Opasraportti

FSci - Courses in English for exchange students (2019 - 2020)

Courses in English for exchange students at the Faculty of Science

This Course Catalogue lists courses taught in English that are available for exchange students at the **Faculty of Science for physics and mathematics, biology and geography** during academic year 2019-20.

When preparing your study plan please use the information provided under the **Courses tab** in this catalogue. Read carefully the information of each course you wish to take (language of instruction, target group, course content, timing, preceding studies, additional information etc.).

For information on the exchange application process please see www.oulu.fi/university/studentexchange. All exchange applicants must submit their exchange application through SoleMOVE by the deadline given, proposed study plan is attached to the on-line application.

Accepted exchange students are required to register to all courses. Course registration takes place once you have received your University of Oulu login information, this takes place close to the start of your exchange period. When registering you will be able to find detailed information on teaching and schedule under **Instruction tab**.

Teaching periods for 2019-20

Autumn term 2019
Period 1: Sept 2 - Oct 25, 2019
Period 2: Oct 28 – Dec 20, 2019

Spring term 2020
Period 3: Jan 7 – March 6, 2020
Period 4: March 9 – May 8, 2020

For arrival and orientation dates see www.oulu.fi/university/studentexchange/academic-calender

Any questions on exchange courses at the Faculty of Science should be addressed to:
Ms Essi Hakala or Ms Outi Kivelä, study.science(at)oulu.fi

Further information on application process and services for incoming exchange students:
www.oulu.fi/university/studentexchange or international.office(at)oulu.fi

Tutkintorakenteisiin kuulumattomat opintokokonaisuudet ja -jaksot

802334A: A Second Course in Differential Equations, 5 op
802673S: Additive Combinatorics, 5 op
757619S: Advanced course in bioinformatics, 5 op
790607S: Advanced literature of Geography, 1 - 5 op
802656S: Algebraic numbers, 5 op
751366A: Animal behaviour, 5 op
790325A: Applied literature of Geography, 1 - 5 op
755321A: Aquatic ecology field course, 5 op
757313A: Basics in population genetics, 5 op
757314A: Basics of bioinformatics, 5 op
766355A: Basics of space physics, 5 op
900013Y: Beginners' Finnish Course 1, 3 op
900053Y: Beginners' Finnish Course 2, 5 op
755608S: Bird ecology and conservation, 2 op
765635S: Celestial mechanics I, 5 op
764639S: Cell membrane biophysics, 5 op
766383A: Climate.Now, 2 - 5 op
766645S: Cluster Physics, 5 op
802661S: Computational Inverse Problems, 5 op
756347A: Conservation of biodiversity, 5 op
900054Y: Conversational Skills in Finnish, 3 op
766655S: Cosmic Rays, 8 op
765658S: Cosmology, 5 op
761673S: Electron and ion spectroscopy, 8 op
750349A: Examinations on optional topics in biology, 2 - 10 op
800323A: Field extensions, 5 op
802677S: Fourier analysis of measures, 5 op
802674S: Fractal Geometry 2, 10 op
755324A: Functional animal ecology, 5 op
790101P: GIS-basics and Cartography, 5 op
763695S: General relativity, 6 op
790340A: Geographies of global development, 5 op
755335A: Identification of animals, invertebrates, 4 op
755334A: Identification of animals, vertebrates, 4 op
756355A: Identification of plant species, brief, 3 op
756354A: Identification of plant species, extensive, 5 op
900015Y: Intermediate Finnish Course 1, 5 op
900016Y: Intermediate Finnish Course 2, 5 op
765686S: Interstellar Medium, 5 op
802675S: Introduction to Additive Combinatorics, 5 op
766658S: Introduction to Atmospheric Processess and Climate, 10 op
802676S: Introduction to Inverse Problems, 5 op
765601S: Introduction to Nonlinear Dynamics, 5 op
790141P: Introduction to Regional Development and Regional Policy, 5 op
756650S: Introduction to molecular ecology, 5 op
802635S: Introduction to partial differential equations, 10 op
790102P: Introduction to the systematic Physical Geography, 5 op
761658S: Ionospheric physics, 8 op
750629S: Kaamos symposium, 2 - 4 op
802320A: Linear Algebra, 5 op
791626S: Methodological special themes in Physical Geography, 5 op
755325A: Methods in ecology I, 5 op
755329A: Methods in ecology II, 5 op
757620S: Methods in genomics and genomics evolution, 5 op
757311A: Molecular methods I, 5 op
761618S: Molecular quantum mechanics, 5 op
761652S: NMR Imaging, 10 op
790346A: Nature conservation: a geographic perspective, 5 op
766344A: Nuclear and particle physics, 5 op
750399A: Optional examinations in environmental protection, 2 - 6 op
791635A: Physical Geography of Fennoscandia, 5 op
765684S: Physics of the Solar System I, 5 op
756344A: Plant ecology, 5 op
756343A: Plant ecology field course, 5 op

761653S: Plasma physics, 8 op
755336A: Population ecology, 10 op
791613S: Position based analyses and services in geography, 5 op
763634S: Quantum devices, 5 op
763612S: Quantum mechanics I, 10 op
763613S: Quantum mechanics II, 10 op
790106A: Region, culture and society, 5 op
792319A: Regional politics, policy and development: Northern Europe, 5 op
765307A: Research Project of Astronomy I, 5 op
791627S: Research in regional geography, 5 op
750613S: Research training, 2 - 15 op
766659S: Solar effects on climate, 6 op
900027Y: Special Course in Finnish: Writing Skills, 3 op
750654S: Special lecture in biology, 2 - 5 op
790605S: Special research course in Physical Geography, 5 op
790350A: Special themes in Regional Development and Regional Policy, 5 op
763620S: Statistical physics, 10 op
765629S: Stellar atmospheres, 10 op
900017Y: Survival Finnish, 2 op
791632S: Sustainable development and global tourism, 5 op
790610S: Sustainable tourism development in Northern environments, 10 op
755322A: Terrestrial animals field course, 5 op
750318A: Thursday seminar in biology, 2 op
802669S: Topology, 5 op
790320A: Tourism planning and development, 5 op
790161A: Tourism, development and sustainability, 5 op
791629S: Traditions and current issues in tourism research, 5 op
755328A: Wildlife management and game animal ecology, 5 op
750377A: Winter ecology, 5 op
790349A: World regional geography, 5 op

Opintojaksojen kuvaukset

Tutkintorakenteisiin kuulumattomien opintokokonaisuuksien ja -jaksojen kuvaukset

802334A: A Second Course in Differential Equations, 5 op

Voimassaolo: 01.06.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mathematics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

800346A	Differential Equations II	4.0 op

ECTS Credits:
5 ECTS credits
Language of instruction:
Finnish
Timing:
2nd year or later, 3rd period

Learning outcomes:
On successful completion of this course, the student will be able to
- apply method of Frobenius to solve second order linear differential equations
- derive and prove the basic properties of Bessel functions, Legendre polynomials and Hermite polynomials
- apply integral transformations to solve some integral equations and ordinary differential equations with constant coefficients
- recognize heat and wave equations and choose the proper method to solve them.

Contents:
The course is devoted to second order ordinary differential equations that are important in applications and classical partial differential equations such as heat and wave equations. Method of Frobenius is introduced to solve second order ordinary differential equations. Some special functions (Gamma function and Bessel functions etc.) and also orthogonal polynomials (Legendre and Hermite polynomials) are considered. Basic facts about Fourier series and Fourier transform are given. Laplace transform is discussed at more advanced level than in earlier studies. Separation of variables is introduced as a method to solve certain boundary value problems for heat and wave equations.

Mode of delivery:
Face-to-face teaching

Learning activities and teaching methods:
Lectures 28 h, exercises 14 h

Target group:
Students majoring in mathematics or applied mathematics, physics or engineering students

Prerequisites and co-requisites:
Differential equations, Complex analysis

Recommended optional programme components:
-

Recommended or required reading:
Lecture notes. Additional reading: Colton D, Partial differential equations, Dover, 1988 Lebedev N N, Special Functions and their applications, Dover, 1972 Nagle R K, Fundamentals of differential equations and boundary value problems, Addison-Wesley, 1996 Zill D G and Cullen M R, Differential equations with boundary-value problems, Brooks/Cole, 2001

Assessment methods and criteria:
Final exam

Grading:
Fail, 1-5

Person responsible:
Valery Serov

Working life cooperation:
No

Other information:
-

802673S: Additive Combinatorics, 5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Mathematics

Arvostelu: 1 - 5, pass, fail

Opettajat: Ville Suomala

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits

Language of instruction:
Finnish or english depending on the participants

Timing:
2nd period (autumn semester)

Learning outcomes:
Upon completion of the course, the students:
- Are familiar with the basic methods of additive combinatorics (sumset estimates, discrete Fourier transform etc.)

- Is familiar with Roths theorem, Freimans Theorem, Balogh-Szemered- Gowers theorem and knows the main ideas in the proofs
- Is able to apply these results

Contents:
Roths theorem on arithmetic progressions, Freiman's theorem, Balogh-Szemeredi-Gowers theorem. Applications of additive combinatorics.
Mode of delivery:
Lectures and exercises
Learning activities and teaching methods:
Lectures 28 h, exercises 8 h, independent study 91 h
Prerequisites and co-requisites:
Introduction to Additive combinatorics or equivalent knowledge
Assessment methods and criteria:
Exam or a seminar presentation
Grading:
Failed, 1-5
Person responsible:
Ville Suomala

757619S: Advanced course in bioinformatics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

753629S Advanced course in bioinformatics 4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English.
Timing:
M.Sc. 2nd spring.
Learning outcomes:
The main objective of this course is to provide students with understanding and experience of the main techniques required to manipulate, analyse and interpret next generation sequence data. Students will understand different technologies; be capable of manipulating data files and assess data quality; assemble and map reads; identify genes and variants; complete some basic analyses of genome data.
Contents:
During the course, students will manipulate an example data set to provide a comprehensive experience of contemporary bioinformatics techniques required to identify genes and polymorphisms, as well as familiarity with the command terminal and basic LINUX commands. This course builds on Basics of bioinformatics (757314A) and complements the theory learnt in Introduction to population genetics (757313A), Introduction to molecular ecology (756650S) and Experimental course in evolutionary genomics (757621S). Lectures provide the core understanding of the main steps and principals behind data analyses, but the core content will be practical experience of handling and analysing large data sets.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Contact hours: 12 hrs lectures, 40 hrs computer exercises, 56 hr independent study. Continuous assessment (coursework) and a final exam.

Target group:
Bioscience and Ecology M.Sc.
Prerequisites and co-requisites:
Basics of bioinformatics (757314A) or equivalent knowledge, Introduction to population genetics (757313A), Molecular evolution (757312A).

Recommended optional programme components:
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Recommended or required reading:
Good guide for much of this is the De Wit P. et al 2012: The simple fool's guide to population genomics via RNA-Seq: an introduction to high-throughput sequencing data analysis. Molecular Ecology Resourses. Molecular Ecology Resources. Volume 12, Issue 6, pages 1058–1067, November 2012 and other course material.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Continuous assessment, learning diary and project report.
Grading:
1-5 / Fail.
Person responsible:
Dr. Phillip Watts.
Working life cooperation:
No.
Other information:
-

790607S: Advanced literature of Geography, 1 - 5 op

Voimassaolo: 01.01.2017 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Paasi Anssi, Jan Hjort, Saarinen, Jarkko Juhani

Opintokohteen kielet: Finnish

ECTS Credits:
1-5 ECTS
Language of instruction:
Finnish or English.
Timing:
1st or 2nd MSc-year, 1st or 2nd semester.
Learning outcomes:
The student will deepen his/her knowledge through literature. More exact learning outcomes is based on method of implementation of the course (agreed with professor).
Contents:
This course serves the specialization of the student. After the course, the student has deepened his/her knowledge and experience in geography.
Mode of delivery:
Book exam, essay or independent studying.
Learning activities and teaching methods:
Ways of performance is discussed with professor.
Target group:
MSc-students
Recommended or required reading:
Will be agreed with professor.
Assessment methods and criteria:
Will be agreed with professor. Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass/fail
Person responsible:
Eeva-Kaisa Prokkola, Jan Hjort, Anssi Paasi, Harri Antikainen, Jarkko Saarinen

802656S: Algebraic numbers, 5 op

Voimassaolo: 01.01.2012 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Mathematics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS cr
Language of instruction:
Finnish and English
Timing:
3/4 year, 4th period
Learning outcomes:
As usual in my mathematical studies I shall be ableto solve problems arising from the subject andto prove essential theorems starting from the given definitions using the tools applied in the course. More detailed; For example, when I pass the course with the grade 1/5, I shall recognize most definitions and I am able to solve closely related problems. Also I am able to rewrite short proofs with some understanding. When I pass the course with the grade 5/5, then I shall understand well the given definitions with the proofs of the theorems deduced from them.Further, I am able to solve challenging problems which demand independent deductions with several stages and applications of appropriate tools.
Contents:
First we revise some basics of rings and fields which are needed to proceed ahead field extensions. In particular, divisibility in an integral domain is carefully studied yielding to applications in the theory of polynomial algebra and algebraic integers. The theory of algebraic numbers is strongly based on polynomial algebra, where the properties of zeros and divisibility of polynomials are considered. The definition of an algebraic number will be generalized to the algebraic elements of field extensions going forward to algebraic fields.Considered as most important algebraic fields we get number fields which are finitely generated subfields of the field A of all complex algebraic numbers. In particular, we study quadratic number fields. Further, we shall consider the divisibility and factorization of algebraic integers with some applications to Diophantine equations.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
28 h lectures, 14 h exercises, 91 h independent study
Target group:
Mathematics majors
Prerequisites and co-requisites:
Basics in Algebra, Alcebraic structures, Matrix algebra, Linear algebra, Basics in Number Theory
Recommended or required reading:
I.N. Stewart and D.O. Tall: Algebraic number theory, Mollin, Richard A., Advanced number theory with applications,
Course material: http://cc.oulu.fi/~tma/OPETUS.html
Grading:
1-5, i
Person responsible:
Tapani Matala-aho
Working life cooperation:
-

751366A: Animal behaviour, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kaitala Arja

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:

English.
Timing:
B.Sc. 3 rd spring or M.Sc. 1 st spring ECOz.
Learning outcomes:
Gain an understanding of the principles of animal behaviour in the context of evolutionary ecology. Introduction to relevant international and national studies on animal behavior.
Contents:
The course is planned for third year students. It gives an overview of modern behavioural ecology, with the emphasis on animal sociality and interactions within and between species. The topics include sexual selection, sexuality, parental care, co-operation and learning. In addition, the lectures cover species interaction, such as predation and predation avoidance. Further examples on applied animal behaviour research and ethology are provided. Participation in lectures, group work and seminars is compulsory. Student report / learning diary (in Finnish or English), covering each week's lectures, will be collected online (Optima interface).

Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
36 h lectures, group work, seminars, exam (voluntary).
Target group:
B.Sc. degree optional to ECO, M.Sc. degree compulsory to ECOz.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Davis, NB, Krebs, JR, & West, SA N.B. (2012) An Introduction to Behavioural Ecology, 4th ed, Wiley-Blackwell.
The availability of the literature can be checked from this link
Assessment methods and criteria:
(evaluation) Learning diaries and voluntary exam.
Grading:
1-5 / Fail.
Person responsible:
Prof. Arja Kaitala, Doc. Topo Lehtonen and Doc. Olli Loukola
Working life cooperation:
No.
Other information:
-

790325A: Applied literature of Geography, 1 - 5 op

Voimassaolo: 01.01.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Juha Ridanpää, Janne Alahuhta, Eeva-Kaisa Prokkola

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
1-5 ECTS
Language of instruction:
Finnish or English
Timing:
1st or 2nd year, 1st or 2nd semester.
Learning outcomes:

The student will deepen his/her knowledge through literature. More exact learning outcomes is based on method of implementation of the course.
Contents:
This course serves the specialization of the student. After the course, the student has deepened his/her knowledge and experience in geography.
Mode of delivery:
Book exam, essay or other mode of independent studying.
Learning activities and teaching methods:
Ways of performance is discussed with the person responsible of the course.
Target group:
Bachelor students of geography
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
Will be agreed with teacher.
Assessment methods and criteria:
Will be agreed with teacher. Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass/fail
Person responsible:
Janne Alahuhta, Juha Ridanpää and Eeva-Kaisa Prokkola

755321A: Aquatic ecology field course, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

751307A Field course in aquatic animals 4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 1st summer. ECOGEN 1st summer.
Learning outcomes:
To learn basic methods in biological freshwater sampling and to identify the most common freshwater taxa.
Contents:
Basics of freshwater ecology. Demonstrations of the most frequently-used biological sampling methods. Identification of the most common freshwater fishes, invertebrates and zooplankton.
Mode of delivery:
Face-to-face teaching and independent studying.
Learning activities and teaching methods:
Summer: 50 h of field work and demonstrations at the Oulanka research station, 83 h of independent studying including a reading package.
Target group:
Compulsory (5 cr) to ECO. TEAeco: either Aquatic ecology field course 5 cr (755321A) or Terrestrial animals field course 5 cr (755322A) is compulsory for biology major, the other field course can be included to the ecology minor. TEAbs, alternatively compulsory to TEAbs either Aquatic ecology field course 5 cr or Terrestrial animals field course 5 cr. TEA: at least 10 cr compulsory, two field courses, one animal and other Plant ecology field course (756343A).
Prerequisites and co-requisites:

Identification of animals, vertebrates 4 cr (755334A) and Identification of animals, invertebrates 4 cr (755335A) or equivalent knowledge. (if necessary, selection to the course 755321A can be based on success in courses 755334A and 755335A).
Recommended optional programme components:
This course is a prerequisite for the following: Winter ecology (750377A), Special course in aquatic invertebrates (754627S), Assessment and monitoring of the ecological status of water bodies (754625S), Field methods in freshwater biomonitoring (754626S).
Recommended or required reading:
Reading package, handouts and lectures given before / during the course.
Assessment methods and criteria:
On the final course day species identification exam on the species met during the course, practical exam on the sampling methods and
theoretical exam based on the literature and demonstration material.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail.
Person responsible:
Prof. Timo Muotka.
Working life cooperation:
No.
Other information:
-

757313A: Basics in population genetics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Lumi Viljakainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

753314A	Basics in population genetics	8.0 op

ECTS Credits:
5 cr / 133 hours of work.
Language of instruction:
English.
Timing:
B.Sc. 2nd spring BSg, M.Sc. 1st spring, ECOGENgen 1st spring, genetics: compulsory in M.Sc. degree.
Learning outcomes:
Student can explain the fundamental population genetics concepts and models and basics in phylogenetics, and is able to apply these in analysis of data.
Contents:
Fundamentals of population genetics (genetic variation, inbreeding, genetic drift, effective population size, mutation, selection, population structure, gene flow), phylogenetic methods and phylogeography.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
22 h lectures, 4 h seminars, 16 h exercises (problem solving and computer exercises), take-home exam.
Target group:
B.Sc. 2nd spring BSg, M.Sc. 1st spring, ECOGENgen 1st spring, genetics: compulsory in M.Sc. degree.
Prerequisites and co-requisites:
Concepts of genetics (757109P) and Experimental course in general genetics (757110P) or equivalent knowledge and Molecular evolution (757312A).
Recommended optional programme components:

Compulsory prequisite for courses Experimental course in evolutionary genomics (757621S), Advanced course in bioinformatics (757619S) and DNA analysis in population genetics (757618S). Recommended prerequisite for course Quantitative genetics (805338A).
Recommended or required reading:
Hamilton, M. B. 2009: Population genetics, Wiley-Blackwell.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Take-home exam, problem solving, laboratory and computer exercises, seminar.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Lumi Viljakainen.
Working life cooperation:
No.
Other information:
Note that Basics in population genetics and Introduction to Molecular ecology courses are alternative; students cannot get credits from both.

