Opasraportti

FSci - Minor subject guide, Faculty of Science (2018 - 2019)

Tutkintorakenteisiin kuulumattomat opintokokonaisuudet ja -jaksot

763314A: Analytical mechanics, 5 op
A325704: Astronomy Minor, 25 - 40 op
- *Compulsory*
  - 765114P: Fundamentals of astronomy I, 5 op
  - 765115P: Fundamentals of astronomy II, 5 op
  - 765309A: Galaxies, 5 op
  - 765384A: Physics of the solar system I, 5 op
- *Choose another: Major Students of Astronomy take 765307A Research project of astronomy and Minor Students of Astronomy take 765308A History of astronomy.*
  - 765307A: Research Project of Astronomy I, 5 op
  - 765308A: History of astronomy, 5 op
- *Electives*
  - 765304A: Celestial mechanics I, 5 - 8 op
  - 765386A: Interstellar Matter, 5 op
  - 765358A: Cosmology, 5 op
  - 765301A: Introduction to Nonlinear Dynamics, 5 op
  - 767303A: Observational Astronomy I, 5 op
  - 767302A: Physics of the solar system II, 5 op
  - 767301A: Time Series Analysis in Astronomy, 5 op
  - 767300A: Observational astronomy II, 5 op

A300001: Basic Studies in Environmental Conservation, 25 - 59 op
- *Period 1*
  - 773346A: Environmental geology, 5 op
  - 771113P: Introduction to Geology I, 5 op
  - 771114P: Introduction to Geology II, 5 op
- *Period 2*
  - 754322A: Introduction to hydrobiology, 5 op
  - 756348A: Ecological responses to global change and air pollution in the subarctic, 5 - 8 op
  - 756347A: Conservation of biodiversity, 5 op
  - 752175P: Environmental ecology, 5 op
  - 750199P: Optional examinations in environmental protection, 2 - 6 op
- *Period 3*
  - 780119P: Introduction to Analytical Chemistry, 5 op
  - 781309A: Environmental Chemistry, 5 op
- *Period 4*
  - 790102P: Introduction to the systematic Physical Geography, 5 op
  - 790340A: Geographies of global development, 5 op
  - 791302A: Environment and society, 5 op
- *Period 5*
  - 750116P: Legislation in environmental protection, 5 op

A325005: Mathematics for Economic Sciences (Minor Studies), 25 - 60 op
761317A: Numerical Programming, 5 op

A325104: Physics Minor, 15 op
- *General Studies in Physics*
  - 761108P: Physical world view, 5 op
  - 761118P: Mechanics 1, 5 op
    - *Compulsory*
      - 761118P-01: Mechanics 1, lectures and exam, 0 op
      - 761118P-02: Mechanics 1, lab. exercises, 0 op
  - 761115P: Laboratory Exercises in Physics 1, 5 op
- *Optional studies in Physics. When you complete 25 ECTS cr from the physics. Choose the 2 courses below. (60 ECTS cr of minor subject are all selected below)*
  - 761119P: Electromagnetism 1, 5 op
  - 761313A: Atomic physics 1, 5 op
  - 761314A: Thermophysics, 5 op
  - 761310A: Wave motion and optics, 5 op
    - *Compulsory*
      - 761310A-01: Wave motion and optics, lectures and exam, 0 op
      - 761310A-02: Wave motion and optics, lab. exercises, 0 op
- *If you want to complete 60 ECTS cr in physics. Choose all the courses below*
  - 761309A: Mechanics 2, 5 op
  - 761120P: Laboratory Exercises in Physics 2, 5 op
  - 761312A: Electromagnetism 2, 5 op
  - 766344A: Nuclear and particle physics, 5 op
  - 763343A: Solid state physics, 5 op
- *Obligatory for subject teacher*
  - 761316A: Being a teacher in mathematical subjects, 5 op

A325304: Theoretical Physics Minor, 25 op
- *Intermediate studies in theoretical physics*
  - 763312A: Quantum mechanics I, 10 op
  - 763313A: Quantum mechanics II, 10 op

A320305: Tourism Studies, 25 op
- *Compulsory*
  - 790160P: Introduction to Tourism Geography, 5 op
  - 790161A: Tourism, development and sustainability, 5 op
  - 790320A: Tourism planning and development, 5 op
  - 756347A: Conservation of biodiversity, 5 op
  - 724106P: Principles of Marketing, 5 op
  - 790165P: Substitutive course on Tourism, 3 - 5 op

Opintojaksojen kuvaukset

Tutkintorakenteisiin kuulumattomien opintokokonaisuuksien ja -jaksojen kuvaukset

763314A: Analytical mechanics, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opettajat: Erkki Thuneberg
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

A325704: Astronomy Minor, 25 - 40 op

Opiskelumuoto: Basic Studies
Laji: Study module
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

Compulsory

765114P: Fundamentals of astronomy I, 5 op

Voimassaolo: 01.03.2014 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS cr

Language of instruction:

Finnish

Timing:

1st Spring, Period 3

Learning outcomes:

Student can describe the basic physical processes behind astronomical phenomena and can solve mathematical problems related to the course.

Contents:

A more detailed basic astronomy course (part one), that contains e.g. the fundamentals of electromagnetic radiation, astronomical instruments, celestial mechanics and the physical environment of the planets.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 26 h, exercises 12 h, self-study 95 h

Target group:

First or second year students in e.g. astronomy, physics, geophysics or geology. 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:

H. Karttunen, K.-J. Donner, P. Kröger, H. Oja and M. Poutanen (eds.): Fundamental astronomy, Springer, 2007, chapters 1-7, Carroll, B.W., Ostlie, D.A., An Introduction to Modern Astrophysics, Pearson 2007. (4. edition or newer.)
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:

Pertti Rautiainen

Working life cooperation:

No work placement period

Other information:

https://noppa.oulu.fi/noppa/kurssi/765114p/etusivu

765115P: Fundamentals of astronomy II, 5 op

Voimassaolo: 01.03.2014 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS cr

Timing:

1st Spring, Period 4

Learning outcomes:

Student can describe the basic physical processes behind astronomical phenomena and can solve mathematical problems related to the course.

Contents:

A more detailed basic astronomy course (part two), that contains e.g. stellar structure and evolution, the structure of the Milky Way and principles of cosmology.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 24 h, exercises 12 h, self-study 97 h

Target group:

First or second year students in e.g. astronomy, physics, geophysics or geology. 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:

H. Karttunen, K.-J. Donner, P. Kröger, H. Oja and M. Poutanen (eds.): Fundamental astronomy, Springer, 2007, chapters 8-20, Carroll, B.W., Ostlie, D.A., An Introduction to Modern Astrophysics, Pearson 2007.
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:

Pertti Rautiainen

Working life cooperation:

No work placement period

Other information:

https://noppa.oulu.fi/noppa/kurssi/765115p/etusivu

765309A: Galaxies, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opettajat: Sébastien Comerón Limbourg
Opintokohteen kielet: English
Leikkaavuudet:

765630S	Galaxies	6.0 op
765330A	Galaxies and cosmology	6.0 op

ECTS Credits:

5 ECTS credits /133 hour of work

Language of instruction:

English

Timing:

2nd - 4th year, Autumn 2018, period 2.

