Opasraportti

LuTK - Biology 2015 - 2016 (2015 - 2016)

Tutkintorakenteisiin kuulumattomat opintokokonaisuudet ja -jaksot

300003Y: Activities in university and student organizations, 1 - 4 op
300002M: Advanced Information Skills, 1 op
751635S: Advanced course in animal physiology, 8 op
757619S: Advanced course in bioinformatics, 5 op
752682S: Advanced course in plant biology, 9 op
751651S: Advanced identification in animals, 4 - 8 op
752608S: Advanced identification of plant species I, 6 op
752625S: Advanced identification of plant species II, 5 - 8 op
755626S: Advanced population ecology, 6 op
751666S: Animal behaviour, 5 op
751366A: Animal behaviour, 5 op
755327A: Animal physiology exercises, 5 op
755323A: Animal physiology lectures, 5 op
754625S: Assessment and monitoring of the ecological status of water bodies, 5 op
755608S: Avian reproductive biology, 2 op
750366A: Bachelor of Science final examination, 5 op
750332A: Bachelor of Science maturity exam, 0 op
750376A: Bachelor of Science seminar and thesis, 10 op
Compulsory
750376A-03: Bachelor of Science seminar and thesis, thesis, 0 op
750376A-02: Bachelor of Science seminar and thesis, workshop, 0 op
750376A-01: Bachelor of Science seminar and thesis, scientific writing, 0 op
751373A-02: Basic identification of animals, invertebrate, 0 op
751373A-01: Basic identification of animals, vertebrate, 0 op
752688S: Basic of plant tissue culture, 5 op
756351A: Basics in population ecology, 5 op
757314A: Basics of bioinformatics, 5 op
750124P: Basics of ecology, 5 op
752388A: Basics of plant tissue culture, 5 op
755631S: Biodiversity in human changed environments, 5 op
750373A: Biogeography, 5 op
Compulsory
750373A-01: Biogeography, animals, 0 op
750373A-02: Biogeography, plants, 0 op
750657S: Biology subject teacher pro gradu thesis, 20 - 40 op
752362A: Botanical collection, 2 - 6 op
752662S: Botanical collection, 2 - 6 op
750121P: Cell biology, 5 op
750121P-02: Cell biology, Botany, 0 op
750121P-03: Cell biology, Genetics, 0 op
750121P-01: Cell biology, Zoology, 0 op
755630S: Community ecology, 5 op
751384A: Comparative animal physiology, 8 op
751684S: Comparative animal physiology, 8 op

757109P: Concepts of genetics, 5 op
757122P: Concepts of genetics for biochemists, 3 op
756347A: Conservation of biodiversity, 5 op
756647S: Conservation of biodiversity, 5 op
757618S: DNA analysis in population genetics, 10 op
755317A: Developmental biology-histology, exercises, 5 op
755320A: Developmental biology-histology, lectures, 5 op
Compulsory
755320A-02: Developmental biology-histology, histology lectures, 0 op
755320A-01: Developmental biology-histology, Developmental biology lectures, 0 op
752672S: Distribution mapping of plants, 2 - 5 op
756348A: Ecological responses to global change and air pollution in the subarctic, 5 - 8 op
756648S: Ecological responses to global change and air pollution in the subarctic, 5 - 8 op
902002Y: English 1 (Reading for Academic Purposes), 2 op
902004Y: English 2 (Scientific Communication), 2 op
752175P: Environmental ecology, 5 op
750626S: Environmental impact assessment (EIA) and ecological inventory of natural resources, 5 op
750372A: Evolution and systematics of organisms, 5 op
750374A: Evolution, systematics and morphology of organisms, 3 op
750336A: Evolutionary ecology, 5 op
750149P: Examinations on optional topics in biology, 2 - 10 op
750349A: Examinations on optional topics in biology, 2 - 10 op
750649S: Examinations on optional topics in biology, 2 - 10 op
757621S: Experimental course in evolutionary genomics, 5 op
757110P: Experimental course in general genetics, 5 op
755321A: Field course in aquatic animals, 5 op
755621S: Field course in aquatic animals, 5 op
752342A: Field course in arctic-alpine ecology and vegetation, 5 op
752642S: Field course in arctic-alpine ecology and vegetation, 5 op
756643S: Field course in ecological botany, 5 op
756343A: Field course in ecological botany, 5 op
755322A: Field course in terrestrial animals, 5 op
755622S: Field course in terrestrial animals, 5 op
754626S: Field methods in freshwater biomonitoring, 5 op
750656S: Final examination in biology, 10 op
754623S: Final examination in hydrobiology, 5 op
755624S: Functional animal ecology, 5 op
755324A: Functional animal ecology, 5 op
756652S: Genetic transformation of plants, 5 - 8 op
757315A: Human genetics, 5 op
757615S: Human genetics, 5 op
751673S: Identification of animals, 5 op
751373A: Identification of animals, 5 op
756311A: Identification of garden plant species, 5 op
756642S: Identification of plant species, 3 - 4 op
756342A: Identification of plant species, 3 - 4 op
751642S: Identification of vertebrates in the field, 2 op
030005P: Information Skills, 1 op
754322A: Introduction to hydrobiology, 5 op
756650S: Introduction to molecular ecology, 5 op
Compulsory
756650S-02: Introduction to molecular ecology, exercises, 0 op
756650S-01: Introduction to molecular ecology, lectures, 0 op
750629S: Kaamos symposium, 2 - 4 op
750329A: Kaamos-symposium, 2 op
750316A: Legislation in environmental protection, 5 op
750616S: Legislation in environmental protection, 5 op
752316A: Macro fungi, 3 op
752616S: Macro fungi, 3 op
750678S: Master of science seminar, 5 op
750632S: Maturity exam, 0 op
755325A: Methods in ecology I, 5 op
755625S: Methods in ecology I, 5 op
755329A: Methods in ecology II, 5 op