757314A: Basics of bioinformatics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Lumi Viljakainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

750340A	Basics of bioinformatics	3.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English.
Timing:
B.Sc. studies, 3rd autumn.
Learning outcomes:
After the course the student can explain and is able to use the basic methods to analyse nucleotide and protein sequences. Student learns how to use various databases, can explain the principles of the analytic methods, is able to take up a critical attitude towards the used methods and gets a good background for applying new methods that are developed continuously.
Contents:
Searching DNA and protein sequences and information connected to the sequences from various databases, genome structure and sequence-based gene prediction and annotation, sequence alignment, introduction to next-generation sequencing techniques.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
12 h lectures, 6 h seminar, 20 h exercises, independent work.
Target group:
BT: compulsory, recommended for all biologists. Suitable also for biochemists.
Prerequisites and co-requisites:
Concepts of genetics (757109P) or equivalent knowledge, also Molecular evolution (757312A) is recommended.
Recommended optional programme components:
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Recommended or required reading:
Pevsner, J. 2015: Bioinformatics and functional genomics, Wiley-Blackwell.
The availability of the literature can be checked from this link.
Assessment methods and criteria:

Take-home exam, exercises, seminar presentation, independent work and student activity.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Lumi Viljakainen.
Working life cooperation:
No.
Other information:
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766355A: Basics of space physics, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

766345A	Basics of space physics	6.0 op

ECTS Credits:
5 ECTS cr
Language of instruction:
Finnish
Timing:
In most years, 4th period
Learning outcomes:
The student identifies and is capable of naming the basic concepts and processes of solar activity, solar wind, magnetosphere and ionosphere. He can explain the reasons for different phenomena in space physics and apply the theory to simple problems.
Contents:
This lecture course gives the basic view on the near space around the Earth. The solar wind is a continuous plasma flow emerging from the Sun. It compresses the magnetic field of the Earth into a region with a cometary shape, called the magnetosphere. The solar radiation and charged particles precipitating from the magnetosphere ionise the upper part of the atmosphere thus creating the ionosphere. The lecture course contains the physics of the Sun, the solar wind, the magnetosphere and the ionosphere, as well as the effects of the the Sun and the solar wind on the magnetosphere and the ionosphere. There are plasma bursts in the Sun causing disturbances in the surrounding space. These phenomena create the varying space weather. The space weather may affect e. g. telecommunication links, electrical power networks and operation of satellites. It may also cause health hazards for astronauts. Since the near space contains ionised gas in magnetic field, plasma physics is used in explaining the phenomena.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 36 h, exercises 18 h, self-study 100 h
Target group:
Primarily for the students of the degree programme in physics. Also for the other students of the University of Oulu.
Prerequisites and co-requisites:
No specific prerequisites
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously
Recommended or required reading:
K. Mursula: Avaruusfysiikan perusteet (Basics of Space physics; in Finnish; distributed in the web page of the Department). Supporting material for instance: H. Koskinen: Johdatus plasmafysiikkaan ja sen avaruussovellutuksiin (Limes ry); A. Brekke: Physics of the upper polar atmosphere (Wiley & Sons).
Course material availability can be checked here.

Assessment methods and criteria:
Final examination.

Read more about assessment criteria at the University of Oulu webpage.
Grading:
Numerical grading scale 0 – 5, where 0 = fail
Person responsible:
Kalevi Mursula
Working life cooperation:
No work placement period
Other information:
https://wiki.oulu.fi/display/766355A
Passing the course helps in getting drafted in various project works of the space physics group.

900013Y: Beginners' Finnish Course 1, 3 op

Voimassaolo: 01.08.1995 -
Opiskelumuoto: Language and Communication Studies
Laji: Course
Vastuuyksikkö: Languages and Communication
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay900013Y Beginners' Finnish Course 1 (OPEN UNI) 2.0 op

Proficiency level:
A1.2
Status:
The course is intended for the international students in every faculty of Oulu University.
Required proficiency level:
A1.1, Completion of the Survival Finnish course (900017Y) or the equivalent language skills.
ECTS Credits:
3 ECTS credits
Language of instruction:
As much Finnish as possible; English will be used as a help language.
Timing:
-
Learning outcomes:
By the end of the course the student can understand and use some familiar and common everyday expressions relating to her/himself and everyday situations. S/he can interact in a simple way provided the other person talks slowly and clearly and is willing to help. The student is able to read short simple texts and messages dealing with familiar topics. S/he also deepens her/his understanding of the Finnish language and communication styles.
Contents:
This is lower elementary course which aims to help students to learn communication skills in ordinary everyday situations. During the course, students broaden their vocabulary and knowledge of grammar and principles of pronunciation. They also practise to understand easy Finnish talk about everyday subjects, and reading and writing short and simple texts/messages.

The topics and communicative situations covered in the course are: talking about oneself, one's family, studies and daily routines, as well as asking about these things from other person, expressing opinions, describing people and things, talking about weather and seasons, the names of the months and colours.

The structures studied are: verb types, basics of the change of the consonants k, p and t in verbs and nouns, the genitive and partitive cases, possessive structure, some declension types for nouns (word types) and the basics of the local cases.
Mode of delivery:
Contact teaching and guided self study
Learning activities and teaching methods:
Lessons 2 times a week (26 h, including the final exam) and guided self study (55 h)
Target group:
International degree and post-graduate degree students and exchange students of the University
Prerequisites and co-requisites:
Completion of the Survival Finnish Course

Recommended optional programme components:
-
Recommended or required reading:
Gehring, S. & Heinzmann, S. Suomen mestari 1 (chapters 3 - 5)
Assessment methods and criteria:
Regular and active participation in the weekly lessons (twice a week), homework assignments and written exam at the end of the course will be observed in assessment.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Grading scale is 1-5.
Person responsible:
Anne Koskela
Working life cooperation:
-
Other information:
Sign-up in WebOodi. The course will start right after the Survival Finnish course.

900053Y: Beginners' Finnish Course 2, 5 op

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay900053Y	Beginners' Finnish Course 2 (OPEN UNI)	4.0 op

Proficiency level:
A1.3
Status:
The course is intended for the international students in every faculty of Oulu University.
Required proficiency level:
A1.2, completion of the Beginners' Finnish course 1 (900013Y) or the equivalent language skills.
ECTS Credits:
5 ECTS credits
Language of instruction:
As much Finnish as possible; English will be used as a help language.
Timing:
-
Learning outcomes:
By the end of the course the student can understand and use some very common everyday expressions and sentences. S/he can communicate in easy and routine tasks requiring a simple and direct exchange of information on familiar everyday matters. The student understands different kinds of short texts. S/he can for example locate important information in them. In addition, s/he has acquired more detailed knowledge of the language and culture.
Contents:
This is a post-elementary course. During the course students learn more about communication in ordinary everyday situations in Finnish. They also extend their vocabulary and knowledge of grammar. Students practise understanding simple Finnish talk and short texts.

The topics and communicative situations covered in the course are: asking for and giving directions, asking for help/favours, carrying out transactions in shops and restaurants, talking about the past, asking for and expressing opinions and feelings, accommodation, travelling, vehicles, work, professions, food, drink and parties.

The structures studied are: the local cases, nominative plural (basic form plural), imperfect (past tense of verbs), part of the imperative, more declension types for nouns (word types), more about the change of the consonants k, p and t in verbs and nouns, declension of the demonstrative pronouns and personal pronouns, more about the partitive case, basics of the object cases, postpositions and some sentence types in Finnish.
Mode of delivery:
Contact teaching and guided self study

Learning activities and teaching methods:
Lessons 2 times a week (52 h, including the tests) and guided self study (83 h)
Target group:
International degree and post-graduate degree students and exchange students of the University
Prerequisites and co-requisites:
Completion of the Beginners' Finnish Course 1
Recommended optional programme components:
-
Recommended or required reading:
Gehring, S. & Heinzmann, S.: **Suomen mestari 1** (kappaleet 6-9)
Assessment methods and criteria:
Regular and active participation in the weekly lessons (twice a week), homework assignments and tests will be taken into consideration in the assessment.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Grading scale is 1-5.
Person responsible:
Anne Koskela
Working life cooperation:
-
Other information:
Sign-up in WebOodi. The lessons will be held **twice a week** during a 13-week period.

755608S: Bird ecology and conservation, 2 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Seppo Rytkönen, Kari Koivula

Opintokohteen kielet: Finnish

ECTS Credits:
2 ECTS credits / 53 hours of work.
Language of instruction:
English
Timing:
M.Sc. degree. Every second year (arranged if resources allow).
Learning outcomes:
Student gets current scientific research knowledge in animal reproductive ecology and behaviour.
Contents:
Introduction to sexual reproduction and parental care in animals. Birds are used as a taxonomic reference group, but the concepts and theories are discussed in the general evolutionary ecological framework. Topics: e.g. habitat selection, territoriality, mating systems and brood parasitism.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
24 h lectures, exam.
Target group:
-
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.

Person responsible:
Doc. Seppo Rytkönen and Doc. Kari Koivula.
Working life cooperation:
No.
Other information:
-

765635S: Celestial mechanics I, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English, Finnish

ECTS Credits:
5 credits
Language of instruction:
English (or Finnish)
Timing:
Not lectured every year
2nd period
Learning outcomes:
The student is able to describe the basic principles of orbital dynamics, and to apply them to solution of simple perturbation problems via numerical integration methods.
Contents:
The course deals with orbital motion of planets, containing several IDL-exercises. The topics include calculation of position from orbital elements, determination of elements from observations. Hyperbolic orbits. Applications of vectorial perturbation theory. General N-body problem.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 28 h, exercises and computer demonstrations 24 h, two independent home assessments, self-study 81 h
Target group:
Primarily for the students of the degree programme in physics. Also for the other students of the University of Oulu.
Prerequisites and co-requisites:
No specific prerequisites
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously
Recommended or required reading:
IDL manual + exercise material.
Fitzpatrick, R.: An Introduction to Celestial Mechanics.
Course material availability can be checked
Assessment methods and criteria:
One written examination.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Numerical grading scale 0 – 5, where 0 = fail
Person responsible:
Jürgen Schmidt
Working life cooperation:
No work placement period
Other information:
https://wiki.oulu.fi/display/765304A/

764639S: Cell membrane biophysics, 5 op

Voimassaolo: 01.01.2019 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opettajat: Kyösti Heimonen

Opintokohteen kielet: Finnish, English

ECTS Credits:
5 ECTS credits / 133 h of student work
Language of instruction:
English, if international students are present. Course materials are in English. Lectures take place in Finnish, if only Finnish-speaking students are present.
Timing:
The course is organized in the autumn semester, during period 2. It is recommended to take and complete the course during the 4th autumn. However, it is also possible to complete it already during the 3rd autumn.
Learning outcomes:
Upon completion of the course, the student is able to describe the basics of cell membrane and ion channel structure and function, to present the basic biophysical models describing the electrical function of the cell membrane, and to solve problems and calculations concerning these models.
Contents:
During the course, the students will become acquainted with the central biophysical phenomena of the cell membrane, for example: the physical structure and properties of the cell membrane and its ion channels, their ion permeation and selectivity, ion channels function and kinetics. In addition, they will learn to know the theoretical basics of the electrophysiological cell membrane recording methods, especially voltage-clamp, and the biophysical models describing the electrical function of the cell membrane, especially the Hodgkin-Huxley model.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 28 h, calculation exercises 14 h, weekly assignments, self-study 91 h
Target group:
Students of Biomedical physics (voluntary in BSc minor, mandatory in MSc). Also the other students of the University of Oulu having necessary background knowledge.
Prerequisites and co-requisites:
Introduction to biomedical physics (764163P) and Foundations of cellular biophysics (764125P) are recommended to be completed before this course. In addition, completion or knowledge of basic university mathematics or calculus is recommended.
Recommended optional programme components:
Does not require additional studies at the same time.
Recommended or required reading:
Lecture handouts and scientific articles presented during the lectures. Recommended additional reading: D. Johnston, S. Wu: Foundations of Cellular Neurophysiology, MIT Press, Cambridge MA, 1995 (partly); B. Hille: Ion channels of excitable membranes, Sinauer Associates Inc., Sunderland, Massachusetts USA, 3rd edition, 2001 (partly).
Assessment methods and criteria:
Both written exam and home exam are mandatory to pass to complete the course. Also, students can earn extra points on top of passed exam points by solving and answering voluntary weekly assignments and calculation exercises evaluated by the teachers.
Grading:
Numerical grading scale 0 – 5, where 0 = fail.
Person responsible:
Kyösti Heimonen
Working life cooperation:
Does not contain working life cooperation.
Other information:
Course website: https://wiki.oulu.fi/display/764323A/Etusivu

766383A: Climate.Now, 2 - 5 op

Voimassaolo: 01.01.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opettajat: Jussi Malila

Opintokohteen kielet: English, Finnish

Leikkaavuudet:

ay766386A	Climate.Now (OPEN UNI)	2.0 op
766683S	Climate.Now	5.0 op
ay766383A	Climate.Now (OPEN UNI)	2.0 op

ECTS Credits:
2-5 ECTS credits
Language of instruction:
Study material and tuition are available both in Finnish and English.
Timing:
2nd period
Learning outcomes:
Upon completion of the course, student can
- look at climate change from many different perspectives and create connections between them as well as look for solutions to the climate challenge in a variety of ways
- reflect her or his own role in climate change and apply what has been learned on the course to her or his field of study
- examine different perspectives, solutions, information sources, and the current debate on climate change critically
Contents:
Scientific basis of climate change, mitigation of climate change, effects of climate change and adaptation.
Mode of delivery:
Web-based and face-to-face teaching
Learning activities and teaching methods:
Two credits: Guided teaching events 10 h, online material and independent study 36 h, learning diary 8 h.
Five credits: Guided teaching events 10 h, online material and independent study 36 h, learning diary 12 h, two projects with reports in small groups 77 h.
Target group:
All students.
Prerequisites and co-requisites:
No prerequisities required
Recommended optional programme components:
No simultaneous studies
Recommended or required reading:
Online learning material at www.climatenow.fi, course moodle pages
Assessment methods and criteria:
Two cr course grading is based on the learning diary.
Five cr course grading is based on the learning diary (50%), project assignment 1 (25%) and project assignment 2 (25%).
Grading:
The course utilizes a numerical grading scal 0-5. In the numerical scale zero stands for a fail.
Person responsible:
Jussi Malila
Working life cooperation:
Problems for group works for the 5 cr course may come from private sector.

766645S: Cluster Physics, 5 op

Voimassaolo: 01.08.2011 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits
Language of instruction:
English
Timing:
Lectures not given every year. 4th period
Learning outcomes:
After the course students can explain what is a (molecular) cluster and are able to describe various formation mechanisms of clusters. Students are able to provide examples of experimental methods on producing various type of clusters. Students will also learn to present the principles of data handling and information evaluation from experiments.
Contents:
The scope of the course in theoretical and experimental methods of studying the properties, formation mechanisms and dynamics of clusters. Different cluster sources and spectroscopy, thermodynamics, and phase transitions of clusters are discussed. The course includes demonstrations where students are familiarized with measurement setups.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures, exercises, groupworks, self study
Target group:
Physics students
Prerequisites and co-requisites:
761314A Thermal physics or equivalent
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously
Recommended or required reading:
Klavs Hansen, Statistical Physics of Nanoparticles in the Gas Phase, Springer, 2018.
Lecture notes.
Assessment methods and criteria:
One written examination.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Numerical grading scale 0 – 5, where 0 = fail
Person responsible:
Jussi Malila
Working life cooperation:
No work placement period

802661S: Computational Inverse Problems, 5 op

Voimassaolo: 01.08.2012 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Mathematics

Arvostelu: 1 - 5, pass, fail

Opettajat: Andreas Hauptmann

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credit
Language of instruction:
English
Timing:
4th period, 3rd/last year during B.Sc. studies, 1st or 2nd year of Master
Learning outcomes:
After successful completion of the course the student will be able to efficiently solve inverse problems computationally. Students will be able to identify suitable solution methods and incorporate prior knowledge,

understand basics and difficulties of real-life inverse problems. Solutions will be implemented in Matlab/Python using simulated and experimental data.

Contents:
Efficiently deal with large-scale tomographic problems, Formulate and compute solutions with variational methods, First and second order optimization methods, Basics of convex optimization and primal-dual methods, Basics of Bayesian methods and uncertainty quantification, Machine and Deep Learning for Inverse Problems.