Learning outcomes:

Student recognizes the main components of galaxies and can apply them to classify galaxies. Student can describe the theories of formation of galactic structures. Student can solve mathematical problems related to the course and recognizes the terminology well enough to be able to read scientific publications.

Contents:

We begin with the classification of galaxies, which introduces many of the concepts needed in the Most of the large galaxies are either spiral galaxies or elliptical galaxies. We study the structure an kinematics in both these galaxy types, including the theories of spiral formation. Especial emphasis on our own galaxy, the Milky Way. We also examine the structure in larger scale: groups and clust galaxies.

Mode of delivery:

Face-to-face-teaching

Learning activities and teaching methods:

Lectures 36 h, exercises, self-study 107 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 of course units that should be completed simultaneuously.

Recommended or required reading:

Sparke, L., Gallagher, J.: Galaxies in the Universe, Cambridge, 2nd ed., 2007. 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:

Sébastien Comerón

Working life cooperation:

No work placement period

Other information:

The course is lectured next time autumn 2018, periods 1-2

765384A: Physics of the solar system I, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opettajat: Jürgen Schmidt

Opintokohteen kielet: English

Leikkaavuudet:

767304A	Solar System Physics	5.0 op
767604S	Solar System Physics	5.0 op
765684S	Physics of the Solar System I	5.0 op
765359A	Physics of the Solar System I	7.0 op
765659S	Physics of the Solar System I	7.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work

Language of instruction:

English

Timing:

Not lectured every year, Period 2

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

Choose another: Major Students of Astronomy take 765307A Research project of astronomy and Minor Students of Astronomy take 765308A History of astronomy.

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:

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

765308A: History of astronomy, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay765308A History of astronomy (OPEN UNI) 5.0 op

765107P Astronomical world view 5.0 op

765107P-02 Astronomical world view (part 2): History of astronomy 0.0 op

765106P History of astronomy 3.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work

Language of instruction:

Finnish

Timing:

1st - 3rd year

Learning outcomes:

Student has a general concept of the history of astronomy and the development of physical world view.

Contents:

Astronomy is the oldest exact science. On the other hand, it uses space telescopes and computer simulations. The stellar sky has been observed already in prehistory. Explaining planetary motions celestial phenomena has been in central role in the development of physical theories, and the reve the cosmic scale has deeply shaped our world view. The history of astronomy has an important rol discussions on the history and philosophy of science. Art and popular culture have also been inspi astronomical phenomena.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 32 h, self-study 107 h

Target group:

All students

Prerequisites and co-requisites:

None

Recommended or required reading:

Lecture notes

Assessment methods and criteria:

One written exam.

Grading:

Numerical grading scale 0-5, where 0=fail

Person responsible:

Pertti Rautiainen

Working life cooperation:

No work placement period

Electives

765304A: Celestial mechanics I, 5 - 8 op

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

ECTS Credits:

5-8 credits

Language of instruction:

English (or Finnish)

Timing:

Not lectured every year

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 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:

Heikki Salo

Working life cooperation:

No work placement period

Other information:

https://wiki.oulu.fi/display/765304A/

765386A: Interstellar Matter, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opettajat: Sébastien Comerón Limbourg
Opintokohteen kielet: English, Finnish

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).

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

765358A: Cosmology, 5 op

Voimassaolo: 29.10.2013 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Leikkaavuudet:

765658S 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).

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

765301A: Introduction to Nonlinear Dynamics, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opettajat: Jürgen Schmidt
Opintokohteen kielet: English, Finnish
Leikkaavuudet:

765601S	Introduction to Nonlinear Dynamics	5.0 op

ECTS Credits:

5 ECTS cr

Language of instruction:

English

Timing:

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

767303A: Observational Astronomy I, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opettajat: Vitaly Neustroev
Opintokohteen kielet: English

ECTS Credits:

5 ECTS credits /133 hours of work

Language of instruction:

English

Timing:

Not lectured every year

Learning outcomes:

After the finished course the student is expected to understand the role of observations in the formation of astronomical knowledge and to know the main observing techniques and instruments.

Contents:

The course gives an introduction to the modern ground- and space-based telescopes and detec observational methods. The primary detector in the visual wavelengths, the CCD camera, and b

image reduction techniques are introduced. Observational methods such as direct imaging, astro photometry, spectroscopy, polarimetry and interferometry are described. Finally, the instruments detectors of other electromagnetic wavelengths are also introduced.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 24 h, exercises 8 h, self-study 101 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:

Recommended reading: Kitchin, C.R.: Astrophysical Techniques. Romanishin, W.: An Introduction to Astronomical Photometry Using CCDs - http://observatory.ou.edu/wrccd22oct06.pdf Birney, D. S., Gonzalez, G. & Oesper, D.: Observational Astronomy (2nd Edition - 2006) Course material availability can be checked here

Assessment methods and criteria:

One written examination Lue lisää opintosuoritusten arvostelusta yliopiston verkkosivulta.

Grading:

Numerical grading scale 0 – 5, where 0 = fai

Person responsible:

Vitaly Neustroev

Working life cooperation:

No work placement period.

767302A: Physics of the solar system II, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opettajat: Jürgen Schmidt

Opintokohteen kielet: English, Finnish

Leikkaavuudet:

767602S	Physics of the solar system II	5.0 op

ECTS Credits:

5 ECTS cr

Language of instruction:

English

Timing:

Not lectured every year

Learning outcomes:

The student learns concepts and methods of solar system science and their application to current problems in the field.

Contents:

In extension of Physics of the Solar System I, this course addresses in greater depth special topics like planeta magnetospheres, tidal interaction, planetary interiors, and the origin and evolution of the Solar System.

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), `Solar System Dynamics', C.D. Murray, S.F. Dermott (Cambridge University Press) 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:

Nowork placement period

767301A: Time Series Analysis in Astronomy, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opettajat: Vitaly Neustroev
Opintokohteen kielet: Finnish, English
Leikkaavuudet:

767601S	Time Series Analysis in Astronomy	5.0 op
765368A	Time Series Analysis in Astronomy	6.0 op
765668S	Time Series Analysis in Astronomy	6.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work

Language of instruction:

English

Timing:

Not lectured every year, Period 4

Learning outcomes:

After taking the course the student is expected to understand basic time series concepts and terminology, to be able to select time series methods appropriate to goals and summarize results of time series analysis in writing. The main objective of this course is to develop the skills needed to do empirical research in fields operating with time series data sets.

Contents:

This is an introductory course, with particular emphasis on practical aspects of the typical time series encountered in astronomy and in related field of sciences: search for periodicities hidden in noise. Topics include detrending, filtering, autoregressive modeling, spectral analysis, regression, and wavelet analysis. Methods that can be applied to evenly and unevenly spaced time series are considered.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 24 h, exercises 24 h. The theoretical part of lectures concentrates on both parametric and nonparametric time series analysis methods. The practical part involves programming, application and interpretation of the results. Self-study 85 h.

Target group:

Student of the intermediate and advanced level.

Prerequisites and co-requisites:

No pre-knowledge is required in the time series analysis field. A rough knowledge of Fourier transforms and related functions as well as some basic knowledge in Statistics would be an advantage.