755629S: Methods in ecology II, 5 op
757620S: Methods in genomics and genomics evolution, 5 op
750179P: Minor subject examination in biology, 5 op
752692S: Mire ecology, 5 op
752392A: Mire ecology, 5 op
757312A: Molecular evolution, 5 op
757611S: Molecular methods I, 5 op
757311A: Molecular methods I, 5 op
757617S: Molecular methods II, 5 op
750699S: Optional examinations in environmental protection, 2 - 6 op
750199P: Optional examinations in environmental protection, 2 - 6 op
750399A: Optional examinations in environmental protection, 2 - 6 op
750031Y: Orientation course for new students, 1 op
756615S: Physiology of forest trees, 5 op
756346A: Plant biology lectures, 5 op
756341A: Plant biology practicals, 5 op
756353A: Plant developmental biology, 5 op
756344A: Plant ecology, 5 op
756644S: Plant ecology, 5 - 7 op
756604S: Plant ecophysiology in changing environments, 5 op
756304A: Plant ecophysiology in changing environments, 5 op
756627S: Plant hormones, 5 op
750615S: Practical training, 10 - 15 op
751660S: Preparation of an insect collection, 2 - 6 op
750658S: Pro gradu thesis in biology, 40 op
757616S: Quantitative genetics and plant and animal breeding, 5 op
750661S: Research group seminar, 2 - 4 op
750613S: Research training, 2 - 15 op
750313A: Research training, 2 - 15 op
755632S: Restoration ecology, 5 op
901035Y: Second Official Language (Swedish), Oral Skills, 1 op
901034Y: Second Official Language (Swedish), Written Skills, 1 op
756612S: Soil ecology, 3 - 5 op
754627S: Special course in aquatic invertebrates, 5 op
750654S: Special lecture in biology, 2 - 5 op
750653S: Special seminar in biology, 2 - 5 op
754628S: Stream ecology, 5 op
756626S: Stress physiology of plants, 4 op
756622S: Structure and dynamics of plant communities, 5 op
750133P: Studies in biology abroad, 1 - 60 op
750633S: Studies in biology abroad, 1 - 60 op
750333A: Studies in biology abroad, 1 - 60 op
750155P: Studies in biology in other Finnish universities, 1 - 60 op
750355A: Studies in biology in other Finnish universities, 1 - 60 op
750655S: Studies in biology in other Finnish universities, 1 - 60 op
756649S: Symbiosis, 5 op
752656S: Taxonomy and ecology of plants, 2 - 4 op
750618S: Thursday seminar in biology, 2 op
750318A: Thursday seminar in biology, 2 op
750033Y: Tutorial for new students, 1 op
040911S: Using animals in research - carrying out procedures, 3 op
755628S: Wildlife management and game animal ecology, 5 op
755328A: Wildlife management and game animal ecology, 5 op
750677S: Winter ecology and physiology, 5 op
750377A: Winter ecology and physiology, 5 op