Mode of delivery:
Face-to-face teaching

Learning activities and teaching methods:
Lectures (24 h), practical and computer classes (18 h) and independent work.

Target group:
Students having mathematics, applied mathematics, or statistics as the major or a minor subject.

Prerequisites and co-requisites:
Introduction to Inverse Problems, Core courses in the B.Sc curriculum of mathematical sciences, Numerical Analysis, Fourier analysis (recommended), Functional analysis (beneficial, but not necessary).

Recommended or required reading:
Kaipio, J and Somersalo, E (2006), Statistical and computational inverse problems, Springer Science & Business Media.
Vogel, C (2002), Computational methods for inverse problems, SIAM.

Assessment methods and criteria:
Active participation in practicals and final exam.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5, fail

Person responsible:
Andreas Hauptmann

Working life cooperation:
No

756347A: Conservation of biodiversity, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay756347A	Conservation of biodiversity (OPEN UNI)	5.0 op
752321A	Conservation of Biodiversity	3.0 op

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

Language of instruction:
English.

Timing:
M.Sc. ECOGEN.

Learning outcomes:
Students know the central concepts of biodiversity, threads to biodiversity, and methods of conservation of biodiversity.

Contents:
Biodiversity and its components. Major theories of the ecological control of biodiversity. Habitat fragmentation and habitat destruction and their consequences. Metapopulation theory and networks of nature reserves. Current issues in the conservation of biodiversity.

Mode of delivery:
Face-to-face teaching.

Learning activities and teaching methods:
28 h lectures, literature, exam.

Target group:
ECOGEN students (code S). Other studies (code A).

Prerequisites and co-requisites:
No
Recommended optional programme components:
-
Recommended or required reading:
Hanski I. 2005: The Shrinking World. International Ecology Institute, Oldendorf/Luhe, Germany.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Exam.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail.
Person responsible:
Dr. Phillip Watts.
Working life cooperation:
No.
Other information:
-

900054Y: Conversational Skills in Finnish, 3 op

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Proficiency level:
B1/B2 , according to the Common European Framework.
Status:
The course is intended for the international students in every faculty of University of Oulu.
Required proficiency level:
A2.2
Completion of Intermediate Finnish 2 (900016Y) or the equivalent language skills.
ECTS Credits:
3 ECTS credits
Language of instruction:
Finnish
Timing:
-
Learning outcomes:
By the end of the course the student can interact with a degree of fluency (and spontaneity) that makes regular interaction with native speakers quite possible. S/he can describe and explain (clearly and in detail) on a wide range of objects, experiences and events, dreams, hopes and ambitions. The student can bring out opinions, give reasons and explanations for them and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options. S/he is also able to give a (clear) prepared presentation and answer the questions posed by the audience.
Contents:
During the course students strengthen their communication skills in formal and informal situations. The goal is to activate the student's Finnish skills and encourage him/her to use them in different situations. There will be various types of situational dialogue, conversation and listening exercises in the course. In addition, students will conduct a short survey which will also be reported to other students in the class.
Mode of delivery:
Contact teaching and guided self study
Learning activities and teaching methods:
Lessons once a week (28-30 h), group work (15 h) and guided self study (36 h)
Target group:
International degree and post-graduate degree students, exchange students and the staff members of the University

Prerequisites and co-requisites:
Completion of Intermediate Finnish 2 (900016Y) or equivalent skills
Recommended optional programme components:
-
Recommended or required reading:
Will be provided during the course.
Assessment methods and criteria:
To pass the course, students must attend class on a regular basis and complete group work tasks and homework assignments.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Grading is on a pass/fail basis.
Person responsible:
Anne Koskela
Working life cooperation:
-
Other information:
Sign-up in WebOodi.

766655S: Cosmic Rays, 8 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
8 credits
Language of instruction:
English
Timing:
Roughly every third year. 3rd - 4th period.
Learning outcomes:
After passing the course the student is able to describe in physical terms the properties, origins, temporal variability, atmospheric effects and experimental methods of cosmic rays, and is able to apply physical theories describing the acceleration and modulation of cosmic rays to explain the properties of cosmic rays.
Contents:
This is an optional physics course at an advanced level on cosmic rays. Cosmic rays are energetic particles from space that can pass through the geomagnetic field and the atmosphere and cause radiation even on the ground. Cosmic rays are energized, e.g., in supernova shocks and solar bursts. Cosmic rays can be used to study the Sun, the heliosphere and the more distant universe.
Contents briefly: Components of cosmic rays, composition, energy spectrum and origin of galactic cosmic rays, acceleration of cosmic rays, solar cosmic rays and their production in flares and coronal mass ejections, modulation of cosmic rays in the heliosphere, Parker's theory, temporal variation of cosmic rays, reactions in the atmosphere and possible climatic effects, detection of cosmic rays in Oulu and elsewhere.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 44 h, 10 exercises (20 h), self-study 149 h
Target group:
Primarily for the students of the degree programme in physics. Also for the other students of the University of Oulu.
Prerequisites and co-requisites:
Recommended courses: 766355A Basics of space physics or 761353A Basics of plasma physics, or equivalent knowledge.
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously
Recommended or required reading:

Parts from: T.K. Gaisser, Cosmic rays and particle physics, Cambridge Univ. Press; P.K.F. Grieder, Cosmic rays at the Earth, Elsevier, 2001.
Lecture notes: K. Mursula ja Ilya Usoskin: Cosmic rays.
Course material availability can be checked here.
Assessment methods and criteria:
One written examination
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Numerical grading scale 0 – 5, where 0 = fail
Person responsible:
Ilya Usoskin
Working life cooperation:
No work placement period
Other information:
https://wiki.oulu.fi/display/766655S/

765658S: Cosmology, 5 op

Voimassaolo: 29.10.2013 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Leikkaavuudet:

765358A Cosmology 5.0 op

ECTS Credits:
5 ECTS credits
Language of instruction:
English
Timing:
2nd, 3rd, or 4th year of study (intermediate course), master (advanced course). 3rd period
Learning outcomes:
The student will learn to derive the basic properties of an isotropic and homogeneous Universe from the Friedmann equations. The consequences of these equations will be compared to the observed Universe in order to study the properties of the different components of the Universe (baryonic matter, non-baryonic dark matter, dark energy...)
Contents:
The course will introduce the Friedmann-Lemaître-Robertson-Metric and the Friedmann equations and will introduce some predictions. Then, observed properties of the Universe will be presented. Fitting the parameters of the theoretical model with observed data leads to the Standard Model which is the present-day paradigm to explain the Universe.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
32 hours of lectures and exercises, 101 hours of self-study.
Target group:
Astronomy and physics students
Prerequisites and co-requisites:
Basic knowledge in physics and mathematics
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously.
Recommended or required reading:
Introduction to Cosmology by Barbara Ryden. Addusson-Wesley, 1st edition, 2002. The lecturer will provide some notes with essential points. Course material availability can be checked here.
Assessment methods and criteria:
Final examination (intermediate and advanced). For the advanced course students, 20% of the mark will come from an extra assignment. Read more about assessment criteria at the University of Oulu webpage.
Grading:

Numerical grades from 0 to 5, where 0=fail
Person responsible:
Sébastien Comerón
Working life cooperation:
No work placement period

761673S: Electron and ion spectroscopy, 8 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
8 credits
Language of instruction:
English
Timing:
Not every year, first and second period
Learning outcomes:
After passing the course of Electron and Ion spectroscopy students are able to explain the basic concepts of electron spectroscopy. Students recognize the special characters of synchrotron radiation and can explain the basics of measuring the electron and ion spectra. The student can give an example of a calculational method, which she/he can use to interpret the experimental electron spectrum.
Contents:
The course gives an introduction to the basics of electron and ion spectroscopy research at the department of physics. The main goal is the understanding of the electron structure and its dynamics when atoms or molecules are excited by energetic photon or electron beam. Besides the basic ideas of electron spectroscopy, experimental set ups are described in details. The theoretical methods used in the interpretation of experimental spectra will be overviewed.
The course starts with a general overview to basics nature of electronic states and the transitions involved in spectroscopy. The conventional sources of ionization and the synchrotron radiation (SR) in spectroscopic research will be overviewed. Then the experimental apparatus for electron and ion spectroscopy will be presented and the handling of the data and experimental interpretation is covered. The course includes two laboratory exercises where the students familiarize to the experimental devices and learn to use datahandling software.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 40 h, exercises 16 h, laboratory exercises 8 h, self-study 149 h
Target group:
Primarily for the students of the degree programme in physics. Also for the other students of the University of Oulu.
Prerequisites and co-requisites:
Basic knowledges of atomic physics.
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously
Recommended or required reading:
Lecture notes
Assessment methods and criteria:
One written examination
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Numerical grading scale 0 – 5, where 0 = fail
Person responsible:
Samuli Urpelainen
Working life cooperation:
No work placement period
Other information:
https://wiki.oulu.fi/display/761673S/

750349A: Examinations on optional topics in biology, 2 - 10 op

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

751354A	Examinations on optional topics	2.0 op
752352A	Examination in optional topics	2.0 op
753351A	Examinations on optional topics	2.0 op

ECTS Credits:
2-10 ECTS credits / 53-267 hours of work.
Language of instruction:
Depends on the book.
Timing:
B.Sc. degree 2.-3. year or M.Sc. degree 1.-2. year.
Learning outcomes:
Student independently concerns him/herself to special issues in animal physiology or animal ecology.
Contents:
Examinations on books, which are not compulsory in any other course unit.
Mode of delivery:
Independent studying: book exam.
Learning activities and teaching methods:
Book exan in Examinarium.
Target group:
-
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Literature chosen in agreement with the responsible teacher.
Assessment methods and criteria:
Book exan in Examinarium.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail.
Person responsible:
Prof. Timo Muotka (ECOa), Doc. Kari Taulavuori (ECOb), Doc. Seppo Rytkönen (ECOa), Doc. Annamari Markkola (ECOb), Dr. Heikki Helanterä (BSg) and Prof. Hely Häggman (BSb).
Working life cooperation:
-
Other information:
-

800323A: Field extensions, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mathematics
Arvostelu: 1 - 5, pass, fail
Opettajat: Tapani Matala-aho

Opintokohteen kielet: Finnish

Leikkaavuudet:

802333A	Permutations, Fields and Galois Theory	10.0 op
800343A	Algebra 2	8.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work
Language of instruction:
Finnish and English
Timing:
2/3 year, 2nd period
Learning outcomes:
An ultimate target is to deepen students algebraic mindset and to give completeness e.g. for advanced courses in algebraic numbers, number theory, cryptography, and group theory.
Contents:
Under the inspection are factor structures of rings, quotient rings and field extensions. As examples we study finite fields, fields of rational functions and quotient fields of formal series as well as basics of number fields. An ultimate target is to deepen students algebraic mindset and to give completeness e.g. for advanced courses in algebraic numbers, number theory, cryptography, and group theory.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
28 h lectures, 14 h exercises, 91 h independent study
Target group:
Mathematics majors
Prerequisites and co-requisites:
802354A Basics in Algebra, 802355A Algebraic Structures, 802120P Introduction to Matrices, 802320A Linear Algebra
Recommended or required reading:
http://cc.oulu.fi/~tma/OPETUS.html
Assessment methods and criteria:
As usual in my mathematical studies I shall be ableto solve problems arising from the subject andto prove essential theorems starting from the given definitions using the tools applied in the course. More detailed; For example, when I pass the course with the grade 1/5, I shall recognize most definitions and I am able to solve closely related problems. Also I am able to rewrite short proofs with some understanding. When I pass the course with the grade 5/5, then I shall understand well the given definitions with the proofs of the theorems deduced from them.Further, I am able to solve challenging problems which demand independent deductions with several stages and applications of appropriate tools.
Grading:
1-5, i
Person responsible:
Tapani Matala-aho
Other information:
Replaces part of the course 802333A Permutations, fields and Galois theory

802677S: Fourier analysis of measures, 5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Minors

Laji: Course

Vastuuyksikkö: Field of Mathematics

Arvostelu: 1 - 5, pass, fail

Opettajat: Meng Wu

Opintokohteen kielet: English

Ei opintojaksokuvauksia.

802674S: Fractal Geometry 2, 10 op

Voimassaolo: 01.01.2019 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Mathematics
Arvostelu: 1 - 5, pass, fail
Opettajat: Esa Järvenpää
Opintokohteen kielet: Finnish

ECTS Credits:
10 ECTS credits
Language of instruction:
Finnish/English
Timing:
4. or 5. year, 3rd -4th period
Learning outcomes:
Upon completion of the course, the student will be able to:
- use Fourier analytic methods in fractal geometry problems
- is familiar with several main research lines in fractal geometry
- use a great variety of methods used in fractal geometry
Contents:
- Fourier transform
- typical and exceptional projections
- Besicovitch sets
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 56 h, exercises 28 h
Target group:
Majors in mathematics
Prerequisites and co-requisites:
Measure and integration. Introduction to fractal geometry and Fractal Geometry are useful but not necessary.
Assessment methods and criteria:
Exam
Grading:
Numerical grading scale 0 – 5, where 0 = fail
Person responsible:
Esa Järvenpää

755324A: Functional animal ecology, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Seppo Rytkönen
Opintokohteen kielet: Finnish
Leikkaavuudet:

751378A Functional animal ecology 6.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Lectures in Finnish, exercises in Finnish / English.
Timing:
B.Sc. 2nd spring or M.Sc. 1st spring. NNE.
Learning outcomes:

The aim of the course is to understand the relationship between morphology and function by the means of general ecomorphological model. The student will get both theoretical and practical basics for ecomorphological (and. general scientific) research procedures: scientific hypothesizing, sampling, data analysis and reporting and interpreting the results.
Contents:
The course focuses on the relationship between phenotype and function, especially the correlation between animal morphology and behaviour. The course consists of two parts: A) Lectures in Finnish. However, articles about each subject are available for foreign students, including ecomorphological models and correlations, measurement error, allometry, fluctuating asymmetry and phylogenetic analyses. B) Exercises consisting of miniature studies, field and laboratory work, and seminar. The results of the mini studies, in form of PowerPoint presentations, are presented in the seminar. Before the exercises, students write a home essay (or take an exam).
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
12 h lectures, 40 h exercises, seminar and essay (or exam).
Target group:
Recommended for ecology students.
Prerequisites and co-requisites:
Recommended Evolution, systematics and morphology of animals, practicals (750374A), Introduction to statistics 5 cr (806118P) and A second course in statistics 5 cr (806119P).
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Essay or exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Seppo Rytkönen.
Working life cooperation:
No.
Other information:
-

790101P: GIS-basics and Cartography, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Harri Antikainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay790101P GIS-basics and Cartography (OPEN UNI) 5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
5 ECTS
Language of instruction:
Finnish, partly in English. English speaking students are asked to contact prof. Rusanen before the course.
Timing:
1 year, 2nd semester
Learning outcomes:
Course gives basic information about Geographical Information System and about the theory of cartography. After the course the student can use ArcGIS program and he/she is able to produce cartographic presentations.
Contents:
Basics of GIS, theories of cartography and statistical graphics and use of ArcGIS program.
Mode of delivery:

Face-to-face learning.
Learning activities and teaching methods:
16 h lectures, 56 h practicals.
Target group:
Common course to all 1st year students of Geography.
Prerequisites and co-requisites:
-
Recommended optional programme components:
Course is part of the minor studies of GIS.
Recommended or required reading:
Paul A Longley, Michael G Goodchild, David J. Maguire & David W. Rhind (2005). Geographic Information Systems and Science. 2 nd edition. 516 p
Assessment methods and criteria:
Exam on exam day.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1–5.
Person responsible:
Harri Antikainen
Working life cooperation:
No
Other information:
English speaking students are asked to contact Harri Antikainen before the course.

763695S: General relativity, 6 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
6 credits
Language of instruction:
English
Timing:
2th - 5th year, first period
Learning outcomes:
To recognize the basic assumptions of general relativity, to be able to repeat how this leads to Einstein field equations and their solution around a massive object, and to apply these in simple cases.
Contents:
The course begins with an exposition of those aspects of tensor calculus and differential geometry needed for a proper treatment of the subject. The discussion then turns to the spacetime of general relativity and to geodesic motion, comparisons and contrasts with Newton's theory being drawn where appropriate. A brief consideration of the field equations is followed by a discussion of physics in the vicinity of massive objects, including an elementary treatment of black holes. Particular attention is paid to those aspects of the theory that have observational consequences. The course concludes with introductory discussion on cosmology.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 26 h, 12 exercise sessions (24 h), self-study 110 h
Target group:
Primarily for the students of the degree programme in physics. Also for the other students of the University of Oulu.
Prerequisites and co-requisites:
763105P Introduction to relativity 1 and 763306A Introduction to relativity 2. The following courses are helpful: Analytical mechanics (763310A) and Classical field theory (763629S) and Hydrodynamics (763654S).
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously
Recommended or required reading:

The course follows accurately the book J. Foster and J.D. Nightingale: "A short course in general relativity", no lecture notes are available.
Course material availability can be checked here.
Assessment methods and criteria:
One written examination
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Numerical grading scale 0 – 5, where 0 = fail
Person responsible:
Jürgen Schmidt
Working life cooperation:
No work placement period
Other information:
Course website

790340A: Geographies of global development, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Juha Ridanpää

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay790340A	Geographies of global development (OPEN UNI)	5.0 op

ECTS Credits:
5 ECTS
Language of instruction:
Finnish or English.
Timing:
2nd or 3rd year, 1st or 2nd semesters (autumn or spring semesters).
Learning outcomes:
This course gives knowledge of global development problems from geographical point of view. After the course the student can explain what development indicates and what kind of social and economic phenomena will explain both development and under development. He/she is also able to compare different actions that are aimed to diminish the uneven development based on different theories and strategies.
Contents:
The course familiarizes students to the theories that aim to explain differences in uneven development. Under development, and its social, cultural and economic aspects will be studies from national, regional and local level. This course also quires to political programs and strategies that are aimed to stabiles equalizes uneven development.
Mode of delivery:
Book exam.
Learning activities and teaching methods:
Book exam.
Target group:
Compulsory for teachers, others obligatory.
Prerequisites and co-requisites:
-
Recommended optional programme components:
–
Recommended or required reading:
- Potter, R.B.T, T. Binns, J.A.Elliot & D.Smith (2004). Geographies of development.