Recommended optional programme components:

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

Recommended or required reading:

Numerical Recipes, papers.

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/765368A/

767300A: Observational astronomy II, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opettajat: Vitaly Neustroev

Opintokohteen kielet: English, Finnish

Leikkaavuudet:

767600S Observational astronomy II 5.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work

Learning outcomes:

This is a follow up course to 767303A/767603S, designed to give additional practice utilizing the skills learned in Part I. Students must have taken Part I of the series prior to enrolling in this class.

Contents:

A more detailed and practical course (part two) which covers the theory and practice of obtaining meaningful as data. Topics covered include different detector/telescope configurations, the atmosphere and its effects on obs observational experiments, calibrations and data reductions, both on a theoretical level and experimentally with data. It also introduces some analysis tools and statistical techniques (signal detection, signal-to-noise estimate fitting, and goodness-of-fit estimation, etc.) that are commonly used in astronomical research.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 12 h, exercises 24 h, self-study 97 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:

Observational astronomy Part I (767303A /767603S)

Recommended optional programme components:

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

Recommended or required reading:

Recommended reading: Kitchin, C.R.: Astrophysical Techniques. Romanishin, W.: An Introduction to Astronomical Photometry Using CCDs - http://observatory.ou.edu/wrccd22oct06.pdf Birney, D. S., Gonzalez, G. & Oesper, D.: Observational Astronomy (2nd Edition - 2006) Course material availability can be checked here

Assessment methods and criteria:

One written examination Lue lisää opintosuoritusten arvostelusta yliopiston verkkosivulta.

Grading:

Numerical grading scale 0 – 5, where 0 = fail

Person responsible:

Vitaly Neustroev

Working life cooperation:

No work placement period.

A300001: Basic Studies in Environmental Conservation, 25 - 59 op

Opiskelumuoto: Basic Studies

Laji: Study module
Vastuuyksikkö: Faculty of Science
Arvostelu: 1 - 5, pass, fail
Opettajat: Kari Taulavuori
Opintokohteen kielet: Finnish
Leikkaavuudet:

ayA300001 Basic Studies in Environmental Conservation (OPE UNI) 25.0 op

Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

Period 1

773346A: Environmental geology, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Oulu Mining School
Arvostelu: 1 - 5, pass, fail
Opettajat: Juha Pekka Lunkka
Opintokohteen kielet: Finnish

ECTS Credits:

5 credits

Language of instruction:

Finnish.

Timing:

2nd or 3rd year.

Learning outcomes:

Upon completion of the course, the student knows and understand:
main environmental concepts
environmental effects of the use of geological resources
geological risk factors
environmental effects of human and urban activity
acidification of soil and water

Contents:

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

Mode of delivery:

Face to face teaching.

Learning activities and teaching methods:

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

Target group:

Students in the 2nd or 3rd year.

Prerequisites and co-requisites:

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

Recommended or required reading:

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

Assessment methods and criteria:

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

Grading:

1-5/fail.

Person responsible:

Pertti Sarala

Working life cooperation:

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

771113P: Introduction to Geology I, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Oulu Mining School
Arvostelu: 1 - 5, pass, fail
Opettajat: Kari Strand
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay771113P	Introduction to Geology I (OPEN UNI)	5.0 op

ECTS Credits:

5 credits

Language of instruction:

Finnish

Timing:

1st year autumn

Learning outcomes:

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

Contents:

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

Mode of delivery:

Face to face

Learning activities and teaching methods:

36 h lectures, 6 h exercises

Target group:

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

Prerequisites and co-requisites:

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

Recommended optional programme components:

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

Recommended or required reading:

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

Assessment methods and criteria:

Written examination and identification test of rock types.

Grading:

5-1/fail

Person responsible:

Kari Strand

Working life cooperation:

No

771114P: Introduction to Geology II, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Oulu Mining School
Arvostelu: 1 - 5, pass, fail
Opettajat: Juha Pekka Lunkka
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS / 133 hours of work

Language of instruction:

Finnish

Timing:

1st year autumn

Learning outcomes:

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

Contents:

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

Mode of delivery:

Face to face teaching

Learning activities and teaching methods:

16 h lectures, 8 h exercises

Target group:

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

Prerequisites and co-requisites:

No

Recommended or required reading:

Handouts and John Grotzinger & Thomas H. Jordan (2010 or 2014) Understanding Earth, 6th or 7th edition, Chapters 5, 8, 15-21.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Obligatory exercises and written examination

Grading:

5-1/fail

Person responsible:

Juha Pekka Lunkka and Tiina Eskola

Working life cooperation:

No

Period 2

754322A: Introduction to hydrobiology, 5 op

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

754308A	Basic course in hydrobiology	3.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 3rd spring, M.Sc. 1st spring. Even numbered years.

Learning outcomes:

Basic knowledge of inland water ecosystems structure, function and organisms. Basic concepts of hydrobiology which are necessary for further hydrobiology studies.

Contents:

Hydrography and physical and chemical properties of lakes and streams. Structure and ecological interactions of aquatic ecosystems (bacters plant and animal plankton, water insects other invertebrates, fishes). Most important biological interactions (competition, predation, parasitism, mutualism), inland water food web structure and regulation. Biodiversity of inland waters. Human influence on inland water biodiversity and ecosystem functions.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

26 h lectures, final exam.

Target group:

ECO, TEA.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

Lectures are compulsory to the students taking the hydrobiology study package.

Recommended or required reading:

Course material and book Brönmark, C. & Hansson, L. 2005: The Biology of Lakes and Ponds. Oxford University Press, 285 p.
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:

Prof. Timo Muotka.

Working life cooperation:

No.

Other information:

-

756348A: Ecological responses to global change and air pollution in the subarctic, 5 - 8 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:

750343A	Ecological responses to global change and air pollution in the subarctic	4.0 op

Ei opintojaksokuvauksia.

756347A: Conservation of biodiversity, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Phillip Watts
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:

B.Sc. 3rd autumn. NNE.

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:

Biology students. Students who are participating in environmental conservation or tourism minor.

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:

-

752175P: Environmental ecology, 5 op

Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Kari Taulavuori
Opintokohteen oppimateriaali:
Jarvis, Peter J. , , 2000
Chiras, Daniel D , , 2001
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay752175P	Environmental ecology (OPEN UNI)	5.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

Spring, (arranged if resources allow).

Learning outcomes:

After finishing the course student understands the ecological background of most important environmental questions and has knowledge to apply this to decision making in environmental problems.

Contents:

Ecological basics of nature conservation. Effects of physical and chemical environment on living organisms, basics of population ecology, communities and ecosystems. Environmental changes and how species can adapt to them. World wide environmental problems and actions to solve them are studied within the course. Special environmental questions in Finland and in Europe.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Book exam and written report according to agreement with teacher.

Target group:

-

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Raven et al. 2012: Environment. Wiley & Sons, 516 p.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Report and final 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:

Arranged if resources allow

750199P: Optional examinations in environmental protection, 2 - 6 op

Voimassaolo: - 31.12.2018
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Kari Taulavuori
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay750199P	Optional examinations in environmental protection (OPEN UNI)	2.0 op

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 in university exam days. Exam days are announced in WebOodi.