Opintojaksojen kuvaukset

Tutkintorakenteisiin kuulumattomien opintokokonaisuuksien ja -jaksojen kuvaukset

300003Y: Activities in university and student organizations, 1 - 4 op

Voimassaolo: 01.01.2010 -
Opiskelumuoto: General Studies
Laji: Course
Vastuuyksikkö: Faculty of Science
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

300002M: Advanced Information Skills, 1 op

Voimassaolo: 01.08.2009 -
Opiskelumuoto: Other Studies
Laji: Course
Vastuuyksikkö: Faculty of Science
Arvostelu: 1 - 5, pass, fail
Opettajat: Sassali, Jani Henrik
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

751635S: Advanced course in animal physiology, 8 op

Voimassaolo: - 31.07.2019
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Hohtola, Esa Juhani
Opintokohteen kielet: Finnish

ECTS Credits:
8 ECTS credits / 213 hours of work.
Language of instruction:
Finnish / (English).
Timing:
M.Sc. 1 st autumn.
Learning outcomes:
After completing the course the student is able to plan and execute small physiological research projects as well as analyze, interpret and report the results in scientific format. The course thus trains the student for preparing his /her master’s thesis.
Contents:
The course comprises of 2-3 extensive laboratory exercises that are carried out as small research projects. The exercises can be from any area of physiology. The students will themselves plan the schedule for the experiment, and write the results in the form of a scientific publication. The report will be presented in a concluding seminar either as an oral presentation or poster.
Mode of delivery:

Face-to-face teaching.
Learning activities and teaching methods:
Laboratory work, group meetings, report, writing, seminar.
Target group:
Compulsory to BSz, exchange students.
Prerequisites and co-requisites:
Animal physiology lectures and exercises (751388, 755318A), Comparative animal physiology (751x84A/S) and Laboratory, instrumentation and measurement techniques (750x22A/S).
Recommended optional programme components:
-
Recommended or required reading:
The required scientific articles and other material will be distributed during the course.
Assessment methods and criteria:
Exercises, reports and final seminar.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Esa Hohtola.
Working life cooperation:
No.
Other information:
-

757619S: Advanced course in bioinformatics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

753629S	Advanced course in bioinformatics	4.0 op

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

Target group:
Bioscience M.Sc.
Prerequisites and co-requisites:
Basics of bioinformatics (757314A) or equivalent knowledge, Introduction to population genetics (757313A), Molecular evolution (757312A).
Recommended optional programme components:
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Recommended or required reading:
Good guide for much of this is the De Wit P. et al 2012: The simple fool's guide to population genomics via RNA-Seq: an introduction to high-throughput sequencing data analysis. Molecular Ecology Resourses. Molecular Ecology Resources. Volume 12, Issue 6, pages 1058–1067, November 2012 and other course material.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Continuous assessment, learning diary and project report.
Grading:
1-5 / Fail.
Person responsible:
Phillip Watts
Working life cooperation:
No.
Other information:
-

752682S: Advanced course in plant biology, 9 op

Voimassaolo: - 31.07.2018

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha, Anna-Maria Pirttilä

Opintokohteen kielet: Finnish

ECTS Credits:
9 ECTS credits / 240 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st or 2 nd spring, every second year.
Learning outcomes:
The student will be able to evaluate how gene expression affects plant development and metabolism, learns both holistic and specific methods of studying gene expression. She/he is also able to evaluate and analyze the reliability of the data achieved. The student will also be familiar with the most recent literature of the field.
Contents:
Due to the new sequencing technologies the amount of sequence data will increase rapidly. The course will focus on gene expression and especially on regulation of gene expression (transcription factors, RNAi, microRNAs, genome level regulation, histone acetylation, and methylation). Research methods at transcriptome, proteome and metabolome level will be included as well as qualitative and quantitative methods both at single gene level but also at global level. The exercises include methodology used in gene expression analyses. The seminars will familiarize in the most recent literature.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
30 h lectures and seminar, 68 h exercises (demonstrations included), reports, final exam.
Target group:
BSb: compulsory MSc studies either course Advanced course in plant biology (752682S) 9 cr or Genetic transformation of plants (756625S) 8 cr.
Prerequisites and co-requisites:
Basics of functional plant biology lectures and exercises (752345A, 756341A) and Molecular methods I (750364A) or equivalent knowledge.
Recommended optional programme components:

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Recommended or required reading:
Taiz, L. & Zeiger, E. (2010) Plant Physiology (5th ed.) Sinauer Ass., Sunderland Mass.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Reports, exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Hely Häggman (lectures) and Doc Anna Maria Pirttilä (excercises).
Working life cooperation:
No.
Other information:
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751651S: Advanced identification in animals, 4 - 8 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Orell, Markku Ilmari

Opintokohteen kielet: Finnish

ECTS Credits:
4-8 ECTS credits / 107-213 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st autumn.
Learning outcomes:
Student is able to identify special animal groups or species from museum samples and know the ecology and distribution in Finland.
Contents:
Identification of special animal groups (fishes; amphibian and reptiles; birds; mammals; some group of invertebrates), their ecology and distribution.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Independent study, oral final exam.
Target group:
ECOe.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Suomen eläimet 1-3; Suomen luonto: Linnut; Nisäkkäät; Kalat, Sammakkoeläimet ja matelijat, Koli, L.: Suomen kalat, Siivonen, L. & Sulkava, S.: Pohjolan nisäkkäät or relevant literature in English.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Oral exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Markku Orell.
Working life cooperation:
No.
Other information:

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752608S: Advanced identification of plant species I, 6 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Anna Ruotsalainen
Opintokohteen kielet: Finnish

ECTS Credits:
6 ECTS credits / 160 hours of work.
Language of instruction:
Finnish / English
Timing:
B.Sc. 3 rd year, M.Sc. 1 st year.
Learning outcomes:
Advanced identification of the vascular plants of Finland.
Contents:
Independent studying of herbarium samples. Distribution types of plants in Fennoscandia excluding the Russian parts.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Independent studying of herbarium samples. The course could be examined in two parts: 1) monocots, 2) ferns, dicots and distributions.
Target group:
-
Prerequisites and co-requisites:
Identification of plant species (752303A) or equivalent knowledge.
Recommended optional programme components:
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Recommended or required reading:
Hämet-Ahti et al. 1998: Retkeilykasvio (Field Flora of Finland), Ed. 4. Finnish Museum of Natural History, Helsinki. 656 p.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Species exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Dr. Anna Liisa Ruotsalainen.
Working life cooperation:
No.
Other information:
-

752625S: Advanced identification of plant species II, 5 - 8 op

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

ECTS Credits:
5-8 ECTS credits / 133-213 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st or 2 nd year.
Learning outcomes:
Identification of systematically or ecologically limited groups. For example macrofungi, mosses, lichens, phytoplankton, aquatic, shore, forest, meadow, peatland or fell plants, species of primeval forest and macroscopic plant remains.
Contents:
Identification of systematically or ecologically limited groups from herbarium samples and preparates. Lichens 8 cr., others 5 cr.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Independent studying of herbarium samples or preparations, species exam.
Target group:
Ecology students.
Prerequisites and co-requisites:
Identification of plant species (752303A).
Recommended optional programme components:
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Recommended or required reading:
Literature related to the topic.
Assessment methods and criteria:
Species exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Dr. Anna Liisa Ruotsalainen.
Working life cooperation:
No.
Other information:
-

755626S: Advanced population ecology, 6 op

Voimassaolo: 01.08.2015 - 31.07.2019

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Orell, Markku Ilmari

Opintokohteen kielet: Finnish

Leikkaavuudet:

755636S	Population ecology	10.0 op
755607S	Population ecology	7.0 op

ECTS Credits:
6 ECTS credits / 160 hours of work.
Language of instruction:
Finnish.
Timing:
M.Sc. 1 st autumn.
Learning outcomes:
Student learns central methodologies how to derive population vital parameters from various kind of long-term data to apply the information to population viability analysis. The focus is to link modeling methods to real data.