Assessment methods and criteria:
Exam on examinarium.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1–5.
Person responsible:

Juha Ridanpää
Working life cooperation:
No.

755335A: Identification of animals, invertebrates, 4 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Kari Koivula
Opintokohteen kielet: Finnish

ECTS Credits:
4 ECTS credits / 106 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 1st spring.
Learning outcomes:
Main point of the course is to learn to indentify Finnish invertebrate species at the family level from museum samples. Basics of species' ecology and classification of organisms.
Contents:
During the spring semester (9 h lectures in Finnish, 16 h exercises, exam) the invertebrate taxons (mostly family- or genus-level) common in Finland are studied using museum samples.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
9 h lectures in Finnish, 16 h exercises, self-learning, exam.
Target group:
ECOGEN.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
This course is needed for attending courses Terrestrial animals field course (755322A) and Aquatic ecology field course (755321A).
Recommended or required reading:
Check course wiki pages.
Assessment methods and criteria:
Species exam. Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Kari Koivula.
Working life cooperation:
No.
Other information:
-

755334A: Identification of animals, vertebrates, 4 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Kari Koivula

Opintokohteen kielet: Finnish

Leikkaavuudet:

755333A Identification of animals 6.0 op

ECTS Credits:
4 ECTS credits / 106 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 1st autumn.
Learning outcomes:
Main goal is to learn to identify Finnish animal species (vertebrate) from museum samples.
Contents:
During the autumn semester (9 h lectures in Finnish, 16 h exercises based on museum samples, exam).
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
14 h lectures in Finnish, 14 h exercises, one exercise group with English lectures, self-learning, exam.
Target group:
ECOGEN.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
This course is needed for attending courses Terrestrial animals field course (755322A) and Aquatic ecology field course (755321A).
Recommended or required reading:
Check course Moodle pages.
Assessment methods and criteria:
Species exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Kari Koivula.
Working life cooperation:
No.
Other information:
-

756355A: Identification of plant species, brief, 3 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola

Opintokohteen kielet: Finnish

Leikkaavuudet:

756342A Identification of plant species 3.0 op

ECTS Credits:
3 ECTS credits / 80 hours of work.
Language of instruction:
Finnish / English.
Timing:
BSc 1st autumn.
Learning outcomes:
Student is able to identify most common boreal plant species in herbarium specimens.

Contents:
Demonstrations and/or independent stud of ca. 350 vascular plants, mosses and lichens in the boreal vegetation zone. In the identification exam student has to know specimens scientific name and family in latin.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
16 h demonstrations and learning from the herbarium samples. 350 plant species. In the identification exam student has to know specimens scientific name and family in latin.
Target group:
BSc degree, BS: compulsory 3 cr.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Booklet Hanhela, P. & Halonen, P. 1995: Plant Identification.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Two species identification subexams (756355A-01 and 756355A-02) 3 cr with the help of handout.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Annamari Markkola
Working life cooperation:
No.
Other information:
-

756354A: Identification of plant species, extensive, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
BSc 1st autumn.
Learning outcomes:
Student is able to identify most common boreal plant species in herbarium specimens.
Contents:
Demonstrations and/or independent stud of ca. 350 vascular plants, mosses and lichens in the boreal vegetation zone. In the identification exam student has to know specimens scientific name and family in latin.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
16 h demonstrations and learning from the herbarium samples. 350 plant species. In the identification exam student has to know specimens scientific name and family in latin.
Target group:
BSc degree: ECO and TEA 5 cr compulsory.
Prerequisites and co-requisites:
No.
Recommended optional programme components:

Course done as 5 cr (756654S) is prerequisite for the Plant ecology field course (756643S) and for the advanced plant species identification courses (752608S and 752625S).
Recommended or required reading:
Booklet Hanhela, P. & Halonen, P. 1995: Plant Identification.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Two species identification subexams (756354A-01 and 756354A-02). 5 cr without the course handout.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail.
Person responsible:
Doc. Annamari Markkola.
Working life cooperation:
No.
Other information:
-

900015Y: Intermediate Finnish Course 1, 5 op

Voimassaolo: 01.08.1995 -
Opiskelumuoto: Language and Communication Studies
Laji: Course
Vastuuyksikkö: Languages and Communication
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay900015Y	Intermediate Finnish Course 1 (OPEN UNI)	4.0 op

Proficiency level:
A2.1
Status:
The course is intended for the international students in every faculty of University of Oulu.
Required proficiency level:
A1.3, Completion of the Beginners' Finnish course 2 (900053Y) or the equivalent language skills.
ECTS Credits:
5 ECTS credits
Language of instruction:
Mainly Finnish
Timing:
-
Learning outcomes:
By the end of the course the student can communicate in ordinary everyday situations when the topics are familiar or connected with everyday matters. S/he can search for and locate key informational content in different kinds of texts. The student can also identify the topic and some details of the discussion around her/him. S/he can describe activities and personal experiences both orally and in writing and s/he also knows the difference between spoken/colloquial and written/standard language. The student knows how things can be expressed with different degrees of politeness and can apply that information in her/his own communication.
Contents:
The course is a lower intermediate course. During the course students strengthen their communication skills in ordinary everyday situations and acquire a wider vocabulary and more thorough knowledge of grammar. In addition, students practise understanding and producing Finnish talk and reading newspaper articles.

The topics and communicative situations covered in the course are: requesting different kinds of requests, expressing politeness, making appointments with friends, giving directions, doing the shopping, talking about the past and talking about his/her future plans, hobbies, transactions e.g. in the doctor's and post office.

The structures studied are: more about the imperative, the verb rections, the deverbal noun (-minen), passive present tense, part of the plural declension of nouns, the third infinitive (ma-infinitive), more about sentence types, perfect tense, more about object cases.

Mode of delivery:
Contact teaching and guided self study
Learning activities and teaching methods:
Lessons 2 times a week (52 h, including the tests) and guided self study (83 h)
Target group:
International degree and post-graduate degree students, exchange students and the staff members of the University
Prerequisites and co-requisites:
Completion of the Beginners' Finnish Course 2
Recommended optional programme components:
-
Recommended or required reading:
Gehring, S. & Heinzmann, S.: **Suomen mestari 2,** (chapters 1 - 5)
Assessment methods and criteria:
Regular and active participation in the weekly lessons (twice a week), homework assignments and the tests will be taken into consideration in the assessment.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Grading scale is 1-5.
Person responsible:
Anne Koskela
Working life cooperation:
-
Other information:
Sign-up in WebOodi. The lessons will be held twice a week during a 13-week period.

900016Y: Intermediate Finnish Course 2, 5 op

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Proficiency level:
A2.2
Status:
The course is intended for the international students in every faculty of University of Oulu.
Required proficiency level:
A2.1, Completion of the Intermediate Finnish course 1 (900015Y) or the equivalent language skills.
ECTS Credits:
5 ECTS credits
Language of instruction:
Finnish
Timing:
-
Learning outcomes:
By the end of the course the student can communicate in various informal situations in Finnish. The student understands the main points of messages and talk around her/him. S/he can produce simple connected text on topics which are familiar or of personal interest and describe experiences and also report heard content to others.
Contents:
The course is an upper intermediate course. During the course students learn the necessary written and oral skills to be able to cope in informal situations arising during everyday life, work and study. In the course, students practise understanding more Finnish talk and written texts, and finding information and talking about it to other people. In the classes the main stress is on oral exercises and group work.
The topics and communicative situations covered in the course are: transactions e.g. in clothes shops and on the phone, Finnish small talk, reacting in different situations, information and facts about Finnish feast culture and features of colloquial/spoken language.

The structures studied are: the perfect and pluperfect, revision of all the verb tenses, comparison of adjectives, conditional, more about the plural declension of nouns (particularly the plural partitive case), more about object and predicative cases, the passive imperfect.
Mode of delivery:
Contact teaching and guided self study
Learning activities and teaching methods:
Lessons twice a week (52 h, including the tests) and guided self study (83 h)
Target group:
International degree and post-graduate degree students, exchange students and the staff members of the University
Prerequisites and co-requisites:
Completion of the Intermediate Finnish Course 1 or equivalent skills
Recommended optional programme components:
-
Recommended or required reading:
Gehring, S. & Heinzmann, S.: **Suomen mestari 2 (chapters 6 - 9)**
Assessment methods and criteria:
Regular and active participation in the weekly lessons (twice a week), homework assignments and the tests will be taken into consideration in the assessment.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Grading scale is 1-5.
Person responsible:
Anne Koskela
Working life cooperation:
-
Other information:
Sign-up in WebOodi.

765686S: Interstellar Medium, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opettajat: Sébastien Comerón Limbourg

Opintokohteen kielet: Finnish, English

ECTS Credits:
5 ECTS credits / 133 hours of work
Language of instruction:
English
Timing:
2nd, 3rd, or 4th year of study (intermediate course), master (advanced course). First period.
Learning outcomes:
In this course we will study some of the most important processes that take place in the interstellar medium.
Contents:
The interstellar medium is a vacuum that is more perfect than any vacuum that could be created on Earth. And yet, it is a complex multiphase medium. The interstellar medium is the home of many astronomical phænomena. For example, this almost vacuum space integrated along long lines of sight is sufficient to cause the absorption of the light from distant objects. Parts of the interstellar medium are ionized and the galactic magnetic field is frozen within it. When the gas is perturbed by supernova explosions the magnetic field accelerates charged particles which are in turn detected on Earth as cosmic rays. Hidden in the core of the densest molecular gas clouds, new stars are being born.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
32 hours of lectures and exercises, 101 hours of self-study.
Target group:
Astronomy and physics students

Prerequisites and co-requisites:
Basic knowledge in physics and mathematics
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously.
Recommended or required reading:
`Physics of the Interstellar and Intergalactic Medium', B. Draine, Princeton University PressThe Physics of the Interstellar Medium, Second Edition '
Assessment methods and criteria:
Final examination (intermediate and advanced). For the advanced course students, 20% of the mark will come from an extra assignment. Read more about assessment criteria at the University of Oulu webpage.
Grading:
Numerical grading scale 0 - 5, where 0 = fail
Person responsible:
Sébastien Comerón
Working life cooperation:
No work placement period

802675S: Introduction to Additive Combinatorics, 5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Mathematics

Arvostelu: 1 - 5, pass, fail

Opettajat: Ville Suomala

Opintokohteen kielet: English, Finnish

ECTS Credits:
5 ECTS credits
Language of instruction:
Finnish (Most of the course material can be provided in English, if necessary).
Timing:
1st period (autumn semester)
Learning outcomes:
Upon completion of the course:
- The student is able to handle basic sumset estimates.
- Is familiar with elementary results related to arithmetic progressions such as the Cauchy-Davenport Theorem and Van der Waerdens Theorem.
- Understands how arithmetic structure is related and nonrelated to the size of the set in various settings.
- Can regognize problems related to additive combinatorics and its applications.
Contents:
Roths theorem on arithmetic progressions, Freiman’s theorem, Balogh-Szemeredi-Gowers theorem. Applications of additive combinatorics.
Mode of delivery:
Lectures and exercises
Learning activities and teaching methods:
Lectures 28 h, exercises 8 h, independent study 91 h
Target group:
All math students (major and minor).
Prerequisites and co-requisites:
This is an independent cTämä kurssi antaa erinomaiset esitiedot kurssille 802673S Additiivinen kombinatoriikkaourse.
Basic knowledge in University mathematics is enough.
Recommended optional programme components:
The course 802673S Additive combinatorics is a continuation of this course.
Assessment methods and criteria:
Exam
Grading:
Failed, 1-5
Person responsible:
Ville Suomala

766658S: Introduction to Atmospheric Processess and Climate, 10 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opettajat: Jack Lin
Opintokohteen kielet: English

ECTS Credits:
10 ECTS credits
Language of instruction:
English
Timing:
Advanced studies or 3rd year; not given annually. 3rd -4th period.
Learning outcomes:
After the course students know the basic structure of the Earth's atmosphere and climate system, and can describe the basic processes affecting radiative transfer in the atmosphere and Earth's energy balance, especially those related to greenhouse gasses, aerosol particles, and clouds.
Contents:
The course serves as an introduction to atmospheric and climate science, and highlights climate relevant processes related to molecular clusters and aerosol particles. Review of blackbody radiation, kinetic theory of gasses and atmospherically relevant phase transitions; absorption and scattering of electromagnetic radiation by gas molecules, aerosol particles and cloud droplets; energy balance of the Earth system, radiative forcing, feedback and climate sensitivity; sources and sinks of aerosol particles and greenhouse gasses, aerosol-cloud-precipitation interactions; structure and thermodynamics of the atmosphere, energy redistribution within the Earth system; observed and predicted climate changes.
Mode of delivery:
Face-to-face or multiform teaching
Learning activities and teaching methods:
Lectures, theoretical exercises, essays, student presentations, group discussions, self-study.
Target group:
Primarily for the students of the degree programme in physics. Also for the other students of the University of Oulu.
Prerequisites and co-requisites:
Thermophysics and Atomic Physics I
Recommended optional programme components:
Further effects of Sun on the Earth system are discussed in 766662S Solar effects on climate. For a general theory explaining the interaction between greenhouse gas molecules and infrared radiation, see 766662S Molecular properties.
Recommended or required reading:
Lecture notes, also D. J. Jacob: Introduction to Atmospheric Chemistry, PUP, 1999; also available at http://acmg.seas.harvard.edu/people/faculty/djj/book/, and R. T. Pierrehumbert: Principles of Planetary Climate, CUP, 2010.
Assessment methods and criteria:
Written examination. Read more about assessment criteria at the University of Oulu webpage.
Grading:
Numerical grading scale 0 - 5, where 0 = fail
Person responsible:
Silvia Calderon, Jack Lin
Working life cooperation:
No work placement period

802676S: Introduction to Inverse Problems, 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Advanced Studies
Laji: Course

Vastuuyksikkö: Field of Mathematics

Arvostelu: 1 - 5, pass, fail

Opettajat: Andreas Hauptmann

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits
Language of instruction:
English
Timing:
3rd/last year during B.Sc. studies, 1st or 2nd year of Master, 3rd period.
Learning outcomes:
After successful completion of the course the student can identify linear ill-posed inverse problems and their severity. Furthermore, the students will be able to analyze and solve such problems with direct and indirect solution methods, identify necessary regularization, is able to implement such methods and work with basic simulated and experimental data.
Contents:
Theory of ill-posed inverse problems, singular value decomposition, Generalized-Inverse and Normal equations, Landweber iterations and Tikhonov regularization, Morozov discrepancy principle. Examples include convolutions, Fourier and Radon transform, corresponding to applications in image processing, X-ray and Magnetic Resonance Tomography. Use of Matlab/Python for implementation.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures (28 h), practical and computer classes (14 h) and independent work.
Target group:
Students having mathematics, applied mathematics, or statistics as the major or a minor subject.
Prerequisites and co-requisites:
Core courses in the B.Sc curriculum of mathematical sciences, especially linear algebra; Numerical Analysis, Fourier analysis (beneficial, but not necessary), Functional analysis (beneficial, but not necessary).
Recommended or required reading:
Mueller, J and Siltanen, S (2012). Linear and nonlinear inverse problems, SIAM.
Assessment methods and criteria:
Active participation in practicals and final exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Fail, 1-5
Person responsible:
Andreas Hauptmann
Working life cooperation:
No

765601S: Introduction to Nonlinear Dynamics, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opettajat: Jürgen Schmidt

Opintokohteen kielet: English, Finnish

Leikkaavuudet:

765301A Introduction to Nonlinear Dynamics 5.0 op

ECTS Credits:
5 ECTS cr
Language of instruction:
English
Timing:

3rd period. Not lectured every year
Learning outcomes:
After the course the student is able to apply basic concepts and methods of Nonlinear Dynamics to modeling approaches in physics, astronomy, biology, and chemistry.
Contents:
The course introduces the methods of the Nonlinear Dynamics approach to the analysis of dynamical systems, such as the concepts of fixed points, stability, bifurcations, as well as synchronization and chaos. Applications to various scientific problems are outlined as worked out examples and in the exercises.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 24 h and exercises (10-12 times), self-study 128 h
Target group:
Primarily for the students of the degree programme in physics. Also for the other students of the University of Oulu. The course can be taken at an intermediate and at an advanced level.
Prerequisites and co-requisites:
No specific prerequisites
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously
Recommended or required reading:
`Nonlinear Dynamics And Chaos' by Steven Strogatz
Assessment methods and criteria:
One written examination and points from worked exercise problems Read more about assessment criteria at the University of Oulu webpage.
Grading:
Numerical grading scale 0 - 5, where 0 = fail
Person responsible:
Jürgen Schmidt
Working life cooperation:
No work placement period
Other information:
https://noppa.oulu.fi/noppa/kurssi/765354a/etusivu

790141P: Introduction to Regional Development and Regional Policy, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Eeva-Kaisa Prokkola

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay790141P Introduction to planning geography (OPEN UNI) 5.0 op

ECTS Credits:
5 ECTS
Language of instruction:
Lectures in Finnish. Exchange students can take this course by taking the exam (extra literature for exchange students).
Timing:
1st year, autumn semester (1st period).
Learning outcomes:
The student is able to apply the most essential concepts of regional development and regional policy. He/she can tell the historical progress of regional development, regional policy and regional planning of Finland and its relationship to contemporary development of European Union.
Contents:
Regional development and regional policy from conceptual and empirical aspects; Theories and mechanisms of RD and RP; Local, national and international development based on regional planning.
Mode of delivery:
Face-to-face learning.

Learning activities and teaching methods:
20 hrs lectures, literature and written exam.

Target group:
Common course to all 1st year students of Geography.
Prerequisites and co-requisites:
-
Recommended optional programme components:
Course is part of minor studies in Geography and minor studies of Regional Development and regioanl planning.
Recommended or required reading:
Andy Pike, Andrés Rodríguez-Pose ja John Tomaney (2016). Local and Regional Development. (toinen painos) Routledge. Saatavilla e-kirjana.