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.

Period 3

780119P: Introduction to Analytical Chemistry, 5 op

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

780111P	Introduction to Analytical Chemistry	4.0 op
780110P	Analytical Chemistry I	5.5 op

ECTS Credits:

5 credits /134 hours of work

Language of instruction:

Finnish

Timing:

2nd autumn

Learning outcomes:

Upon completion the student should have acquired knowledge and understanding of basic concepts of quantitative chemical analysis employing classical methods of analysis.

Contents:

Steps in quantitative analysis, statistical evaluation of analytical data, chemical equilibrium in aqueous solutions, gravimetry, titrimetry, spectrophotometry.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

30 hours of lectures + 20 hours of exercises + 84 hours of self-study

Target group:

Chemistry, compulsory. In the study entity of 25 credits compulsory.
Mathematical Sciences, Physical Sciences, optional.

Prerequisites and co-requisites:

General and Inorganic Chemistry A (780117P) and General and Inorganic Chemistry B (780118P), or General and Inorganic Chemistry I (780114P) and General and Inorganic Chemistry II (780115P), or Introduction to Chemistry (780113P), or Basic Principles in Chemistry (780109P).

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:

Harvey, D.: Analytical Chemistry 2.0-an open-access digital textbook (can be loaded from Internet).
Saarinen, H. ja Lajunen, L.H.J.: Analyyttisen kemian perusteet, Oulun yliopistopaino, 2004.

Assessment methods and criteria:

Two intermediate examinations or one final examination.

Grading:

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

Person responsible:

Paavo Perämäki

Working life cooperation:

No

Other information:

No

781309A: Environmental Chemistry, 5 op

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

ay781309A	Environmental Chemistry for Chemistry Teachers	5.0 op

780373A	Environmental Chemistry	3.0 op
780316A	Environmental Chemistry	2.0 op
780355A	Environmental Chemistry and Hazardous Wastes	4.0 op
780359A	Environmental Chemistry	4.0 op
780360A	Environmental Chemistry and Hazardous Wastes	5.5 op

ECTS Credits:

5 credits /134 hours of work

Language of instruction:

Finnish

Timing:

Autumn

Learning outcomes:

Upon completion the student should have acquired an understanding of chemistry of atmosphere, hydrosphere and terrestrial environment. The student should have understanding of twelve principles of green chemistry. After the course the student is acquainted with the limitations of the use of dangerous chemicals and is able to find updated information of them.

Contents:

Fundamentals of environmental chemistry; chemistry of the soil, natural and waste waters and atmosphere, circulation of chemical compounds in the nature, chemical releases, environmentally toxic and other noxious compounds, environmental analytics and basics of physical measurements. Environmental friendly chemistry. The principles of green chemistry with examples of real life.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

50 hours of lectures, essay 20 hours, self-study 64 hours

Target group:

Chemistry, optional

Prerequisites and co-requisites:

General and Inorganic Chemistry A (780117P) or Basic Principles in Chemistry (780120P).

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:

van Loon, G.W. & Duffy, S.J.: Environmental Chemistry, A Global Perspective, Oxford, 2000; Lancaster M.: Green Chemistry: An introductory text, RSC, 2002.

Assessment methods and criteria:

Final examination. Grading: 70% final examination, 30% essay. Read more about assessment criteria at the University of Oulu webpage.

Grading:

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

Person responsible:

Lecturer Minna Tiainen

Working life cooperation:

No

Other information:

No

Period 4

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.

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.

791302A: Environment and society, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Geography
Arvostelu: 1 - 5, pass, fail
Opettajat: Rusanen Jarmo Juhani
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay791302A Environment and society (OPEN UNI) 5.0 op

ECTS Credits:

5 ECTS

Language of instruction:

Finnish and English.

Timing:

2nd year, 1st semester (autumn semester).

Learning outcomes:

Student is able to define and interpret different normative systems of the environmental conservation, environmental organisations as part of the environmental issues.

Contents:

Current environmental issues, environmental guidance system, environment as conflict.

Mode of delivery:

Face-to-face learning.

Learning activities and teaching methods:

Lectures (8 h) and seminar work.

Target group:

Voluntary.

Prerequisites and co-requisites:

-

Recommended optional programme components:

Course is part of minor studies of Environment protection.

Recommended or required reading:

Will be announced later.

Assessment methods and criteria:

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

Grading:

1–5.

Person responsible:

Jarmo Rusanen

Working life cooperation:

No.

Other information:

Exchange students are asked to contact prof. Rusanen before taking this course.

Period 5

750116P: Legislation in environmental protection, 5 op

Voimassaolo: 01.08.2011 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Jari-Heikki Oksanen
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay750116P Legislation in environmental protection (OPEN UNI) 5.0 op

Ei opintojaksokuvauksia.

A325005: Mathematics for Economic Sciences (Minor Studies), 25 - 60 op

Opiskelumuoto: Basic Studies
Laji: Study module
Vastuuyksikkö: Field of Mathematics
Arvostelu: 1 - 5, pass, fail
Opettajat: Kari Myllylä
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

761317A: Numerical Programming, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish, English

ECTS Credits:
5 ECTS
Language of instruction:
English
Timing:
Not lectured every year
Learning outcomes:
Numerical algorithms for differentiation, special functions, integration, derivation, interpolation and Fourier transform. Ordinary differential equations and differential equations with eigenvalues are solved. Algorithms for linear equations and matrix equations with eigenvalues are given. The programming language can be chosen freely. Examples are given in Fortran and Mathematica languages.
Contents:
Numerical algorithms for differentiation, special functions, integration, derivation, interpolation and Fourier transform. Ordinary differential equations and differential equations with eigenvalues are solved. Algorithms for linear equations and matrix equations with eigenvalues are given. The programming language can be chosen freely. Examples are given in Fortran and Mathematica languages.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 26 h, 12 excercises, 3 project works
Target group:
Primarily for the students of the degree programme in physics

Prerequisites and co-requisites:
Recommended: mathematics for physicists, differential equations, linear algebra. Basic knowledge of programming, at least 763114P Introduction to programming
Recommended optional programme components:
No alternative course units or course units that should be completed simultaneously
Recommended or required reading:
Lecture notes, W. H. Press, B. P. Flannery, S. A. Teukolsky and W. T. Vetterling: Numerical Recipes. The Art of Scientific Computing.
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:
Kari Jänkälä

A325104: Physics Minor, 15 op

Opiskelumuoto: Basic Studies
Laji: Study module
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

General Studies in Physics

761108P: Physical world view, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

761112P	Physical world view	3.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work

Language of instruction:

Finnish

Timing:

Autumn

Learning outcomes:

After the course student can see the position of physics in the advancement of scientific world view and technology. The student has a comprehensive view of different learning and studying methods (s)he can use later on.

Contents:

The forming of key concepts in physics, using models and observations in advancing both classical and modern physics. The meaning of applying physics in modern society. Getting to know different areas of physics research.