Contents:
Introduction to the mechanisms and factors, which affect the structure, size and dynamics of a population. Topics include e.g. intraspecific relationships of species, predator-prey and parasite-host interactions, competition and the structure of environment and changes in it. Information of the relations between age distribution, birth rate, mortality rate and migration of the population are needed in viability analyses of a population. The aim of the course is to initiate into the methods by which the data of individuals is leaden to the parameters describing the condition and dynamics of the population.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
36 h lectures, 33 h computer exercises, independent work, exam.
Target group:
ECOz: compulsory.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Supplementary reading Morris, W.F & Doak, D.F. Quantitative conservation biology. Theory and practice of population viability analysis. Akçakaya, H.R., Burgman, M.A. & Ginzburg, L.R. Applied population ecology. Principles and computer exercises using RAMAS ® EcoLab. Lande, R., Engen,S. & Sæther, B-E. Stochastic population dynamics in ecology and conservation. The availability of the literature can be checked from this link.
Assessment methods and criteria:
Exam. Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Markku Orell.
Working life cooperation:
No.
Other information:
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751666S: Animal behaviour, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kaitala Arja

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 3 rd spring or M.Sc. 1 st spring ECOz.
Learning outcomes:
To understand basic principles of animal behaviour in an evolutionary ecology contest.
Contents:
The basics of behavioural ecology of animals. Lecture topics: Animal foraging, predator-pray interactions, mating systems, and social behaviour. Seminars are based on the latest research results.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
30 h lectures, seminars, final exam.
Target group:
B.Sc. degree optional to ECO, M.Sc. degree compulsory to ECOz.
Prerequisites and co-requisites:
No.

Recommended optional programme components:
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Recommended or required reading:
Davis, NB, Krebs, JR, & West, SA N.B. (2012) An Introduction to Behavioural Ecology, 4th ed, Wiley-Blackwell.
The availability of the literature can be checked from this link
Assessment methods and criteria:
Seminar and exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Arja Kaitala.
Working life cooperation:
No.
Other information:
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751366A: Animal behaviour, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kaitala Arja

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 3 rd spring, M.Sc. 1 st spring ECOz.
Learning outcomes:
To understand basic principles of animal behaviour in an evolutionary ecology contest.
Contents:
The basics of behavioural ecology of animals. Lecture topics: Animal foraging, predator-pray interactions, mating systems, and social behaviour. Seminars are based on the latest research results.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
30 h lectures, seminars, exam.
Target group:
B.Sc. degree optional to ECO, M.Sc. degree compulsory to ECOz.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
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Recommended or required reading:
Davis, NB, Krebs, JR, & West, SA N.B. (2012) An Introduction to Behavioural Ecology, 4th ed, Wiley-Blackwell.
The availability of the literature can be checked from this link
Assessment methods and criteria:
Seminar and exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Arja Kaitala.
Working life cooperation:
No.
Other information:
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755327A: Animal physiology exercises, 5 op

Voimassaolo: 01.08.2015 - 31.07.2017
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

755318A Animal physiology, exercises 4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 3 rd autumn.
Learning outcomes:
Students know basic physiological methods and can design simple experiments.
Contents:
The laboratory course will familiarize students with the use of simple experimental trials, laboratory tests and computer aided measurements the physiological basic principles.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
32 h laboratory training, exam.
Target group:
BS compulsory, TEAbs optional.
Prerequisites and co-requisites:
Cell biology (750121P) and Animal physiology, lectures (751388A).
Recommended optional programme components:
This course is a prerequisite for the courses Comparative animal physiology (751x84A/S), and Advanced animal physiology (751635S).
Recommended or required reading:
Animal physiology course booklet.
Assessment methods and criteria:
Exam. Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Working life cooperation:
No.
Other information:
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755323A: Animal physiology lectures, 5 op

Voimassaolo: 01.08.2015 - 31.07.2020
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

751388A Animal physiology, lectures 4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 2nd spring.
Learning outcomes:
After completing the course the student is able to form a general view of animal body functions, the regulation of organ systems, and the background of human health and diseases.
Contents:
Course focus on the basic problematic of physiological themes including nervous system, muscles, circulation, nutrition, metabolism, immune system, hormones and reproduction physiology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
50 h lectures and independent studying, mid-semester exams, home essays.
Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
Cell biology (750121P) or equivalent knowledge.
Recommended optional programme components:
This course is a prerequisite for the courses Animal physiology, exercises (755318A), Comparative animal physiology (751x84A/S) and Advanced course in animal physiology (751635S).
Recommended or required reading:
Reece, J.B. Urry, L.A. Cain, M.L., Wasserman, S.A. Minorsky, P.V. & Jackson R.B. 2011: Campbell Biology (9e). Pearson, Global Edition, 1309 p, handouts. The availability of the literature can be checked from this link.
Assessment methods and criteria:
Home essays and exam. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.