Assessment methods and criteria:
Exam on exam day.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5.
Person responsible:
Eeva-Kaisa Prokkola
Working life cooperation:
No.
Other information:
Exchange students can take this course by taking the exam (extra literature for exchange students).
Literature for exchange students:

- Andy Pike, Andrés Rodríguez-Pose ja John Tomaney (2016). Local and Regional Development. Routledge.
- Anssi Paasi, Kaj Zimmerbauer (2016). Penumbral borders and planning paradoxes: Relational thinking and the question of borders in spatial planning. Environment and Planning A 2016, Vol. 48(1) 75–93
- Martin, Lauren. & Eeva-Kaisa, Prokkola (2017). Making labor mobile: Borders, precarity, and the competitive state in Finnish migration politics. Political Geography 60C, 143-153.

Further information ask teacher.

756650S: Introduction to molecular ecology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kvist, Laura Irmeli, Lumi Viljakainen

Opintokohteen kielet: English

Leikkaavuudet:

750645S	Molecular ecology	2.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English.
Timing:
B.Sc. 2 nd spring or M.Sc. 1 st spring, ECOGEN ECO and BS.
Learning outcomes:
This course introduces genetic theories, basics of phylogenetics and usage of molecular biology methods in ecology. The aim is that students know the basic methodology, can apply them into variety of genetic and ecological questions and is familiar with basics of population genetics and phylogenetics in order to be able to analyze and interpret genetic data.
Contents:

Basics of population genetics (variation, effective population size, bottlenecks, population structure, gene flow), relationships between molecular and adaptive variation, phylogenetic methods and phylogeography. Usage of molecular methods for identification of species, sex and individuals, behavioural ecology (mating systems, cooperation, mating success) and conservation.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
22 h lectures, 36 h exercises (laboratory and computer exercises), seminar, final exam.
Target group:
M.Sc. degree: 1st spring ECO optional, ECOGEN eco 1st spring compulsory.
Prerequisites and co-requisites:
Concepts of genetics (757109P), Experimental course in general genetics (757110P) and Molecular evolution (757312A) or equivalent knowledge.
Recommended optional programme components:
ECO: Population ecology 10 cr. (755336A).
Recommended or required reading:
Beebee, T and Rowe G.2004 or 2008. An introduction to molecular ecology. Oxford University Press.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Final exam and seminar.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Laura Kvist.
Working life cooperation:
No.
Other information:
Note that Introduction to Molecular ecology and Introduction to population genetics courses are alternative; students cannot get credits from both.

802635S: Introduction to partial differential equations, 10 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Mathematics

Arvostelu: 1 - 5, pass, fail

Opettajat: Valeriy Serov

Opintokohteen oppimateriaali:
Colton, David, , 1988
Kress, Rainer, , 1999
Folland, Gerald B. , , 1995

Opintokohteen kielet: Finnish

ECTS Credits:
10 cr
Timing:
First and second period.
Learning outcomes:
On successful completion of this course, the student will be able to
- solve linear and quasi-linear partial differential equations of first order using the method of characteristics
- apply the method of separation of variables to solve initial-boundary value problems for heat, wave and Laplace equations
- verify that a given function is a fundamental solution of a partial differential operator
- use single and double layer potentials to solve boundary value problems for Laplacian

Contents:
Linear and nonlinear equations of the first order, trigonometric Fourier series, Laplace equation in R^n and in bounded domains, potential theory, Green's function, Heat equation in R^n and in bounded domains, Wave equation in R^n and in bounded domans, d'Alembert formula for any dimensions, Fourier method.
Assessment methods and criteria:
Read more about assessment criteria at the University of Oulu webpage.

Person responsible:
Valeriy Serov

790102P: Introduction to the systematic Physical Geography, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Jan Hjort

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay790102P Introduction to the systematic physical geography (OPEN UNI) 5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
5 ECTS cr
Language of instruction:
Finnish and English (Lectures are only in Finnish, but this course can be completed also in English with some extra readings. Practicals are also organized in English.)
Timing:
1 year, 2nd semester
Learning outcomes:
This introductory course will give information about systematic fields of Physical Geography and its contemporary research. After the course, the student recognizes the most essential phenomena of geosphere (geomorphology), hydrosphere (hydrogeography), biosphere (biogeography), atmosphere (climatology), and he/she is able to do conclusions about the factors that influence those phenomena. The aim of the practical's is that the student can use basic methods of the research of Physical Geography.
Contents:
Geomorphology, climatology, hydrogeography, biogeography; and geosphere, atmosphere, hydrosphere and biosphere. The students will learn how nature works and how to resolve multiple environmental questions. Practical's are focused to the importance of the material compilation and its technical use.
Mode of delivery:
Face-to-face learning.
Learning activities and teaching methods:
20 h lectures, 56 h practicals.
Target group:
Common course to all 1st year students of Geography.
Prerequisites and co-requisites:
-
Recommended optional programme components:
Course is part of the minor studies of Geography.
Recommended or required reading:
- Strahler, Alan (2013). Introducing Physical Geography.
- More material from the practicals.

Assessment methods and criteria:
Exam on an exam day.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1–5.
Person responsible:
Jan Hjort and Olli-Matti Kärnä
Working life cooperation:
No.
Other information:
Exchange students are asked to contact prof. Hjort before the course.

761658S: Ionospheric physics, 8 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English, Finnish

ECTS Credits:
8 credits
Language of instruction:
English
Timing:
First and second period. Not every year.
Learning outcomes:
After the course, the student can describe how the ionosphere is formed in the upper atmosphere and solve problems associated with the most important physical processes, e.g. the production and loss of ionization, electric currents, and ambipolar diffusion.
Contents:
The topic of this course is the ionised part of the upper atmosphere of the Earth, which is called the ionosphere. Ionosphere is created mainly by the EUV radiation from the Sun. The ionosphere at high latitudes is much more dynamic than at mid or low latitudes. This is because the high-latitude ionosphere is magnetically connected to the magnetosphere of the Earth, which in turn is connected to the solar wind in a complex way. Intense electric currents are flowing in the high-latitude ionosphere and aurora (northen lights) appear. The ionosphere was originally found because of its effect on the propagation of radio waves (radio connections around the Earth without satellites are only possible due to the ionosphere). On the other hand, the most important methods of ionospheric research are based on radio waves. Therefore, the physics of the ionosphere has also practical applications and consequences.
Contents in brief: Solar radiation, the atmosphere of the Earth and its dynamics, formation of the ionosphere and ion chemistry, plasma motion and diffusion in the ionosphere, ionospheric electrical currents and electric fields, some selected phenomena of the ionosphere (e.g. electrojets in the equatorial and auroral regions, sporadic-E layers and polar wind).
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 40 h, exercises 12 h (6 pcs), project work 30 h and self-study 123 h
Target group:
Primarily for the students of the degree programme in physics. Also for the other students of the University of Oulu.
Prerequisites and co-requisites:
No prequisities are required, but useful basics are given in course 766355A Basics of space physics.
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously
Recommended or required reading:
A. Aikio and T. Nygrén: Ionospheric Physics, available on the web-page of the course. This is in some parts based on the textbook: A. Brekke, Physics of the Upper Atmosphere, John Wiley & Sons, 1997.
Course material availability can be checked here
Assessment methods and criteria:
End examination, also project work will be graded.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Numerical grading scale 0 – 5, where 0 = fail
Person responsible:
Anita Aikio
Working life cooperation:
No work placement period
Other information:
https://wiki.oulu.fi/display/761658S/

750629S: Kaamos symposium, 2 - 4 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Muotka, Timo Tapani
Opintokohteen kielet: English
Voidaan suorittaa useasti: Kyllä

ECTS Credits:
2-4 ECTS credits / 53-107 hours of work.
Language of instruction:
English.
Timing:
M.Sc. and Ph.D. autumn.
Learning outcomes:
Students get acquainted to preparing, presenting and evaluating a scientific oral presentation.
Contents:
The Kaamos Symposium consisting of presenting current research projects is held every year at the end of autumn period. Through presenting their research work and projects and obtaining feedback from the audience (students and the staff of the department) post graduate students gain experience in holding a scientific presentation.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Presentation (talk) and participation to whole symposium = 2 cr (PhD students, 750929J)
Participation to whole symposium and 5 summaries of presentations = 2 cr (master and bachelor students, 750629S or 750629A, summaries are to be sent to the responsible teacher by email)
poster = 0.5 cr (PhD students, 750929J)
Target group:
Undergraduate biology students (2 cr) and postgraduate biology students (2-4 cr).
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Abstract book.
Assessment methods and criteria:
Presentation or reports.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Timo Muotka.
Working life cooperation:
No.
Other information:
-

802320A: Linear Algebra, 5 op

Voimassaolo: 01.06.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Mathematics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

802119P	Linear Algebra II	5.0 op

ECTS Credits:
5 ECTS cr

Language of instruction:
Finnish and English
Timing:
2nd year, 3rd period
Learning outcomes:
On successful completion of this course, the student will be able to
- apply the definition of linear space and concepts associated with linear spaces such as basis
- work with linear mappings and their matrix representations
- apply the definition of inner product space and concepts associated with inner product spaces such as orthogonality
- prove results related to linear spaces
Contents:
The aim of the course is to provide the student with the knowledge needed in almost all later courses in mathematics: abstract vector spaces and subspaces, linear independence and bases, inner product spaces, linear mappings and concepts associated with linear mappings such as kernel, eigenvalues and eigenvectors.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
28 h lectures, 14 h exercises, 91 h independent study
Target group:
Mathematics majors and minors students
Prerequisites and co-requisites:
802120P Introduction to Matrices
Recommended optional programme components:
-
Recommended or required reading:
http://cc.oulu.fi/~tma/OPETUS.html
Assessment methods and criteria:
Final exam
Grading:
1-5, fail
Person responsible:
Tapani Matala-aho
Working life cooperation:
No
Other information:
-

791626S: Methodological special themes in Physical Geography, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Jan Hjort

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

Required proficiency level:
Quantitative research methods in Geography
ECTS Credits:
5 ECTS
Language of instruction:
Finnish and English if needed.
Timing:
1st or 2nd MSc-year, 2nd semester.
Learning outcomes:
The objective is that the student can critically apply statistically-based spatial modelling methods to solve study problems in Physical Geography, understands the principles of the modelling techniques and acknowledges the importance of theory in scientific research.
Contents:

A special course that focuses on regression-based spatial modelling in Physical Geography. Spatial analysis and modelling are central development fields in Physical Geography. The course offers methodological knowledge for the preparation of MSc and doctoral thesis.
Mode of delivery:
Face-to-face learning.
Learning activities and teaching methods:
Lectures, practicals and practical work
Target group:
MSc students in Physical Geography.
Prerequisites and co-requisites:
Course Quantitative research methods in Geography have to be done.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Written report.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5.
Person responsible:
Professor Hjort and PhD student in Physical Geography.
Working life cooperation:
No.
Other information:
Course will be organized in English if needed.

755325A: Methods in ecology I, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Koivula, Seppo Rytkönen

Opintokohteen kielet: Finnish

Leikkaavuudet:

750347A Ecological methods I 6.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 3rd autumn, ECOGEN 1st autumn.
Learning outcomes:
Students are familiar to scientific method and can recognize scientific information from pseudo-scientific and other descriptions and explanations of surrounding world. Students have learned to assess the uncertainty of information and can also evaluate the quality of information with respect to its theoretical and applied value. Students also learn the build a valid theoretical or empirical strategy to solve scientific problems.
Contents:
The aim of the course is to introduce the students in scientific modes of argumentation and research methods in modern ecology. Both the empirical and theoretical methods and their relationship in theory formation are discussed. Hypothesis testing; observational method, experimental method and comparative method are the empirical methods introduced. Autumn period ends in a seminar where scientific publications are analysed.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures, seminar, exercises and exam.
Target group:

Compulsory to ECO.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
See course wiki pages.
Assessment methods and criteria:
Exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Kari Koivula and Doc. Seppo Rytkönen.
Working life cooperation:
No.
Other information:
-

755329A: Methods in ecology II, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Seppo Rytkönen

Opintokohteen kielet: Finnish

Leikkaavuudet:

750647S Methods in ecology II 7.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Lectures Finnish / English, exercises also in English.
Timing:
Finnish B.Sc. 3rd spring, ECOGEN ECO 1st spring.
Learning outcomes:
The aim of the course is to learn in practice how to apply scientific method in ecological research. The student learns how to select appropriate methods for different ecological problems, and a toolkit for study design and data analysis.
Contents:
Continuation to course Ecological methods I 5cr (755325A, 755625S). This course focuses on applying the scientific method in ecological research. The course consists mainly of computer exercises in the following subjects: sampling, sample size determination, experimental design and statistical analysis esp. analysis of variance, comparative methods (independent contrasts - analysis), multivariate methods (cluster analysis, ordination) and meta-analysis. Also other current issues can be included.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures 8 h, 40 h exercises, independent work and exam.
Target group:
ECOGEN ECO compulsory.
Prerequisites and co-requisites:
Course Ecological methods I 5 cr (755325A). Recommended: Introduction to Statistics 5 cr (806118P) and A second course in statistics 5 cr (806119P).
Recommended optional programme components:
-
Recommended or required reading:
Reading package at course wiki-pages.

Assessment methods and criteria:
Exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Seppo Rytkönen and Doc. Kari Koivula.
Working life cooperation:
No.
Other information:
-

757620S: Methods in genomics and genomics evolution, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Heikki Helanterä

Opintokohteen kielet: Finnish

Leikkaavuudet:

753612S	Methods in genomics and genomics evolution	6.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1st autumn.
Learning outcomes:
Student knows focal features of genome structure, evolution and research methods.
Contents:
Genome structure, composition, comparative genomics, recombination and evolutionary factors affecting genome composition. Theory and methods.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
24 h lectures, 24 h seminars, independent work 83 h, exam, reports.
Target group:
BSg.
Prerequisites and co-requisites:
Concepts of genetics 5 cr (757109P), Experimental course in general genetics 5 cr (757110P) and Basics in population genetics 5 cr (757313A).
Recommended optional programme components:
-
Recommended or required reading:
Recent review articles.
Assessment methods and criteria:
Reports and exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Ass. Prof. Heikki Helanterä.
Working life cooperation:
No.
Other information:
-

757311A: Molecular methods I, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Lumi Viljakainen
Opintokohteen kielet: Finnish
Leikkaavuudet:

750364A Molecular methods I 4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
BS: B.Sc. 2nd autumn, ECOGEN 1st autumn.
Learning outcomes:
Student can isolate DNA, estimate the quality and measure the quantity of DNA, amplify DNA fragments using polymerase chain reaction, design PCR primers, clone and sequence DNA. The student is able to evaluate the results and optimize the methods.
Contents:
Isolation of genomic DNA, amplification of DNA by PCR, primer design, DNA sequencing molecular cloning, analysis of DNA-sequence and writing scientific reports.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
48 h laboratory work including demonstrations, 50 h independent work including homework and writing report.
Target group:
Compulsory to BSc and ECOGEN, suitable for ECO students who are interested in population and evolutionary ecology.
Prerequisites and co-requisites:
Concepts of genetics (757110P) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Reports.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail
Person responsible:
Doc. Lumi Viljakainen.
Working life cooperation:
No.
Other information:
-

761618S: Molecular quantum mechanics, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail

Opettajat: Perttu Lantto

Opintokohteen kielet: Finnish, English

ECTS Credits:
5 ECTS credits / 133 hours of work
Language of instruction:
English
Timing:
3rd -4th period. Every second year (even year), spring
Learning outcomes:
After passing the course, the students can routinely apply the formalism of quantum mechanics and group theory to molecular problems, understand the basic features of the electronic structure of atoms and molecules, and know about the methods of electronic structure calculation.
Contents:
The course will provide the necessary background for students interested in molecular spectroscopy and/or the electronic structure calculations of molecules, materials and nanostructures. Subject matters: rotational motion and hydrogenic atoms, angular momentum, group theory, perturbation theory, variation theory, molecular electronic structure, computation of molecular electronic structure (quantum chemistry).
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 28 h, demonstrations 14 h, self-study 91 h
Target group:
Advanced undergraduate and beginning graduate students of physics, chemistry and materials sciences. Also for the other students of the University of Oulu. Teacher students.
Prerequisites and co-requisites:
Atomic physics 1 and Quantum mechanics 1, or the corresponding knowledge.
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously
Recommended or required reading:
P.W. Atkins and R.S. Friedman, "Molecular Quantum Mechanics", 5th edition, Chapters 3 - 9, Oxford University Press, 2011.
Assessment methods and criteria:
Final examination. Read more about assessment criteria at the University of Oulu webpage.
Grading:
Numerical grading scale 0 - 5, where 0 = fail
Person responsible:
Perttu Lantto
Working life cooperation:
No work placement period
Other information:
Course website

761652S: NMR Imaging, 10 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opettajat: Ville-Veikko Telkki

Opintokohteen kielet: Finnish, English

ECTS Credits:
10 ECTS credits / 266 hours of work
Language of instruction:
English
Timing:
First and second period. Every second year (odd year), autumn.
Learning outcomes:

After completion, student understands the principles of the imaging methods based on nuclear magnetic resonance (NMR) and how NMR imaging can be used to characterize physical properties of various materials.
Contents:
Topics include one-dimensional Fourier imaging, k space, gradient echoes, multidimensional Fourier imaging, continuous and discrete Fourier transform, sampling, folding, filtering, resolution, and contrast.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 44 h, exercises 20 h, self-study 149 h
Target group:
Primarily for the students of the degree programmes in physics and chemistry. Also for the other students of the University of Oulu.
Prerequisites and co-requisites:
761663S NMR spectroscopy is helpful, but not necessary.
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously
Recommended or required reading:
Textbooks: E. M. Haake, R. W. Brown, M. R. Thompson and R. Venkatesan, Magnetic Resonance Imaging. Physical Principles and Sequence Design., John Wiley & Sons, Inc., 1999 (in part), B. Blümich, NMR Imaging of Materials, Clarendon Press, 2000 (in part).
Assessment methods and criteria:
One written examination.
Grading:
Numerical grading scale 0 – 5, where 0 = fail
Person responsible:
Ville-Veikko Telkki
Working life cooperation:
No work placement period
Other information:
Course website

790346A: Nature conservation: a geographic perspective, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Marja Lindholm

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS
Language of instruction:
Finnish and English
Timing:
2nd or 3rd year, 1st or 2nd semester.
Learning outcomes:
The student is able to define and apply the most essential concepts of the discipline from the view point of Physical Geography.
Contents:
The student deepens his/her geographical way of thinking by reading the material of Physical Geography and by writing three applied essays. The topics of the essays are agreed separately with the course supervisor.
Mode of delivery:
The student gets course instructions and agrees the subjects of the essays with the course supervisor.
Learning activities and teaching methods:
Independent work, essays
Target group:
Major students in geography.
Prerequisites and co-requisites:
-
Recommended optional programme components:

Course is part of minor studies in Basic Studies in Environmental Conservation
Recommended or required reading:
List of source books is given together with course instructions.
Assessment methods and criteria:
The student writes three applied essays. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes a numerical grading scale 1-5.
Person responsible:
Marja Lindholm
Working life cooperation:
No.

