetration and sizing, fillers and pigments, dyes, foam control, slime control.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
46 hours of lectures, 88 hours of self study
Target group:
Chemistry, optional
Prerequisites and co-requisites:
Introduction to Organic Chemistry (780103P or 780116P)

Recommended optional programme components:
Previous courses 783619S Wood Chemistry 3 cr and 783638S Introduction to Fiber Chemsitry of Polysaccharides 3 cr

Recommended or required reading:
Sjöström, E.: Wood Chemistry: Fundamentals and Applications, Academic Press, New York 1981. Eklund, D. ja Lindström, T.: Paper Chemistry, An Introduction, DT Paper Science Publication, Grankulla, 1991 or newer books dealing with wood and paper chemistry
Assessment methods and criteria:
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:
Prof. Osmo Hormi
Working life cooperation:
No
Other information:
No

781627S: Main Group Chemistry, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Chemistry

Arvostelu: 1 - 5, pass, fail

Opettajat: Laitinen Risto

Opintokohteen kielet: Finnish

ECTS Credits:
5 credits/134 hours of work
Language of instruction:
Finnish/English on demand
Timing:
4th or 5th year. The course is given every other year, next time duoring the autumn 2015.
Learning outcomes:
After this course the student is familiar with recent progress in modern main group chemistry.
Contents:
Periodic system, hydrogen, alkali and alkaline earth metals, semimetals and non-metals. The content of the course varies.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
28 hours of lectures, 14 hours of exercises, 92 hours of self-study
Target group:
Chemistry, optional
Prerequisites and co-requisites:
Inorganic Chemistry I (780353A or 781301A) and Inorganic Chemistry II (780391A, 781302A tai 781642S)
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:
Overton, T., Rourke, J., Weller, M. ja Armstrong, F.: Inorganic Chemistry, 6. painos, Oxford University Press, Oxford 2014. Chapters 9-18. Material handed out by the lecturer.
Assessment methods and criteria:
The assessment of the course is based on the 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:
Prof. Risto Laitinen
Working life cooperation:

No
Other information:
No

781651S: Metrological Fundamentals of Analytical Chemistry, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Chemistry
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

ECTS Credits:
5 credits /134 hours of work
Language of instruction:
Finnish
Timing:
4th or 5th autumn. The course is lectured every other year, next time during the autumn 2015.
Learning outcomes:
Upon completion of the course, student should have acquired knowledge and understanding of most common statistical techniques that are applied in validation of analytical methods and in quality control in analytical laboratories.
Contents:
Significance tests, analysis of variance, regression methods, measurement uncertainty, validation and optimization of analytical methods.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
30 hours of lectures + 20 hours of exercises + 84 hours of self-study
Target group:
Chemistry, optional
Prerequisites and co-requisites:
Introduction to Analytical Chemistry (780111P or 780119P)
Recommended optional programme components:
Previous 781631S Statistical Methods in Analytical Chemistry 4 credits
The course is an independent entity and does not require additional studies carried out at the same time.
Recommended or required reading:
Massart, D. L., Vandeginste, B.G.M., Buydens, L.M.C., De Jong, S., Lewi, P.J. and Smyers-Verbeke, J.: Handbook of Chemometrics and Qualimetrics: Part A, Elsevier, 1997, partly.
Assessment methods and criteria:
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:
Prof. Paavo Perämäki
Working life cooperation:
No
Other information:
No

780601S: Project work, 12 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Chemistry
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

ECTS Credits:
10 credits/200 hours of work
Language of instruction:
Finnish/English on demand
Timing:
4th autumn-spring
Learning outcomes:
After the laboratory project the student knows a research work and methods of his/her field and has readiness to perform the Pro Gradu Thesis.
Contents:
Laboratory work and written report
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
200 hours of work including laboratory research and a report.
Target group:
Chemistry, compulsory
Prerequisites and co-requisites:
B.Sc. studies in chemistry including the course Research Training (780301A) complited
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 given by teachers
Assessment methods and criteria:
Laboratory research and a report
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes verbal grading scale pass/fail.
Person responsible:
Professors, Docents, Lectures and Doctor level Researchers of the Chemistry Department.
Working life cooperation:
No
Other information:
The Project work including the report is to be done within six months from starting the work

784640S: Structural Chemistry I, 5 op

Voimassaolo: 01.08.2011 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Chemistry

Arvostelu: 1 - 5, pass, fail

Opettajat: Mattila, Sampo Antero

Opintokohteen kielet: Finnish

Leikkaavuudet:

780317A Structural Chemistry I 5.0 op

ECTS Credits:
5 credits/134 hours of work
Language of instruction:
Finnish
Timing:
4th or 5th Autumn
Learning outcomes:
After this course the student is familiar with the basics of interpretation of IR, NMR and mass spectra in identification, structure elucidation and quantification of organic molecules.
Contents:
Principles of chromatography, the interpretation of IR, NMR and mass spectra and methods of problem solving with the aid of IR, NMR and mass spectra.
Mode of delivery:

Face-to-face teaching
Learning activities and teaching methods:
40 hours of lectures, 20 hours of demonstrations and exercises, 74 hours of work Approximately ¼ of the course is in the scope of quantitative analysis and approximate ¾ qualitative analysis.
Target group:
Chemistry
Prerequisites and co-requisites:
No specific prerequisites
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:
Williams, D.H. & Fleming, I.: Spectroscopic Methods in Organic Chemistry, 5th ed., McGraw-Hill, Avon, 1995.
Assessment methods and criteria:
Final examination, exercises and tasks during the course
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:
Lecturer Sampo Mattila
Working life cooperation:
No
Other information:
No

781658S: Surface Analytical Techniques, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Chemistry

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
5 credits /134 hours of work
Language of instruction:
Finnish/English on demand
Timing:
4th or 5th spring. The course is lectured every other year, next time autumn 2015.
Learning outcomes:
Upon completion the student should have acquired knowledge and understanding of function of techniques and applications of them.
Contents:
Field emission scanning electron microscope, Energy filtered transmission electron microscope, Computer controlled electron probe microanalyzer and X-ray photoelectron spectroscopy, sample preparation, applications.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
50 hours of lectures, portfolio 10 hours, essay 10 hours, self-study 64 hours
Target group:
Chemistry, optional
Prerequisites and co-requisites:
Inorganic Chemistry I (780353A or 781301A)
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:
Brandon & Kaplan, Microstructural Characterization on Materials, Wiley, 2008
Assessment methods and criteria:

Problem based learning. This course unit utilizes continuous assessment. The students will be compiling a learning diary all through the course unit, and write a essay. Learning diary and essay will be assessed. The assessment of the course unit is based on the learning outcomes of the course unit. Attendance is compulsory. 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:
Lecturer Minna Tiainen
Working life cooperation:
No
Other information:
No

782637S: Surface Chemistry, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Chemistry

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
5 credits /134 hours of work
Language of instruction:
Finnish/English on demand
Timing:
4th or 5th autumn. The course is lectured every other year, next time during the autumn 2015.
Learning outcomes:
Upon completion of the course, the student will be able to explain the essential phenomena of surface chemistry, such as surface tension, interfaces and surface reactions. The student knows the properties of liquid surfaces and interfaces, and the role of surface active agents. The student will be able to explain properties of surfaces and surface phenomena. The student knows the most important surface structures and methods used in surface science studies. Surface phenomena are significant in several industrial applications, and those applications are theoretically studied during the course.
Contents:
Properties of liquid-gas, liquid-liquid, solid-gas and solid-liquid interfaces. Surface structures, Surface phenomena and Surface analytical methods. A wide range of applications are considered on molecular level, such as emulsions, foams, flotation, nucleation, surface active agents.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
5O hours of lectures, 84 hours of self-study
Target group:
Chemistry, optional
Prerequisites and co-requisites:
Physical Chemistry I and Physical Chemistry II
Recommended optional programme components:
Previous courses Surface Chemistry I and Surface Chemistry II
Recommended or required reading:
Adamson, A.W.: Physical Chemistry of Surfaces, 6. painos, John Wiley & Sons, New York, 1997 (partly);
Somorjai, G.A.: Introduction to Surface Chemistry and Catalysis, John Wiley & Sons, New York, 1994 (partly).
Final examination is based on the lectures.
Assessment methods and criteria:
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:
Prof. Ulla Lassi
Working life cooperation:

No
Other information:
No

781655S: X-Ray Crystallography, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Chemistry
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

ECTS Credits:
5 credits /134 hours of work
Language of instruction:
Finnish/English on demand
Timing:
4th or 5th autumn. The course is lectured every other year, next time during the autumn 2015 and 2017.
Learning outcomes:
After this course the student is familiar with basic concepts of crystal symmetry, the fundamentals of crystal structure determination, and has some hands-on experience in the structure determination.
Contents:
Crystal classes, crystal symmetry, scattering of X-rays in crystalline material, determination of the crystal structure from single crystals, powder samples and Rietveld refinement.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
32 hours of lectures, 12 hours of demonstrations, 90 hours of self-study (including practical exercise with a written report)
Target group:
Chemistry, optional
Prerequisites and co-requisites:
Inorganic Chemistry I (780353A or 781301A), Inorganic Chemistry II (780391A, 781302A or 781642S)
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:
Massa, W.: Crystal Structure Determination, 2 nd Ed., Springer, Berlin, 2004.
Assessment methods and criteria:
The assessment of the course is based on the final examination and the report of the practical exercise. 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:
Prof. Risto Laitinen
Working life cooperation:
No
Other information:
No