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

754625S: Assessment and monitoring of the ecological status of water bodies, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Muotka, Timo Tapani

Opintokohteen kielet: Finnish

Leikkaavuudet:

754613S	Assessment and monitoring of the ecological status of water bodies	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 3 rd or M.Sc. 1 st autumn, arranged if resources allow.
Learning outcomes:
The aim of this course is to give basic knowledge on the methods of typology, ecological status assessment, classification and biomonitoring of rivers and lakes.
Contents:

Theoretical and practical methods for setting environmental objectives and quality standards for surface waters will get acquainted.
Mode of delivery:
Blended teaching.
Learning activities and teaching methods:
20 h lectures, literature, learning assignment, final exam.
Target group:
ECOz, ECOb.
Prerequisites and co-requisites:
Field course in aquatic animals (751307A) and Basic course in hydrobiology (754308A) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Handouts, Internet material.
Assessment methods and criteria:
Final 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:
-

755608S: Avian reproductive biology, 2 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jukka Forsman, Seppo Rytkönen, Orell, Markku Ilmari

Opintokohteen kielet: Finnish

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

Grading:
1-5 / Fail.
Person responsible:
Prof. Markku Orell and Dr. Seppo Rytkönen.
Working life cooperation:
No.
Other information:
-

750366A: Bachelor of Science final examination, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 3 rd year.
Learning outcomes:
Student will understand basic methods, results and theories in ecology, physiology or genetics.
Contents:
Examinations on books related to B.Sc. thesis subject. List of books are presented on WebOodi. All the books are recommended to be are done on the same exam.

Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Students make workshops where they discuss content of the books. Book exam (4 h). Exam is held in Examinarium, instructions: http://www.oulu.fi/english/studying/examinarium

Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
BSz:

- Option 1: Randall etc.: Eckert's Animal Physiology, 5. ed., 2002 or newer, (chapter 4 onwards).
- Option 2: Richard W. Hill, Gordon A. Wyse, and Margaret Anderson: Animal Physiology, 2. ed., Sinauer Press, 2008.
- Other books can be agreed on special reasons with prof. Esa Hohtola.

BSg

- Klug, W. S., Cummings, M. R., Spencer, C.A ja Palladino M.A.: Concepts of Genetics (10. ed.). Pearson & Prentice Hall, 2012
  OR
- Klug, W. S., Cummings, M. R., Spencer, C.A ja Palladino M.A.: Concepts of Genetics (11. ed.). Pearson & Prentice Hall, 2015
  Remember to mention the book edition to the teacher which book edition you read.
- responsible teacher dos. Helmi Kuittinen

BSb:

- Option 1: Ridge, I. 2002. Plants. Oxford University Press, 344 p. ISBN 0-19-925548-2
- Option 2: Mauseth, J.D. 2009. An introduction to plant biology. 4th ed.
- Other books can be agreed on special reasons with prof. Hely Häggman.

ECOz:
Exam book ensemble (5 cr.) is chosen from the following list:

- Bennett, P.M. & Owens, I.P.F. 2002. Evolutionary ecology of birds. Life histories, mating systems and extinction. – Oxford University Press. 206 p.
- Hanski, I . 2007. The Scrinking world. (2 cr.)
- Jarvis, P. 2000. Ecological principles and environmental issues. – Prentice Hall, 279 p.
- Davies, N.B. Krebs, J.R. & West, S.A. 2012. An introduction to behavioural ecology. – Blackwell, 441 p. (4 cr).
- Mayr, E. 1999. Biologia. Elämän tiede. – Art House, 327 p. (2 cr.)
- Pianka, E. R. 2000. Evolutionary ecology. – Harper & Row, 429 p.
- Townsend, C.R., Begon, M. & Harper, J.L. 2008. Essentials of ecology. – Blackwell. 482 p.
- Smith, J.N.M., Keller, L.F., Marr, A.B. & Arcese, P. 2006. Conservation and biology of small populations. – Oxford University Press. 205 p.
- Other books can be agreed on special reasons with prof. Markku Orell

ECOb:

- Larcher W. 2003. Physiological Plant Ecology 4th edition, 513 p.
- Ridge I. (Ed.) 2002. Plants. Oxford University Press, 345 p.
- Salonen V. 2006. Kasviekologia. 306 p., WSOY.
- Willis K.J. and McElwain J.C. 2002. The evolution of plants. 378 p. Oxford University Press.
- Scott Peter 2008. Physiology and Behaviour of Plants. Wiley, 305 p.
- Timonen, S & Valkonen, J. 2013. Sienten biologia. Gaudeamus, 448 p.
- Other books can be agreed on special reasons with prof. Jari Oksanen

The availability of the literature can be checked from this link.