766344A: Nuclear and particle physics, 5 op

Voimassaolo: 01.12.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

766330A-01	Structure of matter, part 1: Solid state physics	0.0 op
766330A-02	Structure of matter, part 2: Nuclear and particle physics	0.0 op
766334A	Structure of matter II	2.0 op

ECTS Credits:
5 ECTS cr
Language of instruction:
Finnish
Timing:
2nd spring, 4th period
Learning outcomes:
The student knows the structure and key properties of atomic nuclei, the most important ways in which the nuclei undergo radioactive decay, and is familiar with some technological applications based on nuclear properties and radioactivity. The student can explain fission and fusion reactions.
The student knows the key varieties of subatomic particles, their properties and interactions. The student can explain main principles of particle accelerators and detectors, and how they are used in research.
Contents:
This course deals with the structure and properties of nuclei, nuclear forces, nuclear models, radioactivity, nuclear reactions, properties and interactions of fundamental particles, and unified theories of fundamental interactions.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 30 h, 8 exercises (16 h), self-study 87 h
Target group:
Primarily for the students of the degree programme in physics.
Also for the other students of the University of Oulu.
Prerequisites and co-requisites:
Atomic physics 1 (766326A), Electromagnetism (766319A). An important supporting course is Thermophysics (766328A/766348A).
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously
Recommended or required reading:
A. Beiser: Concepts of Modern Physics, McGraw-Hill Inc.

Assessment methods and criteria:
Final examination.
Read more about assessment criteria at the University of Oulu webpage.
Grading:

Numerical grading scale 0 – 5, where 0 = fail
Person responsible:
Minna Patanen
Working life cooperation:
No work placement period
Other information:
Course website

750399A: Optional examinations in environmental protection, 2 - 6 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
2-6 ECTS credits / 53-160 hours of work. About 100 pages / 1 ECTS credit.
Language of instruction:
Most books are in English.
Timing:
B.Sc. or M.Sc. degree.
Learning outcomes:
To understand environmental protection in global context.
Contents:
Depends on the book.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Three times per both semesters. Exam days are announced in Tuudo.
Target group:
Biology, geography, geology, environmental engineering , exchange students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Gaston & Spicer (2004) Biodiversity – an introduction. Blackwell Publishing, 191p; Lockwood et al. (2007) Ivasion Ecology, Blackwell Publishing, 304 p; ACIA (2005) Arctic Climate Impact Assessment, Cambridge University Press, 1042 p.; Dincer et al. (2013) Causes, Impacts and Solutions to Global Warming, Springer, 1183 p.
Assessment methods and criteria:
Exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Kari Taulavuori.
Working life cooperation:
No.
Other information:
Student has to consult about the selected literature before exam.

791635A: Physical Geography of Fennoscandia, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Janne Alahuhta

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay791635A	Physical Geography of Fennoscandia (OPEN UNI)	5.0 op

ECTS Credits:
5 ECTS
Language of instruction:
Finnish and English
Timing:
2nd or 3rd year, 1st or 2nd semester.
Learning outcomes:
Course familiarizes students to the geography of the Fennoscadia. When the student has passed the written exam, he/she can define the special characters of the physical geography of Fennoscandia
Contents:
Physical geography of the Fennoscandia.
Mode of delivery:
Book exam.
Learning activities and teaching methods:
Book exam.
Target group:
Obligatory for teachers, others voluntary.
Prerequisites and co-requisites:
-
Recommended optional programme components:
Course is part of minor studies of Geography.
Recommended or required reading:

- Seppälä, Matti (ed.) (2005). Physical Geography of Fennoscandia, 1st ed. 432 p. Oxford University Press.

Assessment methods and criteria:
Exam on examinarium.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1–5.
Person responsible:
Janne Alahuhta
Working life cooperation:
No.

765684S: Physics of the Solar System I, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opettajat: Jürgen Schmidt

Opintokohteen kielet: English

Leikkaavuudet:

767604S	Solar System Physics	5.0 op
767304A	Solar System Physics	5.0 op
765384A	Physics of the solar system I	5.0 op
765659S	Physics of the Solar System I	7.0 op
765359A	Physics of the Solar System I	7.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work

Language of instruction:
English
Timing:
Period 2. Not lectured every year.
Learning outcomes:
The student learns basic concepts and methods of solar system science and their application to current problems in the field.
Contents:
The course describes and discusses observations of planets and their satellite systems, asteroids and meteoroids, comets and dwarf planets. Fundamental modern research methods and their application to up to date problems and phenomena in the solar system are introduced. Topics of planetary formation as well as extrasolar planets will be briefly discussed.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
26 hours lecture, 26 hours exercises, 135 hours self-study
Target group:
Primarily for the students of the degree programme in physics. Also for the other students of the University of Oulu. The course can be taken at an intermediate and at an advanced level.
Prerequisites and co-requisites:
No specific prerequisites
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously
Recommended or required reading:
`Planetary Sciences', I. de Pater, J.J. Lissauer (Cambridge University Press), `Physics of the Solar System', B. Bertotti, P. Farinella, D. Vokrouhlicky (Kluwer Academic Publishers). Course material availability can be checked here.
Assessment methods and criteria:
One written examination and points from worked exercise problems Read more about assessment criteria at the University of Oulu webpage.
Grading:
Numerical grading scale 0 - 5, where 0 = fail
Person responsible:
Jürgen Schmidt
Working life cooperation:
No work placement period
Other information:
https://noppa.oulu.fi/noppa/kurssi/765359a/etusivu https://noppa.oulu.fi/noppa/kurssi/765659s/etusivu

756344A: Plant ecology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori, Annamari Markkola

Opintokohteen kielet: Finnish

Leikkaavuudet:

752300A Plant ecology 7.0 op

ECTS Credits:
5 cr / 133 hours of work.
Language of instruction:
Lectures Finnish, Exercises Finnish / English.
Timing:
B.Sc. 2nd autumn. ECOGEN 1st autumn.
Learning outcomes:
Student will get basic knowledge how plants adapt to different environmental factors.
Contents:

The main subject of this course is the heterogeneity of environment and the capacity of plants to adapt flexibly to different light and nutrient conditions. For carbon economy the main questions are variation in photosynthetic potential, extrinsic factors which restrict the photosynthesis and the structural and physiological adaptations to different light conditions. Nutrient economy is not only dependent on the soil of the habitat but also on the capacity of plant to change the ions from the surface of soil particles. Symbiosis has a great importance on nutrient economy of boreal plants. The balance between benefits and costs defines whether the symbiosis with the nitrogen fixation bacteria or with mycorrhizal fungi is beneficial for the plant or not. There is competition between plants for soil nutrients and for light. How is it possible that plants competing for the same basic nutrients can live in the same habitat? Isn't the niche theory valid for plants?

Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
(1) Book exam. **(2)** 22 h demonstrations and exercises in field and laboratory (basic methods in plant ecology and laboratory work) and 4 h final seminars. International students will compensate lectures by reading book Ridge, I. 2002: Plants, Oxford Univ. Press.
Target group:
Compulsory to ECO.
Prerequisites and co-requisites:
Basics of ecology (750124P) and Plant ecology field course (756343A) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Ridge, I. 2002: Plants, Oxford Univ. Press..
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Lecture Book exam (final grade), laboratory diary and seminar presentation (both accepted/rejected).
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail.
Person responsible:
Doc. Kari Taulavuori.
Working life cooperation:
No.
Other information:
-

756343A: Plant ecology field course, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola

Opintokohteen kielet: Finnish

Leikkaavuudet:

752304A	Field course in ecological botany	5.0 op

ECTS Credits:
5 cr / 133 h of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 1st summer. ECOGEN 1st summer.
Learning outcomes:
Student is able to identify most common boreal plant species in the field, to plan and conduct ecological field experiments and use basic methods in vegetation analyses.
Contents:

Vegetation in the coast of Bothnian Bay in Hailuoto and/or Oulu (3 days). Basics of boreal forest and mire vegetation classification and types at Oulanka Research Station (7 days). Vegetation research and basic methods of stock estimation. Mire vegetation development and ecological biodiversity.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures 10 h, field demonstrations and laboratory exercises, excursions 84 hours in Oulu and/or Hailuoto and Oulanka Research Station. Field exams for plant identification and mire ecology, report.
Target group:
B.Sc. Compulsory to ECO 5 cr and TEA 5 cp, TEA: at least 10 cr compulsory, two field courses, one ecological botany field course (756343A) and other animal field course (either 755321 or 755322A).
Prerequisites and co-requisites:
Identification of plant species (756354A) 5 cr or equivalent knowledge.
Recommended optional programme components:
Course has capacity for 32 or 40 students. Possible elimination of the candidates is done by study success and Plant identification (756354A) grade. This course is a prerequisite for courses Plant ecology (752600S), Mire ecology (752692S) and Field course in Arctic-Alpine ecology and vegetation (752642S).
Recommended or required reading:
Laitinen et al. 2012: Field course in ecological botany; Hanhela, P. & Halonen, P. 1995: Plant identification; Huttunen, A: 1995: Introduction to forest types; Eurola, S., Hicks, S. and Kaakinen, H. 1994: Key to Finnish mire types, pp. 12-117 in: Moore, P. D. (ed.), 1994 European mires, London Academic Press, London, 367 p.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Field exams, report.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail.
Person responsible:
doc. Annamari Markkola.
Working life cooperation:
Essential working life skills are learned during the field course.
Other information:
-

761653S: Plasma physics, 8 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
8 credits
Language of instruction:
English (or finnish depending on participants)
Timing:
First and second period. Not lectured every year.
Learning outcomes:
The course begins with the introduction of the basic plasma theories: the kinetic theory and magnetohydrodynamics. After passing the course the student is able to explain the physical content of these theories, and is able to apply the theories to basic plasma problems. The student is also able to linearize partial differential equations related to these theories, transforming complicated differential equations into a solvable form. The student is able to apply these methods to study basic plasma wave modes and the most important plasma instabilities.
Contents:
Most normal matter in the universe is in plasma state, i.e., consists of charged particles interacting electromagnetically. Plasma physics studies what kind of phenomena appear in such a system. Plasma physics is

the most important theory of space physics, which is applied to describe, e.g., ionospheric, magnetospheric, solar and heliospheric phenomena. This course gives a profound treatment of plasma theories and plasma phenomena, such as plasma waves.
Contents briefly: Kinetic theory of plasma, magnetohydrodynamic theory, linearization of differential equations, MHD waves, waves in cold plasma, kinetic theory of plasma waves, Landau damping, instabilities.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
44 h lectures, 20 h calculational exercises, 149 h independent studying
Target group:
This is an optional course for physics students at an advanced level on plasma physics. Recommended for students of space physics, astronomy and theoretical physics. Gives important background especially for all other space physics courses.
Prerequisites and co-requisites:
Intermediate level electromagnetism is recommended as background.
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously
Recommended or required reading:
Lecture notes: T. Asikainen: Plasma physics. Parts from books: Baumjohann-Treumann: Basic Space Plasma Physics, Imperial College Press, 1997; Treumann- Baumjohann: Advanced Space Plasma Physics, Imperial College Press, 1997; H. Koskinen, Johdatus plasmafysiikkaan ja sen avaruussovellutuksiin. Limes, 2001; F.F. Chen: Plasma Physics and Controlled Fusion, 2nd ed., Vol. 1, Plasma Physics, Plenum Press; J. A. Bittencourt: Fundamentals of plasma physics, Pergamon Press, 1986.
Assessment methods and criteria:
One written examination
Grading:
Numerical grading scale 0 – 5, where 0 = fail
Person responsible:
Timo Asikainen

755336A: Population ecology, 10 op

Voimassaolo: 01.08.2019 - 31.07.2020

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kvist, Laura Irmeli

Opintokohteen kielet: English

Leikkaavuudet:

756351A	Basics in population ecology	5.0 op
754628S	Stream ecology	5.0 op

ECTS Credits:
10 ECTS credits / 266 hours of work + optional 5 ECTS.
Language of instruction:
English.
Timing:
B.Sc. 3rd autumn - spring.
Learning outcomes:
Basic skills in methods of population biology. Student learns basic on theory and application of population ecology methodologies.
Contents:
Demography and life history strategies with emphasis on dynamics of structured populations in space and time, with an emphasis on conservation biology. Usage of matrix amd mark-recapture models to calculate basic population parameters and analyze population viability. Metapopulation dynamics and ecological and evolutionary genetics and interactions between populations and their environment are

addressed. In exercises, dynamics of populations are analysed with matrix models, mark-recapture models and simulation programs. In addition, the student can take an optional field course part for collecting and analyzing population ecological data.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
36 h lectures, 50 h computer exercises, seminar and an optional field course with a report.
Target group:
ECO: BSc compulsory. ECOGEN eco: MSc compulsory.
Prerequisites and co-requisites:
Basics of ecology (750124P) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Silvertown & Charlesworth 2001: Introduction to Plant Population Biology (4 th edition), Blackwell Science. Morris, W.F & Doak, D.F. Quantitative conservation biology. Theory and practice of population viability analysis. Akçakaya, H.R., Burgman, M.A. & Ginzburg, L.R. Applied population ecology. Principles and computer exercises using RAMAS ® EcoLab. Lande, R., Engen,S. & Sæther, B-E. Stochastic population dynamics in ecology and conservation.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Two exams. A report of the optional part.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Laura Kvist.
Working life cooperation:
No.
Other information:
-

791613S: Position based analyses and services in geography, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Ossi Kotavaara

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
5 ECTS
Language of instruction:
Finnish and also English at need
Timing:
1st or 2nd MSc-year, 2nd semester.
Learning outcomes:
The objective is that the student understands basics of GPS positioning, can use GPS devices, can collect location based data by GPS and positioning in research.
Contents:
Basics of GPS and hand held devices, collecting location based geographical information by GPS, GPS data transformations with GIS, research by using GPS data. Location based services (LBS).
Mode of delivery:
Face-to-face learning.
Learning activities and teaching methods:

20 h lectures, reading circle, exercises, demonstrations and field working. Integrating GPS and LBS data with GIS and research in theory and practice. Written report and seminar.
Target group:
Especially students of GIS.
Prerequisites and co-requisites:
GIS bacis and cartography and Advanced course of GIS have to be done.
Recommended or required reading:
NOPPA Study Portal
Assessment methods and criteria:
Written report and seminar.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1–5
Person responsible:
Ossi Kotavaara, Harri Antikainen
Working life cooperation:
No.

763634S: Quantum devices, 5 op

Voimassaolo: 01.01.2019 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opettajat: Matti Silveri

Opintokohteen kielet: Finnish, English

Leikkaavuudet:

763693S Quantum optics in electric circuits 6.0 op

ECTS Credits:
5 ECTS
Language of instruction:
English
Timing:
The course is held in every second/third autumn semester, during period I. It is recommended to complete the course at the 3th, 4th, or 5th autumn semester.
Learning outcomes:
Upon completion of the course, the student

- knows the quantum mechanical circuit theory such that the student can construct a Hamiltonian operator for a simple electric ciruit
- is able to explain damping of quantum systems via master equation formalism and knows how it is derived and justified
- is able to to solve time-dependent quantum mechanical problems involving uncoupled or coupled harmonic oscillators and quantum bits
- knows basics of modern superconducting circuit based quantum bits

Contents:
The basic concepts and methods of modern quantum devices: quantum circuit theory, damping via master equation, harmonic oscillator, and Josephson junction based quantum bits.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 28 h, exercises 14 h, and self-study 93 h
Target group:
Advanced undergraduate and beginning graduate students of physics. Everyone, who is interested in the physics and working principles of modern quantum devices.
Prerequisites and co-requisites:
The recommended prerequisite is the courses of Quantum mechanics I 763312A and Quantum mechanics II 763613A/S or corresponding knowledge.
Recommended optional programme components:

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

Recommended or required reading:

Lecture notes, E. Thuneberg & M. Silveri: Quantum devices, not following any particular book

Assessment methods and criteria:

Final examination. Read more about assessment criteria at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail

Person responsible:

Matti Silveri

Working life cooperation:

The course does not contain working life cooperation.

763612S: Quantum mechanics I, 10 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

763312A Quantum mechanics I 10.0 op

ECTS Credits:

10 ECTS cr

Language of instruction:

Finnish / English depending on the audience

Timing:

First and second period, 3rd autumn

Learning outcomes:

The most important goal of the course is the development of a quantum mechanical frame-of-mind. After the course, the student knows the postulates of quantum mechanics and can solve the Schrödinger equation in such one- and three-dimensional problems that have important applications in condensed matter physics and in atomic, nuclear and molecular physics. The student will also learn to derive the uncertainty principle and use it to interpret what happens in a quantum mechanical measurement.