Mode of delivery:

Multiform teaching

Learning activities and teaching methods:

48 h face-to-face teaching, 85 h independent work including course work and group work

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:

Feynman, R. The Character of Physical Law, Penguin Books 1992 (or equivalent, there are several prints). The original Massenger Lectures by Richard Fenyman in 1965 (7x55min) can be found online with search "Richard Feynman messenger lectures".

Assessment methods and criteria:

Passed course work or final exam

Grading:

Numerical grading scale 0-5, where 0 = fail

Person responsible:

Laura Timonen

Working life cooperation:

No work placement period

Other information:

https://wiki.oulu.fi/display/761112P/

761118P: Mechanics 1, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opettajat: Vaara, Juha Tapani
Opintokohteen kielet: Finnish
Leikkaavuudet:

766343A	Mechanics	7.0 op
761111P	Basic mechanics	5.0 op
761101P	Basic Mechanics	4.0 op
766323A	Mechanics	6.0 op
761323A	Mechanics	6.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work
- 761118P-01, Lectures and exam (4 cr)
- 761118P-02, Lab. exercises (1 cr)

Language of instruction:

The lectures will be in Finnish. The textbook is in English and exercises are selected from the textbook. For further information, contact the responsible person of the course.

Timing:

Autumn

Learning outcomes:

The student is able to describe the basic concepts of mechanics and to apply those when solving the problems related to mechanics.

Contents:

We encounter many phenomena related to mechanics in our everyday life. Most engineering sciences are based on mechanics and mechanics forms the basis of many other fields of physics, including modern physics. Contents in brief: Short summary of vector calculus. Kinematics, projectile motion and circular motion. Newton's laws of motion. Work and different forms of energy. Momentum, impulse and collisions. Rotational motion and moment of inertia. Torque and angular momentum. Rigid body equilibrium problems. Gravitation. Periodic motion. Fluid mechanics.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 30 h, 7 exercises (14 h), 2 laboratory exercises (3 hours/exercise), self-study 83 h

Target group:

For the students of the University of Oulu.

Prerequisites and co-requisites:

Knowledge of vector calculus and basics of differential and integral calculus.

Recommended optional programme components:

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

Recommended or required reading:

Text book: H.D. Young and R.A. Freedman: University physics, Addison-Wesley, 13th edition, 2012, chapters 1-14. Also older editions can be used. Lecture material: Finnish lecture material will be available on the web page of the course.

Assessment methods and criteria:

Both parts (761118P-01 and 761118P-02) will be graded separately. The final grade of the course is the weighted average of the grades of part 1 (4 cr) and part 2 (1 cr).
761118P-01: Three midterm exams or final examination
761118P-02: Two laboratory exercises
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail

Person responsible:

Juha Vaara

Working life cooperation:

No work placement period

Other information:

https://wiki.oulu.fi/display/761118P

Compulsory

761118P-01: Mechanics 1, lectures and exam, 0 op

Voimassaolo: 01.01.2017 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opettajat: Vaara, Juha Tapani
Opintokohteen kielet: Finnish
Leikkaavuudet:

766343A Mechanics 7.0 op

761111P-02 Basic mechanics, lab. exercises 0.0 op
761111P-01 Basic mechanics, lectures and exam 0.0 op
761111P Basic mechanics 5.0 op
761121P Physical Measurements I 3.0 op
761101P Basic Mechanics 4.0 op
761323A Mechanics 6.0 op
766323A Mechanics 6.0 op

Language of instruction:

The lectures will be in Finnish. The textbook is in English and exercises are selected from the textbook. For further information, contact the responsible person of the course.

Timing:

Autumn

Learning outcomes:

The student is able to describe the basic concepts of mechanics and to apply those when solving the problems related to mechanics.

Contents:

We encounter many phenomena related to mechanics in our everyday life. Most engineering sciences are based on mechanics and mechanics forms the basis of many other fields of physics, including modern physics. Contents in brief: Short summary of vector calculus. Kinematics, projectile motion and circular motion. Newton's laws of motion. Work and different forms of energy. Momentum, impulse and collisions. Rotational motion and moment of inertia. Torque and angular momentum. Rigid body equilibrium problems. Gravitation. Periodic motion. Fluid mechanics.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

The whole course: Lectures 30 h, 7 exercises (14 h), 2 laboratory exercises (3 hours/exercise), self-study 83 h

Target group:

For the students of the University of Oulu

Prerequisites and co-requisites:

Knowledge of vector calculus and basics of differential and integral calculus.

Recommended optional programme components:

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

Recommended or required reading:

Text book: H.D. Young and R.A. Freedman: University physics, Addison-Wesley, 13th edition, 2012, chapters 1-14. Also older editions can be used. Lecture material: Finnish lecture material will be available on the web page of the course.

Assessment methods and criteria:

761118P-01: Three midterm exams or final examination

Grading:

Numerical grading scale 0 – 5, where 0 = fail

Person responsible:

Juha Vaara

Working life cooperation:

No work placement period

Other information:

Course website
Both parts (761118P-01 and 761118P-02) will be graded separately. The final grade of the course is the weighted average of the grades of part 1 (4 cr) and part 2 (1 cr).

761118P-02: Mechanics 1, lab. exercises, 0 op

Voimassaolo: 01.01.2017 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

766343A Mechanics 7.0 op
761111P-01 Basic mechanics, lectures and exam 0.0 op
761111P-02 Basic mechanics, lab. exercises 0.0 op
761111P Basic mechanics 5.0 op
761101P Basic Mechanics 4.0 op
761323A Mechanics 6.0 op
766323A Mechanics 6.0 op

Timing:

Autumn

Learning outcomes:

The student is able to describe the basic concepts of mechanics and to apply those when solving the problems related to mechanics.

Contents:

We encounter many phenomena related to mechanics in our everyday life. Most engineering sciences are based on mechanics and mechanics forms the basis of many other fields of physics, including modern physics. Contents in brief: Short summary of vector calculus. Kinematics, projectile motion and circular motion. Newton’s laws of motion. Work and different forms of energy. Momentum, impulse and collisions. Rotational motion and moment of inertia. Torque and angular momentum. Rigid body equilibrium problems. Gravitation. Periodic motion. Fluid mechanics.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

The whole course: Lectures 30 h, 7 exercises (14 h), 2 laboratory exercises (3 hours/exercise), self-study 83 h

Target group:

For the students of the University of Oulu

Prerequisites and co-requisites:

Knowledge of vector calculus and basics of differential and integral calculus.

Recommended optional programme components:

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

Other information:

Course website

761115P: Laboratory Exercises in Physics 1, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

761121P Physical Measurements I 3.0 op

761121P-01 Physical measurements I, exam 0.0 op

761121P-02 Laboratory exercises in physics 1, lab. exercises 0.0 op

800149P Introduction to LateX 2.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work

Language of instruction:

Finnish

Timing:

Spring

Learning outcomes:

The student can safely make physical measurements, use different measurement tools, read different scales, handle the data, calculate the error estimations and make a sensible report of his laboratopy measurements.

Contents:

The skill to make laboratory measurements is important for physicists. This is an introductory course how to make physical measurements and how to treat the measured data. Laboratory works are made in groups. The laboratory security is an essential part also in physics. Measurements are made with different instruments. As a result the most probable value is determined as well as its error. The skills obtained during this course can be applied in the other laboratory courses Laboratory exercises in physics 2 and 3.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 10 h, exercises 20 h (5 x 4 h). Five different works will be made during the course in groups. Self-study 103 h.