Contents:

Quantum mechanics, together with the general theory of relativity, lays the foundation for the modern scientific understanding of the nature. Recent developments in nanotechnology has also brought quantum-based applications into our everyday lives. However, the greatest influence quantum mechanics brings is on how we understand and interpret the behavior of the basic building blocks of nature. One of the interesting results of quantum mechanics is the uncertainty principle which means, for example, that a particle does not possess well defined position and velocity at a given time. This has far-reaching consequences in our understanding of the structure of matter, and even of the present amount and distribution of galaxies in the known universe. The inherent indeterminacy in the classical state of the particles implies that the microscopic particles have to be described with the so-called wave function, which determines the probability density of finding the particle at an arbitrary location. The course begins with the introduction of the basic principles and postulates of quantum mechanics. As an example, several one-dimensional problems for the time-evolution of the wave function are solved. The uncertainty principle is derived in its general form, and applied to the simultaneous measurement of position and velocity. In three-dimensional problems, spherical symmetry is connected with the angular momentum. The corresponding operators and quantum numbers are derived. As an example, the quantized energy states of hydrogen atom are solved. The general formulation of quantum mechanics in terms of abstract Hilbert space and its linear transformations is presented, and shown to be equivalent with the wave function formalism. The properties of the general theory are illustrated in terms of the two quantum paradigms: the two-level system and the harmonic oscillator.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 50 h, 12 exercises (á 3 h), self-study and examination 184 h

Target group:

Compulsory for theoretical physicists and physicists. Also for the other students of the University of Oulu.

Prerequisites and co-requisites:
Atomic physics (766326A) and knowledge of linear algebra and differential equations.
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously
Recommended or required reading:
J. Tuorila: Kvanttimekaniikka I (2013, in Finnish). D. Griffiths: Introduction to Quantum Mechanics (2005).
Assessment methods and criteria:
Two written intermediate examinations or one final examination.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Numerical grading scale 0 – 5, where 0 = fail
Person responsible:
Matti Alatalo
Working life cooperation:
No work placement period
Other information:
Course website

763613S: Quantum mechanics II, 10 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

763313A Quantum mechanics II 10.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
10 ECTS cr
Language of instruction:
English (or Finnish, depending on the participants)
Timing:
3rd-4th period, 3rd spring
Learning outcomes:
Course continues the development of the quantum mechanical frame-of-mind. After the course, the student can solve different physical eigenvalue problems by using matrices, can calculate the quantum numbers of the system, and can estimate the effect of a perturbation. The student can also solve problems that arise in low-energy scattering.
Contents:
Quantum mechanics of two and many particle systems is discussed in the context of, e.g.the periodic table of elements and the band structure of solids. For atomic, molecular and nuclear physics, the essential quantity in classifying states is the angular momentum, which we study in detail including the particle spin. Effects of weak perturbations are studied in terms of time-independent and time-dependent perturbation theory. As an example, we calculate fine-structure corrections to hydrogen atom, Zeeman effect, and the bound states of ionic Hydrogen molecule and He-atom. We derive the Fermi golden rule to calculate radiation induced transition rates between eigenstates. Finally we study interactions between particles using scattering theory. Concepts such as cross section, phase shift, scattering amplitude and Green’s function are introduced.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 50 h, 12 exercises, self-study and examination 184 h
Target group:
For all interested in modern, quantum phenomena, compulsory for theoretical physicists. Also for the other students of the University of Oulu.
Prerequisites and co-requisites:
Quantum Mechanics I (763312A).
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously.

Recommended or required reading:
J. Tuorila: Kvanttimekaniikka II (2014, in Finnish). D. Griffiths: Introduction to Quantum Mechanics (2005).
Assessment methods and criteria:
Two written intermediate examinations or one final examination.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Numerical grading scale 0 – 5, where 0 = fail
Person responsible:
Matti Silveri
Working life cooperation:
No work placement period
Other information:
Course website

790106A: Region, culture and society, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Paasi Anssi

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS
Language of instruction:
English and Finnish
Timing:
2nd year, 1st semester.
Learning outcomes:
A student can explain and represent the main ideas of regional geography, theoretical and practical meanings of concept 'region' and the role of region in order to manage society and culture.
Contents:
Development of (contemporary) regional geography, theoretical meanings of concept 'region', region and power. Lecture serves different fields of specialization.
Mode of delivery:
Face-to-face learning.
Learning activities and teaching methods:
16 h lectures and an exam (lectures and literature)
Target group:
Common course to all students of Geography.
Prerequisites and co-requisites:
-
Recommended optional programme components:
Course is part of minor studies of Geography.
Recommended or required reading:
Material will be delivered during the course.
Assessment methods and criteria:
Exam on exam day.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1–5.
Person responsible:
Anssi Paasi.
Working life cooperation:
No.

792319A: Regional politics, policy and development: Northern Europe, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Heikki Sirviö

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS
Language of instruction:
Finnish and English. English speaking students should contact the teacher before the course.
Timing:
2nd year, 1st semester
Learning outcomes:
Upon completion of the course the student will be able to:
- analyse and classify basic theories, concepts and models of regional development and policy,
- apply theories, concepts and models in interpretation, recognize their use in scientific papers and discuss them,
- perceive the characteristics and challenges in the regional development and policy in Northern Europe.

Contents:
Students familiarize themselves with the basic theories, concepts, and models of regional development and policy, and their application in practical challenges and decision-making by reading and analysing scientific articles.
Mode of delivery:
Face-to-face teaching, independent work.
Learning activities and teaching methods:
The course involves 14 h of reading group sessions and 118 h of self-learning by reading the assigned articles, writing memos and preparing an essay.
Target group:
Students who take the Regional development and policy module.
Prerequisites and co-requisites:
-
Recommended optional programme components:
The course does not require additional studies carried out at the same time.
Course is part of minor studies of regional development and regional policy.
Recommended or required reading:
Reading list will be available by the beginning of the course.

Assessment methods and criteria:
The assessment criteria are based on the learning outcomes of the course.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1–5.
Person responsible:
Heikki Sirviö
Working life cooperation:
No.

765307A: Research Project of Astronomy I, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opettajat: Heikki Salo

Opintokohteen kielet: Finnish

Leikkaavuudet:

765332A Study project in astronomy 1 5.0 op

765332A-01 Data processing in astronomy 0.0 op

765332A-02 Study project 0.0 op

765135P Data processing in astronomy 2.0 op

ECTS Credits:
5 ECTS credits /133 hours of work
Language of instruction:
Finnish or English
Timing:
3rd-4th period, 2 nd Spring
Learning outcomes:
Student is able to use computer in processing and visualizing astronomical data.

Contents:
Student is able to use computer in processing and visualizing astronomical data.
Mode of delivery:
Face-to-face teaching, independent study
Learning activities and teaching methods:
Lectures 21 h and study project, self-study 115 h
Target group:
Students in astronomy
Prerequisites and co-requisites:
No
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously
Recommended or required reading:
Lecture material
Assessment methods and criteria:
Quality of the project report
Grading:
Numerical grading scale 0 – 5, where 0 = fail
Person responsible:
Heikki Salo, Vitaly Neustroev, Sebastien Comeron, Jürgen Schmidt, Aaron Watkins, Joachim Lanz, Xiaodong Liu

791627S: Research in regional geography, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Paasi Anssi

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS
Language of instruction:
Finnish and/or English.
Timing:
1st or 2nd MSc-year, 2nd semester.
Learning outcomes:

The student can interpret the latest discourse of the regional geography and participate to it by connecting his/her own study to the discussed issues.

Contents:
The course focuses on the contemporary issues of new regional geography.
Mode of delivery:
Face-to-face learning.
Learning activities and teaching methods:
Study circle, presentations, book exam.
Target group:
Students in Human and Cultural Geography.
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
Cresswell Tim (2014) Place. 2nd edition. Wiley-Blackwell
Assessment methods and criteria:
Exam on exam day.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5.
Person responsible:
Anssi Paasi.
Working life cooperation:
No.
Other information:
Course is organized on every other year, next on spring 2020.

750613S: Research training, 2 - 15 op

Opiskelumuoto: Advanced Studies

Laji: Practical training

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
1-14 ECTS credits / 27-405 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. degree.
Learning outcomes:
Student applies the education given knowledge and skills in working life to gain hands-on experience.
Contents:
Work on special projects in the different biology research groups at the department or elsewhere or independent project work including field and/or laboratory work or work at the biological stations. The work is not included to other study modules in biology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
The topic and the study plan have to be agreed on in advance (registration form). The student has to keep diary and prepare a report on the work.
Target group:
-
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-

Recommended or required reading:
-
Assessment methods and criteria:
Report.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Doc. Seppo Rytkönen ja Doc. Annamari Markkola (ECO), Dr. Heikki Helanterä and Prof. Hely Häggman (BS).
Working life cooperation:
Yes. Participating to biology project gives working life skills.
Other information:
-

766659S: Solar effects on climate, 6 op

Voimassaolo: 01.01.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

ECTS Credits:
6 credits
Language of instruction:
English or Finnish
Timing:
3rd-4th period. Roughly every second year
Learning outcomes:
After passing the course the student is able to describe the basic patterns and modes of climate and climate variability, general circulation, ocean-atmosphere coupling, and telecommunication, as well as the major influences of the Sun by the different mechanisms to the climate modes and patterns.
Contents:
This is an optional physics course at an advanced level on the solar effects on the Earth's atmosphere and climate. Climate change is well known to everyone and its importance to mankind overall can hardly be overestimated. On the other hand, while the Sun is the ultimate source of climate, the solar effects on climate change are still poorly understood. Moreover, in addition to the electromagnetic radiation (total and spectral irradiance), new solar effects have recently been found that are related to solar wind.
Topics: Major modes of climate variability, stratosphere-troposphere coupling, telecommunication between various modes, volcanic influences, greenhouse gas warming, NAO/NAM, ENSO, QBO, ozone depletion, total and spectral solar irradiance, top-down and bottom-up mechanisms of solar influence, solar wind effects
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 30 h, 4 exercises (8 h), seminar, essay writing, self-study
Target group:
Primarily for the students of the degree programme in physics, especially space physics. Also for other students of the University of Oulu.
Prerequisites and co-requisites:
Recommended background information: Basics of Space physics -course or equivalent information.
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously
Recommended or required reading:
Course material will be informed during the course.
Assessment methods and criteria:
Seminar, essay and one final examination.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Numerical grading scale 0 – 5, where 0 = fail
Person responsible:

Kalevi Mursula
Working life cooperation:
No work placement period
Other information:
https://wiki.oulu.fi/display/766659S

900027Y: Special Course in Finnish: Writing Skills, 3 op

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Proficiency level:
B1/B2, according to the Common European Framework.
Status:
The course is intended for the international students in every faculty of University of Oulu.
Required proficiency level:
A2.2 Completion of the Finnish for Advanced Students (900020Y) or the equivalent language skills.
ECTS Credits:
3 ECTS credits
Language of instruction:
Finnish
Timing:
-
Learning outcomes:
By the end of the course the student can write coherent and detailed descriptions and summaries about various matters. S/he is able to summarize text and justify his/her own statements of opinions. In addition, the student knows the steps of the writing process and understands the significance of a text's function and target audience. S/he can also differentiate between formal and informal writing styles.
Contents:
During the course students develop their writing skills in Finnish and are guided in the drafting of different text types and documents needed in studies and work. In the course students learn how to write informal and formal letters, an argument-essay, a summary, a job application and a report.
Mode of delivery:
One contact lesson at the beginning of the course and guided independent studying using online
Learning activities and teaching methods:
The course will be held online using an Optima environment.
Target group:
International degree and post-graduate degree students, exchange students and the staff members of the University
Prerequisites and co-requisites:
Completion of the Intermediate Finnish Course 2
Recommended optional programme components:
-
Recommended or required reading:
Web based material.
Assessment methods and criteria:
To pass the course, the student must complete all the required writing assignments.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Grading is on a pass/fail basis.
Person responsible:
Anne Koskela
Working life cooperation:
-
Other information:
Sign-up in WebOodi or by emailing the contact teacher.

750654S: Special lecture in biology, 2 - 5 op

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

752667S	Special topics in plant ecology	2.0 op
751690S	Lectures on special topics in zoology	2.0 op

ECTS Credits:
2-5 ECTS credits / 53-133 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. or Ph.D. degree. Arranged if resourses allow
Learning outcomes:
Students will be acquainted to current issues in biology.
Contents:
Seminars on current issues in biology.
Mode of delivery:
Varying.
Learning activities and teaching methods:
Varying.
Target group:
Biology students.
Prerequisites and co-requisites:
Varying.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Varying.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail or Pass / Fail.
Person responsible:
Prof. Timo Muotka, Prof. Hely Häggman and Ass. Prof. Heikki Helanterä.
Working life cooperation:
No.
Other information:
-

790605S: Special research course in Physical Geography, 5 op

Voimassaolo: 01.01.2017 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Geography
Arvostelu: 1 - 5, pass, fail
Opettajat: Jan Hjort
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS
Language of instruction:
Finnish or English.
Timing:
1st or 2nd MSc-year, 1st or 2nd semester.
Learning outcomes:
The student will deepen and develop his/her knowledge in physical geography through literature or through empirical study. More exact learning outcomes is based on method of implementation of the course (agreed with professor).
Contents:
This course serves the specialization of the student. After the course, the student has deepened his/her knowledge and experience in physical geography.
Mode of delivery:
Face-to-face learning, essay or independent studying.
Learning activities and teaching methods:
This course may be performed by different ways. The student can carry out a course from other module, work as research assistant, write an essay, complete a virtual course related to his/her field or make a manuscript based on his/her Master Thesis. Way of performance is discussed with professor.
Target group:
MSc-students, especially in physical geography
Recommended or required reading:
Will be agreed with professor.
Assessment methods and criteria:
Will be agreed with professor. Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass/fail
Person responsible:
Jan Hjort
Working life cooperation:
Yes. Working in research or development projects gives working life experience.

790350A: Special themes in Regional Development and Regional Policy, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS
Language of instruction:
Finnish and English
Timing:
2nd or 3rd year, 1st or 2nd semesters (autumn or spring semesters)
Learning outcomes:
1) Student understands the idea of Communicative Planning Theory. Student acquaint her/himself with critical theoretical debates regarding the communicative approach.
2) Student understands the theoretical debates about strategic planning and city-regionalism. Student learns to interpret novel and forthcoming reforms in the planning system from a critical point of view.

Contents:
communicative planning theory, market-driven processes and planning, strategic planning and city-regionalism, reforms of planning system
Mode of delivery:
Compilation of essays. Exchange students are asked to contact the teacher in advance, if planning to pass the course during her/his exchange.
Learning activities and teaching methods:
Student studies the given literature with care and writes the compilation of essays independently. Detailed instructions from the teacher.
Target group:

Students specializing in Regional Development and Policy, voluntary for others.
Prerequisites and co-requisites:
The course is planned for those students who already have some basic knowledge of regional development or regional policy. The student should have passed some general level introductory studies to the field of regional development/policy in her/his home institution (equivalent to the course 'Introduction to Regional Development and Regional Policy' in Oulu) before attending this course. Please contact teacher in advance and clarify your starting level to her/him.
Recommended optional programme components:
-
Recommended or required reading:
Ask instructions and the list of literature from the teacher.
Assessment methods and criteria:
Compilation of essays as independent work.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1–5.
Person responsible:
Vesa Väätänen. During summer (1.7.-31.8.2020) Marika Kettunen.
Working life cooperation:
No.
Other information:
Exchange students are asked to contact the teacher before registration.

763620S: Statistical physics, 10 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
10 ECTS cr
Language of instruction:
English
Timing:
First and second period, 3rd - 5th year
Learning outcomes:
To recognize the basics of statistical physics and to apply them to thermodynamics, noninteracting classical-, Bose- and Fermi gases, to perturbation theory of interacting systems and to phase transitions.
Contents:
Statistical physics studies how the microscopic properties of particles are connected to the macroscopic properties of matter. The course begins with an overview of the classical thermodynamics, and continues with quantum mechanical concepts of statistical physics: the density operator, partition function etc. The statistical properties of non-interacting fermions and bosons form a central part of the course, after which some methods for studying interacting systems are introduced. The course finishes with a description of the phase transitions and critical phenomena.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 50 h, exercises 30 h, self-study 187 h
Target group:
Theoretical physics students and students interested in the microscopical foundations of the properties of matter. Also for the other students of the University of Oulu.
Prerequisites and co-requisites:
Quantum mechanics II (763313A) and Thermodynamics (766328A), also recommended is Advanced quantum mechanics (763622S).
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously
Recommended or required reading:
J. Arponen: Statistinen fysiikka (in Finnish)

L.E. Reichl: A Modern Course in Statistical Physics
Lecture notes
Course material availability can be checked here.
Assessment methods and criteria:
One written examination
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Numerical grading scale 0 – 5, where 0 = fail
Person responsible:
Matti Alatalo
Working life cooperation:
No work placement period
Other information:
Course website

765629S: Stellar atmospheres, 10 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opettajat: Vitaly Neustroev

Opintokohteen kielet: English, Finnish

ECTS Credits:
10 ECTS cr
Language of instruction:
English
Timing:
First and secon period. Not lectured every year.
Learning outcomes:
The student should understand in the end of the course basics of radiation transport, physics of formation of stellar spectra, know the main opacity sources in various types of stars, understand theory of line formation and be able to determine chemical composition from stellar spectra.
Contents:
Stellar types, spectra, temperatures. Radiative transfer. Continuous and line spectra. Spectral analysis. Theory of line formation. The course can also be incorporated into advanced studies with some supplementary work.
Mode of delivery:
Face-to-face teaching, Not lectured every year
Learning activities and teaching methods:
Lectures 48 h and exercises, self-study 155 h
Target group:
Primarily for the students of the degree programme in physics. Also for the other students of the University of Oulu.
Prerequisites and co-requisites:
Fundamentals of astronomy (recommended)
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously
Recommended or required reading:
E. Böhm-Vitense: Stellar astrophysics, vol. 2, Cambridge Univ. Press, 1989. Course material availability can be checked here.
Assessment methods and criteria:
One written examination Read more about assessment criteria at the University of Oulu webpage.
Grading:
Numerical grading scale 0 – 5, where 0 = fail
Person responsible:
Vitaly Neustroev
Working life cooperation:
No work placement period
Other information:

https://wiki.oulu.fi/display/765373A/

900017Y: Survival Finnish, 2 op

Voimassaolo: 01.08.1995 -
Opiskelumuoto: Language and Communication Studies
Laji: Course
Vastuuyksikkö: Languages and Communication
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay900017Y Survival Finnish Course (OPEN UNI) 2.0 op

Proficiency level:
A1.1
Status:
The course is intended for the international students in every faculty of Oulu University.
Required proficiency level:
No previous Finnish studies.
ECTS Credits:
2 ECTS credits
Language of instruction:
Finnish and English
Timing:
-
Learning outcomes:
By the end of the course the student can understand and use some very common everyday expressions and phrases, and s/he can locate informational content in simple texts and messages. The student also knows the basic characteristics of Finnish language and Finnish communication styles.
Contents:
This is an introductory course which aims to help students to cope with the most common everyday situations in Finnish. During the course, students learn some useful everyday phrases, some general features of the vocabulary and grammar, and the main principles of pronunciation.