Target group:

For the students of the University of Oulu.

Prerequisites and co-requisites:

No specific prerequisites.

Recommended optional programme components:

800149P Introduction to LaTex

Recommended or required reading:

Lecture material is in Finnish. Work instructions are available also in English.

Assessment methods and criteria:

Written reports of the experiments and one written examination.

Grading:

Numerical grading scale 0 – 5, where 0 = fail

Person responsible:

Seppo Alanko

Working life cooperation:

No work placement period

Other information:

Includes parts:
761115P-01 Laboratory Exercises in Physics 1, lecture and exam
761115P-02 Laboratory Exercises in Physics 1, laboratory exercises
761115P-03 Laboratory Exercises in Physics 1, Introduction to LateX

Optional studies in Physics. When you complete 25 ECTS cr from the physics. Choose the 2 courses below. (60 ECTS cr of minor subject are all selected below)

761119P: Electromagnetism 1, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opettajat: Timo Asikainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

761113P-01	Electricity and magnetism, lectures and exam	0.0 op
761113P-02	Electricity and magnetism, lab. exercises	0.0 op
761113P	Electricity and magnetism	5.0 op
766319A	Electromagnetism	7.0 op
761103P	Electricity and Magnetism	4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work
- 761119P-01, Lectures and exam (4 cr)
- 761119P-02, Lab. exercises (1 cr)

Language of instruction:

Finnish

Timing:

Second fall term

Learning outcomes:

The student will be able to understand the basic concepts of electromagnetism and can apply this understanding to solve problems related to electromagnetism.

Contents:

Basic principles of electromagnetic phenomena and their physical and geometric interpretation. More detailed contents will be presented later.

Mode of delivery:

face-to-face teaching

Learning activities and teaching methods:

Lectures 32 h, 7 exercises (14 h), 2 laboratory exercises (3 hours/exercise), self-study 83 h

Target group:

For the students of the University of Oulu.

Prerequisites and co-requisites:

Knowledge of vector calculus and basics of differential and integral calculus.

Recommended optional programme components:

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

Recommended or required reading:

Text book: H.D. Young and R.A. Freedman: University physics, Addison-Wesley, 13. ed., chapters 21-31. Also other editions can be used. Lecture material in finnish.

Assessment methods and criteria:

Both parts (761119P-01 and 761119P-02) will be graded separately. The final grade of the course is the weighted average of the grades of part 1 (4 cr) and part 2 (1 cr).
761119P-01: Three small midterm exams or final examination
761119P-02: Two laboratory exercises
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail

Person responsible:

Timo Asikainen

761313A: Atomic physics 1, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opettajat: Saana-Maija Aho

Opintokohteen kielet: Finnish

Leikkaavuudet:

766326A Atomic physics 1 6.0 op

ECTS Credits:

5 ECTS credits

Language of instruction:

Finnish

Timing:

Second autumn term

Learning outcomes:

Student can explain the development of the atomic model. Student is able to describe some interaction mechanisms of electromagnetic radiation and matter. Student can resolve easy quantum mechanical problems. Student can describe the principles used when the wave functions and energies of some simple systems are determined. Student can take advantage of the periodic table of elements in finding the chemical and physical properties of atoms based on its electronic structure.

Contents:

In the beginning of the course, the historical events which led to the development of the quantum mechanics and the modern atomic model in the early 20th century are discussed. In this context, the interaction processes between matter and electromagnetic radiation, like black-body radiation, the photoelectric effect, and scattering, are examined. In quantum mechanics, particles are usually described with the aid of wave functions. De Broglie wavelength, the group and phase velocities of particles, and Heisenberg uncertainty principle serve as an introduction to the wave properties of particles. The Bohr’s atomic model, electronic transitions of atoms, and emission spectra of atoms are also discussed. The first touch to the quantum mechanics is the solutions of wave functions and energies for some simple systems, like hydrogen atom, are described. Additionally, many-electron atoms are discussed briefly. Some modern research methods which are used to study the atomic physics are introduced. Applications which exploit the atom physical phenomena in everyday life are also discussed.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 28 h, 7 exercises, self-study 90 h

Target group:

No specific target qroup

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:

Books: A. Beiser: Concepts of Modern Physics, McGraw-Hill Inc.

Assessment methods and criteria:

Group excercises, lectures, webexcercises or two exams.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail

Person responsible:

Saana-Maija Huttula

Working life cooperation:

No work placement period

761314A: Thermophysics, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opettajat: Perttu Lantto
Opintokohteen kielet: Finnish
Leikkaavuudet:

766348A	Thermophysics	7.0 op
766328A	Thermophysics	6.0 op
761328A	Thermophysics	4.0 op

ECTS Credits:

5 ECTS cr

Language of instruction:

Finnish

Timing:

Third autumn semester

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:

The goal of the course is to explain how the macroscopic thermophysical properties of a system (e.g., equation of state) can be derived from its fundamental microscopic properties (e.g., from the behavior of the molecules). For this purpose, the students are given a physically clear understanding of the basic principles of thermophysics, recognizing the fundamental role of its statistical nature. Topics will include: Basic concepts, The first law, Thermal expansion, heat transfer, and diffusion, The second law, The combined law, Heat engines and refrigerators, Thermodynamic potentials, Phases of matter, Classical ideal gas, Classical and open systems, Quantal ideal gas.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 32 h, 9 exercises (18 h), self-study 83 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:

Textbooks: H. D. Young and R. A. Freedman: University Physics, 13th edition, Pearson Addison-Wesley, 2012, or earlier editions (in part), F. Mandl: Statistical Physics, second edition, John Wiley & Sons Ltd., 1988 (in part).
Lecture notes: Juhani Lounila: 766328A Termofysiikka, Oulun yliopisto, 2015.

Assessment methods and criteria:

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:

Perttu Lantto

Working life cooperation:

No work placement period

761310A: Wave motion and optics, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opettajat: Seppo Alanko
Opintokohteen kielet: Finnish
Leikkaavuudet:

766349A	Wave motion and optics	7.0 op
761114P	Wave motion and optics	5.0 op
761114P-02	Wave motion and optics, lab. exercises	0.0 op
761114P-01	Wave motion and optics, lectures and exam	0.0 op
766329A	Wave motion and optics	6.0 op
761104P	Wave Motion	3.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work

Language of instruction:

Finnish. The course material and exercises are available in English.

Timing:

First spring

Learning outcomes:

The student is able to treat different types of waves by methods of general theory of wave motion. The student is also able to solve problems related to basic optics and apply her/his knowledge to teaching and research in physics.

Contents:

General principles of wave motion, sound, electromagnetic waves, propagation of light, image formation in mirrors and lenses, optical instruments, interference, Fraunhofer diffraction, diffraction grating.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 28 h, exercises 14 h, 2 laboratory exercises (3 hours/exercise), self-study 90 h

Target group:

No specific target qroup

Prerequisites and co-requisites:

Basic skills in mathematics.

Recommended optional programme components:

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

Recommended or required reading:

H. D. Young and R. A. Freedman, University Physics, Addison-Wesley, 2000 ja 2004, F. L. Pedrotti ja L. S. Pedrotti, Introduction to optics, Prentice-Hall, 2. ed., 1993 ja E. Hecht, Optics, (3rd ed.), Addison Wesley Longman, 1998.

Assessment methods and criteria:

Two written intermediate examinations or one final examination

Grading:

Numerical grading scale 0 – 5, where 0 is fail

Person responsible:

Seppo Alanko

Working life cooperation:

No work placement period

Other information:

Includes parts:
761310A-01 Wave motion and optics, lectures and exam
761310A-02 Wave motion and optics, lab. exercises

Compulsory

761310A-01: Wave motion and optics, lectures and exam, 0 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opettajat: Seppo Alanko
Opintokohteen kielet: Finnish
Leikkaavuudet:

766349A	Wave motion and optics	7.0 op
761114P	Wave motion and optics	5.0 op
761114P-01	Wave motion and optics, lectures and exam	0.0 op
761114P-02	Wave motion and optics, lab. exercises	0.0 op
766329A	Wave motion and optics	6.0 op
761104P	Wave Motion	3.0 op

Language of instruction:

Finnish. The course material and exercises are available in English.

Timing:

Firts spring

Learning outcomes:

The student is able to treat different types of waves by methods of general theory of wave motion. The student is also able to solve problems related to basic optics and apply her/his knowledge to teaching and research in physics.

Contents:

General principles of wave motion, sound, electromagnetic waves, propagation of light, image formation in mirrors and lenses, optical instruments, interference, Fraunhofer diffraction, diffraction grating.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 28 h, exercises 14 h, 2 laboratory exercises (3 hours/exercise), self-study 90 h

Target group:

No specific target qroup

Prerequisites and co-requisites:

Basic skills in mathematics

Recommended optional programme components:

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

Recommended or required reading:

H. D. Young and R. A. Freedman, University Physics, Addison-Wesley, 2000 ja 2004, F. L. Pedrotti ja L. S. Pedrotti, Introduction to optics, Prentice-Hall, 2. ed., 1993 ja E. Hecht, Optics, (3rd ed.), Addison Wesley Longman, 1998.

Assessment methods and criteria:

Two written intermediate examinations or one final examination

Grading:

Numerical grading scale 0 – 5, where 0 is fail

Person responsible:

Seppo Alanko

Working life cooperation:

No work placement period

761310A-02: Wave motion and optics, lab. exercises, 0 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

766349A	Wave motion and optics	7.0 op
761114P	Wave motion and optics	5.0 op
761114P-01	Wave motion and optics, lectures and exam	0.0 op
761114P-02	Wave motion and optics, lab. exercises	0.0 op
766329A	Wave motion and optics	6.0 op
761104P	Wave Motion	3.0 op

Ei opintojaksokuvauksia.

If you want to complete 60 ECTS cr in physics. Choose all the courses below

761309A: Mechanics 2, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work

Language of instruction:

Finnish

Timing:

Second year fall term

Learning outcomes:

Students can apply the Lagrange's and Hamilton's methods to various problems in classical mechanics, and are aware of their connection to quantum mechanics. They can explain why the theory of relativity is needed, apply the Lorentz-transformation, explain why faster-than-light signals do not exist, and undestand the equivalence between mass and energy.

Contents:

In the first of the course part we discuss the Lagrangian and Hamiltonian formulations of classical mechanics. They are alternative but equivalent ways to formulate the equations of motion that follow from Newtons laws. We will also encounter some new mathematical tools, such as calculus of variations, which can be used to solve various minimization problems. Possible symmetries and conservation laws are emphasized in the Lagrangian and Hamiltonian equations of motion, which often simplify the study of complex dynamical systems. Many important concepts in quantum mechanics have counterparts in the Lagrangian and Hamiltonian formulations of classical mechanics. In the second half of the course we go beyond the realm of Newtonian mechanics and study the principles of the (special) theory of relativity. We will derive the Lorentz-transformation of coordinates by starting from Einstein's basic assumptions, and study motion in flat spacetime. Among other things we will derive the equivalence of mass and energy (E=m*c^2) and discuss various apparent paradoxes.

Mode of delivery:

face-to-face teaching

Learning activities and teaching methods:

Lectures 28 h, 7 exercises (14 h), self-study 91 h

Target group:

For the students of the University of Oulu

Prerequisites and co-requisites:

Basics of differential and integral calculus. Mechanics 1.

Recommended optional programme components:

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

Recommended or required reading:

Lecture notes in Finnish. Other recommended material will be specified later.

Assessment methods and criteria:

Two written intermediate examinations or one final examination.

Grading:

Numerical grading scale 0 – 5, where 0 = fail

Person responsible:

Heikki Vanhamäki

Working life cooperation:

No work placement period

Other information:

Lectured for the 1st time during period 1 in autumn 2018.

761120P: Laboratory Exercises in Physics 2, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

766106P Laboratory exercises in physics 2 4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work

Language of instruction:

Finnish

Timing:

1. spring - 3. autumn

Learning outcomes:

After completing the course, the student can rather independently work with the most important measuring instruments used in physics and has experience in planning and conducting different measurements. The student is also able to critically assess her/his own results and report them to a group of peers.

Contents:

The laboratory exercises (0,5 ECTS per exercise) train the student in applying measurements to research into different physical phenomena. The exercises include practising how to plan the measurements, learning how to use the measuring instruments, processing and assessing the results, and drawing up scientific reports. Some of the exercises can be chosen according to the student´s own interest.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Per one exercise, 4 h of measurements in the laboratory and 5-9 h of preparation and drawing up a report independently.

Target group:

No specific target qroup

Prerequisites and co-requisites:

Recommended: 761121P/761115P Laboratory exercises in physics 1.

Recommended optional programme components:

Each exercise is closely related to a basic or intermediate course in physics, because the phenomena connected to the measurements and their theory are discussed in the lectures for the courses.

Recommended or required reading:

The exercise work instructions and guidelines for the work report, which can be found on the website of the course.

Assessment methods and criteria:

Adequate familiarization with the phenomenon under scrutiny and the measurements before the exercise (oral or written questions), successfully completing the guided measurements, reporting on the exercise (the work report 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:

Seppo Alanko

Working life cooperation:

No work placement period

Other information:

Course webpage

761312A: Electromagnetism 2, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opettajat: Anita Aikio
Opintokohteen kielet: Finnish
Leikkaavuudet:

766319A Electromagnetism 7.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work

Language of instruction:

Finnish

Timing:

Second spring term

Learning outcomes:

The student will be able to derive the individual results like electric fields produced by charge distributions, magnetic field by current systems and solve problems related to electromagnetic induction. The student can derive the wave equation for electromagnetic waves.

Contents:

The foundations of the electromagnetic field theory. Exact contents to be specified later.