The topics and communicative situations covered in the course are: general information about the Finnish language, some politeness phrases (how to greet people, thank and apologize), introducing oneself, giving and asking for basic personal information, numbers, some time expressions (how to tell and ask the time, days of the week, time of day), food, drink and asking about prices.

The structures studied are: personal pronouns and their possessive forms, forming affirmative, negative and interrogative sentences, the conjugation of some verbs, the basics of the partitive singular and some local cases for answering the ‘where'-question.
Mode of delivery:
Contact teaching, on-line learning and independent work. There will be organized also one on-line group in each semester.
Learning activities and teaching methods:
Lessons 2 times a week (26 h, including the final exam) and guided self study (24 h)
Target group:
International degree and post-graduate degree students and exchange students of the University
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
Will be provided during the course.
Assessment methods and criteria:
Regular and active participation in the weekly lessons (twice a week), homework assignments and written exam at the end of the course will be observed in assessment.
Read more about assessment criteria at the University of Oulu webpage.
Grading:

Grading scale is on a pass/fail basis.
Person responsible:
Anne Koskela
Working life cooperation:
-
Other information:
Sign-up in WebOodi.

791632S: Sustainable development and global tourism, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Geography
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

ECTS Credits:
5 ECTS
Language of instruction:
Finnish and English.
Timing:
1 MSc-year, 2nd semester.
Learning outcomes:
Following completion of the course the learner will be able to: know the definitions, origins and evolution of globalisation and sustainable development; apply the principles and theories which underpin the different forms of tourism, globalisation and sustainability; demonstrate an understanding of the complex relations between tourism and sustainable development in global contexts; explain the role played by international, national and regional tourism organisations in the global tourism development; evaluate the role and impacts of tourism in local-global nexus; compare the role and importance of tourism in developed and developing countries, urban and rural settings and nature-based and cultural tourism; critique the major global forces that are shaping future tourism and its relation sustainability; and demonstrate competencies in oral and written presentations and ability to critically evaluate others' viewpoints.
Contents:
Definitions and key concepts and ideas of tourism, globalisation and sustainable development and their relations; theories of development/under-development and globalisation; political economy of global tourism and sustainability; local-global nexus and globalisation from below; international, regional and national tourism organizations; global tourism; regional structures and development; impacts of tourism in local-global nexus and different socio-spatial contexts; and tourism-globalisation-sustainability: case studies focusing north and south.
Mode of delivery:
Face-to-face learning.
Learning activities and teaching methods:
20 hrs lectures, written report and presentation.
Target group:
Especially students in Tourism Geography, and Human Geography and teachers.
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
Literature:
- Mowforth, M. ja I. Munt (2009). Tourism and Sustainability.
- Selection of articles: (to be announced during the course)

Other readings:
- Butler, R. ja T. Hinch (toim.) (2007). Tourism and Indigenous Peoples;
- Holden, A. (2008). Environment and tourism;
- Saarinen, J., Becker, F., Manwa, H. ja D. Wilson (toim.) (2009). Sustainable Tourism and Southern Africa;
- Sharpley, R. ja D.J. Telfer (2002). Tourism and Development;
- Saarinen, J. Rogerson, C, ja H. Manwa (toim.) (2012). Tourism and Millennium Development Goals.

Assessment methods and criteria:
Written report and exam on exam day.

Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5.
Person responsible:
Saarinen Jarkko
Working life cooperation:
No.
Other information:
-

790610S: Sustainable tourism development in Northern environments, 10 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Kaarina Tervo-Kankare

Opintokohteen kielet: English

ECTS Credits:
10 ects
Language of instruction:
English
Timing:
Spring semester, online (University's online learning platform)
Learning outcomes:
To familiarize students with theory and knowledge related to sustainable tourism development in Northern environments.

In the course students will

1. Gain **knowledge** of the phenomena of northern tourism; the place of sustainable northern tourism within globalization and climate change; and the socio-cultural dimensions of northern tourism.
2. Acquire **skills** that will enable them to critically evaluate why the phenomena of northern tourism should be studied; identify the implications of northern tourism for indigenous cultures; evaluate the implications of northern tourism as related to local communities and resources; and critically examine governance aspects of northern tourism
3. Get the **general competence** of synthesizing academic reading materials read; participating in master's level discussion of course materials; and developing research and writing skills to a Master's level.

Contents:
The course will address tourism in the circumpolar north from a societal perspective. It will present different views on the phenomenon and its dimensions, resources and implications for nature, places and cultures involved. The place of northern tourism in times of globalization and emergent global issues like climate changes will be explored, together with the relevant governance aspects.
Mode of delivery:
Online (University of Oulu's OPTIMA environment)
Learning activities and teaching methods:
Learning will take place in interactive and collaborative forms. It will take place on-line, through such methods as lectures, group discussions, and teamwork. Instructors and students will share discoveries and materials during the course, and use a variety of communication tools.
Prerequisites and co-requisites:
Applicants must have a Bachelor's Degree in tourism, social science, humanities or science, or Bachelor of Business Administration, Bachelor of Arts or Bachelor of Science.
Person responsible:
Kaarina Tervo-Kankare

755322A: Terrestrial animals field course, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Seppo Rytkönen

Opintokohteen kielet: Finnish

Leikkaavuudet:

751306A Field course in terrestrial animals 4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. - 1st summer. ECOGEN 1st summer.
Learning outcomes:
The aim of the course is to learn the basics of field identification and ecology of terrestrial animals in northern Finland. The student will understand that proper skills in species identification and knowledge of species' ecology are the basis of ecological research.
Contents:
The fauna in different kinds of terrestrial habitats is studied using several ecological sampling and research methods. The course is hold at the Oulanka Research Station, Kuusamo, and deals with identification and ecology of invertebrates, mammals (especially small mammals), gallinaceous birds and birds of prey. The exercises take place partly in the field and partly in the laboratory. Data gained during the course is analyzed. The results are reported (in PowerPoint) and presented in the final seminar in Kuusamo.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Part 1. (Oulu): 2 h demontration, independent studying. Part 2. (Oulanka): 49 h demonstrations and practicals, one species and theory exam, seminar.
Target group:
Compulsory (5 cr) to ECO. TEAeco: either Aquatic ecology field course 5 cr (755321A) or Terrestrial animals field course 5 cr (755322A) is compulsory for biology major, the other field course can be included to the ecology minor. TEAbs, alternatively compulsory to TEAbs either Aquatic ecology field course 5 cr or Terrestrial animals field course 5 cr. TEA: at least 10 cr compulsory, two field courses, one animal and other Plant ecology field course (756343A).
Prerequisites and co-requisites:
Identification of animals, vertebrates 4 cr (755334A) and Identification of animals, invertebrates 4 cr (755335A) or equivalent knowledge.
Recommended optional programme components:
This course is a prerequisite to course Winter ecology (750377A).
Recommended or required reading:
Compulsory at Oulanka: 1) Rytkönen, S. ym. 2003: 751306 Maaeläimistön tuntemus ja ekologia. - Biologian laitoksen monisteita 3/2003. Oulun yliopisto, Oulu. 2) Pentinsaari, M. ym. 2015: Eläinten lajintuntemus, selkärangattomat. Oulun yliopisto, Oulu. Insect book recommended: Chinery, M. 1988 Pohjois-Euroopan hyönteisheimojen määritysopas, Tammi, Helsinki, 2. painos.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Theory exam, species identification exam, seminar presentation.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail.
Person responsible:
Doc. Seppo Rytkönen.
Working life cooperation:
No.
Other information:
Binoculars, bird identification book, suitable outfit. Preparation knife, preparation scissors and sharp cusp tweezers.

750318A: Thursday seminar in biology, 2 op

Voimassaolo: 01.08.2011 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Heikki Helanterä
Opintokohteen kielet: English
Voidaan suorittaa useasti: Kyllä

ECTS Credits:
2 ECTS credits / 53 hours of work.
Language of instruction:
English.
Timing:
B.Sc., M.Sc. or Ph.D. degree.
Learning outcomes:
Students get knowledge about the current results and theories in biology.
Contents:
Lectures in English on current topics in biology given by guest lecturers from Finland or abroad.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Guest lectures on Thursdays 12 am-1 pm.
Target group:
Undergraduate and postgraduate students interested in biology.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
10 participations and 10 one page long reports. You can combine lectures from different academic terms to make the needed 10 essays.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Doc. Heikki Helanterä.
Working life cooperation:
No.
Other information:
-

802669S: Topology, 5 op

Voimassaolo: 01.06.2016 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Mathematics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: English, Finnish

Ei opintojaksokuvauksia.

790320A: Tourism planning and development, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Kaarina Tervo-Kankare

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay790320A Tourism planning and development (OPEN UNI) 5.0 op

ECTS Credits:
5 ECTS
Language of instruction:
Finnish and English.
Timing:
3 year, 2nd semester.
Learning outcomes:
After this course, student understands the relationship between tourism planning and regional development and he /she knows the most central models of planning and development in local, regional and national level. He/she knows the starting points of the tourism policy in local and European level, the background aspects of the tourism policy.
Contents:
Concepts and theories of the tourism development and tourism planning, economic impacts in regional level and basic aspects of the tourism policy and regional tourism strategies.
Mode of delivery:
Face-to-face learning.
Learning activities and teaching methods:
Lectures, written seminar work and presentation, exam.
Target group:
Students who're specialising to Tourism Geography. Course is part of minor studies tourism geography.
Prerequisites and co-requisites:
-
Recommended optional programme components:
Course is part of minor studies tourism geography.
Recommended or required reading:

- Hall, C.M. (2000). Tourism Planning: Policies, Processes and Relationships. 236 s. Prentice Hall, Harlow.
- Fennel, David A. (1999 or later version). Ecotourism – an introduction (partly).

Assessment methods and criteria:
Exam on exam day.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1–5.
Person responsible:
Kaarina Tervo-Kankare
Working life cooperation:
No.
Other information:
Written exam can be written also in Finnish. Written seminar work and presentation is in English. If needed, this course can be organised as written exam and practical's.

790161A: Tourism, development and sustainability, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Kaarina Tervo-Kankare

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay790161A Tourism, sustainability and environment (OPEN UNI) 4.0 op

ECTS Credits:
5 ECTS
Language of instruction:
English
Timing:
2nd year, 1st semester
Learning outcomes:
After the course, the student understands and can apply the principles of sustainable tourism in different contexts; he/she understands the importance of sustainable development in tourism in different contexts and from different viewpoints (spatial, stakeholder, sector). Student acknowledges the utilization of tourism for diverse development purposes and has basic understanding about its potential pitfalls, especially in the Global South framework. The student can analyse and compare the impacts and meaning of different tourism activities to sustainable development.
Contents:
The course focuses on the idea of sustainable tourism and sustainable development with emphasis on tourism in Global South. The course examines the conceptual and practical dimensions of sustainable tourism, its relationship with sustainable development in general and the applicability and problems associated with it. The course's basic concepts include the following: tourism and sustainable development, sustainable tourism, tourism impacts and sustainability at different scales (local-global) and environments, the roles of different actors (stakeholders) in sustainable tourism, tourism development plans and policies, methods to measure sustainability in tourism and tourism development, the role of sustainable tourist.
These concepts will be discussed both theoretically and in practice, highlighting their relevance in the Global South dimension and utilizing examples in different contexts. Some topical issues relating with the main theme sustainable tourism, such as pro-poor tourism and climate change will be covered in the Global South contexts. In addition, the student chooses one relevant topic to which she/he familiarizes.
Increase knowledge about the role and meaning of tourism in relation to development at different scales, and in different contexts, in the sustainability framework. Sustainability will be examined throughout the tourism system, at different scales and in diverse environments, with central focus on the development issues in the Global South.
Mode of delivery:
Most of the course is virtual, and realized in Moodle environment. Virtual lectures, readings, small tasks, group discussions and assignments.
Learning activities and teaching methods:
Lectures, self study, group work, web-based work, essay. To be confirmed at the first lecture.
Target group:
Students of geography who will specialize to Tourism Geography. Course is also part of minor studies tourism geography.
Prerequisites and co-requisites:
-
Recommended or required reading:
Most of the course material will be provided via the course's Moodle environment.
Assessment methods and criteria:
Evaluation will be based on the learning diaries and the final assignment, which is also evaluated by peers.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1–5.
Person responsible:
Senior lecturer Kaarina Tervo-Kankare
Working life cooperation:
No.

791629S: Traditions and current issues in tourism research, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Kaarina Tervo-Kankare

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay791629S Traditions and current issues in tourism research (OPEN UNI) 5.0 op

ECTS Credits:
5 ECTS
Language of instruction:
Finnish/English
Timing:
1st or 2nd MSc-year, 2nd semester.
Learning outcomes:
Following the completion of the course the learner has deepened her/his knowledge on the research traditions and current issues in tourism geographies.
The course is structured around lectures and studies based on the department's researchers' and/or visiting scholars' and PhD students' demonstrations, and will provide insights to students on timely issues in tourism research, development, planning and/or management.
After the course the student will be able to: know and describe the basic concepts and theories of lecture/course subjects; evaluate the importance of lecture/course subjects; contextualise and integrate lecture/course subjects to Finnish or other specific regional context. In addition he/she will demonstrate competencies in oral and written presentations, teamwork and ability to critically evaluate others' viewpoints.
Contents:
Key theories, concepts and perspectives introduced during the course and based on the introduced cases studies.
Mode of delivery:
Mostly face-to-face learning, depending on the course structure.
Learning activities and teaching methods:
16 hrs lectures, group work, written and oral assignments, and exam or report.
Target group:
Especially students of Tourism Geography.
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
Will be announced when the course starts.
Assessment methods and criteria:
Assignments and/or written exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5.
Person responsible:
Kaarina Tervo-Kankare
Working life cooperation:
No.
Other information:
The course is organized uneven years, but yearly when resources allow. Alternatively, the course may be performed by case study based on recent literary and its written and oral presentation.

755328A: Wildlife management and game animal ecology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jouni Aspi, Kari Koivula

Opintokohteen kielet: Finnish

Leikkaavuudet:

751368A Wildlife management and game animal ecology 6.0 op

ECTS Credits:
5 cr / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 3rd autumn or M.Sc. 1st autumn.
Learning outcomes:
After carrying out the study module the student will be able to recognize special ecological traits of the game animals and relate them to the general ecological framework. The student will be also able to appraise the basics of sustainable harvest of game animals and critically judge different wildlife management methods from the scientific point of view.
Contents:
The ecology of game species, their life histories, population dynamics and predator-prey relationships. Hunting ecology: man as predator, management of the game species. The impact of forestry on the game species' populations. Students are also introduced to wildlife management in practice and to the social aspects of wildlife-human relationship.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
24 h lectures, one-day excursion to a game breeding area, visiting lecturers from relevant research institutes and game administration, seminar with written reports and exam.
Target group:
-
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Seminar with report and exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Jouni Aspi ja Doc. Kari Koivula.
Working life cooperation:
Yes.
Other information:
-

750377A: Winter ecology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

Leikkaavuudet:

750325A	Winter ecology and physiology	3.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English.
Timing:
B.Sc. 3rd or M.Sc. 1 st spring.

Learning outcomes:
Student obtains basic knowledge of animal and plant acclimations and adaptations to winter, and can evaluate the effects of cold temperatures and snow on overwintering, and learns central methodology in winter ecology and physiology.
Contents:
(1) Lectures (8) and 6 h laboratory practicals; (2) 4 day long field excursion to the Oulanka Research Station (28 h); (3) report concerning course works and seminar presentation; (4) Book exam: Marchal, P.J. 1996: Life in the cold. An introduction to winter ecology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures, exercises, report, seminar presentation and exam.
Target group:
Biology students.
Prerequisites and co-requisites:
Courses Basics of ecology (750124P), Cell biology (750121P), Terrestrial animals field course (755322A), Aquatic ecology field course (755321A), Plant ecology field course (756343A) and Basics of plant biology, lectures (756346A) or equivalent knowledge.
Recommended optional programme components:
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Recommended or required reading:
Marchand, P. J. 1996: Life in the cold. An introduction to winter ecology. (3rd edition). University Press of New England. 304 p.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Activity in practicals and seminar presentation and exam, where one question concern lectures and course works, and 2 question concern book issues.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Kari Taulavuori.
Working life cooperation:
No.
Other information:
-

790349A: World regional geography, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Janne Alahuhta, Sanna Varanka

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay790349A	World regional geography (OPEN UNI)	5.0 op

ECTS Credits:
5 ECTS
Language of instruction:
Finnish and English.
Timing:
2nd or 3rd year, 1st or 2nd semester.
Learning outcomes:
After the course, the student can define and interpret different regional phenomena and processes in the global level.
Contents:
Regional phenomena of the world and their role in Physical Geography.
Mode of delivery:

Online course in Moodle: https://moodle.oulu.fi/course/view.php?id=584

Target group:

Recommended for teachers, others voluntary.

Prerequisites and co-requisites:

-

Assessment methods and criteria:

Read more about assessment criteria at the University of Oulu webpage.

Grading:

1–5.

Person responsible:

Janne Alahuhta

Working life cooperation:

No.

Other information:

The course will be arranged twice during an academic year. The course consist of five periods. Each of these periods last for two weeks.