Mode of delivery:

face-to-face teaching

Grading:

Numerical grading scale 0 – 5, where 0 = fail

Person responsible:

Anita Aikio

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

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:

Textbooks: H. D. Young and R. A. Freedman: University Physics, 13th edition, Pearson Addison-Wesley, 2012, or earlier editions (in part), R. Eisberg and R. Resnick: Quantum physics of atoms, molecules, solids, nuclei, and particles, John Wiley & Sons (in part). Additional material available from the web pages of the course.
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:

Minna Patanen

Working life cooperation:

No work placement period

Other information:

Course website

763343A: Solid state 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 Structure of matter 6.0 op
766330A-02 Structure of matter, part 2: Nuclear and particle physics 0.0 op
766330A-01 Structure of matter, part 1: Solid state physics 0.0 op
763333A Structure of matter I 4.0 op

ECTS Credits:

5 ECTS cr

Language of instruction:

Finnish

Timing:

2nd spring

Learning outcomes:

To learn to explain the basics of solid state physics such as lattice structure, binding interactions, lattice vibrations, band structure and its effect on conductivity, conductivity of semiconductors, the interaction between light and matter, magnetism and superconductivity, and to apply these to different materials.

Contents:

The rapid development of technology is largely based on understanding the properties of the solid state. There are many interesting phenomena in solid state physics, which are consequences of very large number of particles and their interactions. The course starts with symmetry of crystal lattices and their experimental determination. Different binding forces of solids are discussed. Lattice vibrations and their contribution to specific heat are studied. Especial emphasis is put on electronic structure, and it is used to explain the electric conduction in metals, insulators and semiconductors. Also experimental methods, magnetism and superconductivity are discussed.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 30 h, 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:

E. Thuneberg: Kiinteä aineen fysiikka (lecture notes), C. Kittel: Introduction to solid state physics.

Assessment methods and criteria:

Examination

Grading:

Numerical grading scale 0 – 5, where 0 = fail

Person responsible:

Matti Alatalo

Working life cooperation:

No work placement period

Other information:

https://noppa.oulu.fi/noppa/kurssi/763343a/

Obligatory for subject teacher

761316A: Being a teacher in mathematical subjects, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opettajat: Saana-Maija Aho
Opintokohteen kielet: Finnish
Leikkaavuudet:

766339A	Physics for teachers	5.0 op
766338A	Physics for teachers	4.0 op

Ei opintojaksokuvauksia.

A325304: Theoretical Physics Minor, 25 op

Opiskelumuoto: Basic Studies
Laji: Study module
Vastuuyksikkö: Field of Physics
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

Intermediate studies in theoretical physics

763312A: Quantum mechanics I, 10 op

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

763612S	Quantum mechanics I	10.0 op

ECTS Credits:

10 ECTS cr

Language of instruction:

Finnish / English depending on the audience

Timing:

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).
Course material availability can be checked here.

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

763313A: Quantum mechanics II, 10 op

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

763613S	Quantum mechanics II	10.0 op

ECTS Credits:

10 ECTS cr

Language of instruction:

English (or Finnish, depending on the participants)

Timing:

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). Course material availability can be checked here.

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

A320305: Tourism Studies, 25 op

Opiskelumuoto: Basic Studies
Laji: Study module
Vastuuyksikkö: Field of Geography
Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

ayA320305 Tourism Studies (OPEN UNI) 25.0 op

Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

Compulsory

790160P: Introduction to Tourism Geography, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Saarinen, Jarkko Juhani

Opintokohteen kielet: Finnish

Leikkaavuudet:

790160A Introduction to tourism geography 5.0 op

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Timing:

1st year, 1st semester.

Learning outcomes:

Student will learn about the toursim phenomenon and its regional and development characteristics and impacts. After the course the student can define and interpret different aspects of the tourism geography and its subject matters.

Contents:

Basic concepts of the tourism phenomena, spatial characteristics of tourism and its development aspects.

Mode of delivery:

Face-to-face learning.

Learning activities and teaching methods:

16 h lectures, exam.

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 Tourism studies.

Recommended or required reading:

- Hall, C.M., Muller, D.K. and J. Saarinen (2009). Nordic Tourism: Issues and Cases.
- Hall, C.M. and S. Page (1999 or later edition). The Geography of Tourism and Recreation - Environment, Place and Space (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:

Jarkko Saarinen

Working life cooperation:

No

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:

Virtual lectures/ppts, reader, short weekly learning diaries, group discussions, and a final assignment, which is also peer-evaluated.

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.

Prerequisites and co-requisites:

-

Recommended optional programme components:

Course is part of minor studies tourism geography.

Recommended or required reading:

Scientific articles, textbook chapters, development and other documents. Most of the course material will be provided via the course's Optima-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:

PhD Kaarina Tervo-Kankare

Working life cooperation:

No.

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:

16 hrs 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.

756347A: Conservation of biodiversity, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Phillip Watts
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:

B.Sc. 3rd autumn. NNE.

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:

Biology students. Students who are participating in environmental conservation or tourism minor.

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:

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724106P: Principles of Marketing, 5 op

Voimassaolo: 01.08.2014 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Oulu Business School
Arvostelu: 1 - 5, pass, fail
Opettajat: Satu Nätti
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay724106P	Principles of Marketing (OPEN UNI)	5.0 op
ay721409P	Principles of Marketing (OPEN UNI)	5.0 op
721409P	Principles of Marketing	5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 credits / 133 hours of work

Language of instruction:

Finnish

Timing:

Period C (1st year).

Learning outcomes:

Upon completion of this course, students are able to define the role of marketing in the organization, likewise define basic concepts of marketing (customer perceived value, value creation process, value-based market analysis and strategy, segmenting, targeting and marketing mix, for example). After completing this course, the student is able to differentiate variety of marketing logics in variety of contexts (for example, differences between consumer marketing and B-to-B marketing). The student is able to use concepts of marketing to aid decision making and evaluate the suitability of these decisions from customer viewpoint.

Contents:

During the course, following themes will be discussed: 1) Basic concepts and phenomena: e.g., value creation in customer relationships and marketing in different contexts, 2) Strategic tools of marketing and latest trends 3) Basics of consumer behavior, 4) Marketing and sustainable development, 5) B-to-B

marketing and sales, 6) integrated marketing communications, 7) Digital marketing, 8) Distribution channels.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

36 hours of lectures and visiting lecturer presentations, group-based business simulation and related group´s learning diary (20h), independent reading of the textbook and articles (77 h). This course can be passed by doing weekly learning assignments OR an exam.

Target group:

Major students in economics and business administration

Prerequisites and co-requisites:

-

Recommended optional programme components:

This course is part of “Introduction to business studies” -module

Recommended or required reading:

Kotler, P & Armstrong, G. (2013), Principles of marketing, 15th ed.

Assessment methods and criteria:

Group work (business simulation) and exam OR weekly learning assignements.

Grading:

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

Person responsible:

Professor of Marketing Satu Nätti and Doctoral Student Outi Keränen.

Working life cooperation:

Upon completion of this course, the student recognizes the meaning of customer-orientation in organizations and in one´s individual actions and professional development. Group work (business simulation) gives wide view on organization entity and activities, likewise understanding of the link between decision making, customer experience and consequent profitability of organization.

Other information:

The number of students is limited.

790165P: Substitutive course on Tourism, 3 - 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Saarinen, Jarkko Juhani

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay790165P	Substitutive course on Tourism (OPEN UNI)	5.0 op

Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.