Assessment methods and criteria:
Exam in Examinarium: http://www.oulu.fi/english/studying/examinarium
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Esa Hohtola, Prof. Hely Häggman, Prof. Jari Oksanen, doc. Helmi Kuittinen and Prof. Markku Orell.
Working life cooperation:
No.
Other information:
-

750332A: Bachelor of Science maturity exam, 0 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
0 ECTS credits / 2-4 hours of work.
Language of instruction:
Finnish / Swedish / English.
Timing:
B.Sc. degree.
Learning outcomes:
The student is well acquainted with the subject of the thesis and shows good first language skills.
Contents:
After completing the Bachelor of Science Thesis, the student writes an essay in his/her native language on the thesis, to show a good command of the language and the topic of the thesis.

Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Detailed instructions on Noppa. Four pages long essay exam. One teacher examine the maturity exam and Pro gradu working group accepts it. 4 h exam.

Target group:
Compulsory to the biology students. Exam is taken after completion of the thesis.

Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Four pages long essay.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Professor of the student's major subject.
Working life cooperation:
No.
Other information:
-

750376A: Bachelor of Science seminar and thesis, 10 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

750396A	Bachelor of Science seminar	3.0 op

ECTS Credits:
10 ECTS credits / 267 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 3 rd year.
Learning outcomes:
Student will plan and write up thesis by getting acquainted to an interesting biology subject and reviewing it critically with the help of relevant scientific source material.
Contents:
Independent research work on a scientific subject in agreement with the responsible professor and under the supervision of the Department. The supervisors may be professors of the department, docents and other teachers and researchers who have the docent's status. The student may have several supervisors, the other supervisor may be from other department, university (also abroad) or from research institute. The subject must be agreed on with the professor in advance. The research work can contain fieldwork, laboratory work, theoretical work or work on collections in museum. The work always includes a literature survey. After having completed the thesis, the student writes the Maturity Exam. The dean will order the examiners by the proposal of the professor. Pro gradu working group accepts and grades the thesis on the basis of the examiners' opinions.
List of the actual B.Sc. thesis topics is on Noppa.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
About 20 pages long thesis.
Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
Done at the same time as B.Sc. seminar workshop in spring.
Recommended or required reading:
-

Assessment methods and criteria:
Thesis. Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Professors.
Working life cooperation:
No.
Other information:
-

Compulsory

750376A-03: Bachelor of Science seminar and thesis, thesis, 0 op

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

Ei opintojaksokuvauksia.

750376A-02: Bachelor of Science seminar and thesis, workshop, 0 op

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

750396A-02	Bachelor of Science seminar, presentation and scientific communication.	0.0 op

Ei opintojaksokuvauksia.

750376A-01: Bachelor of Science seminar and thesis, scientific writing, 0 op

Voimassaolo: 01.08.2015 - 31.07.2017
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

750396A-01	Bachelor of Science seminar, scientific review	0.0 op

Ei opintojaksokuvauksia.

751373A-02: Basic identification of animals, invertebrate, 0 op

Voimassaolo: - 31.07.2016
Opiskelumuoto: Intermediate Studies
Laji: Partial credit

Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Panu Välimäki, Marko Mutanen
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

751373A-01: Basic identification of animals, vertebrate, 0 op

Voimassaolo: - 31.07.2016
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Pudas, Tuula Kaarina, Kari Koivula
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

752688S: Basic of plant tissue culture, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Häggman, Hely Margaretha, Anna-Maria Pirttilä
Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 2 nd or M.Sc. 1 st autumn.
Learning outcomes:
The course aims to help students learn to basic plant tissue culture concepts, to establish tissue culture systems and to understand totipotency.
Contents:
Preparation of culture media and establishment of sterile cultures starting from different plant organs and tissues. Cytodifferentiation and viability tests are also included in the course. Students are able to follow how plant hormones determine the differentiation of tissues.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
8 h lectures, 35 h demonstrations and exercises, literature work, seminar.
Target group:
Optional to BS in the B.Sc. degree, compulsory to BSb in the M.Sc. degree.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
Course gives ability to further studies in molecular biology.
Recommended or required reading:
Course handout the book: Collin, H. A. & Edwards, S. 1998: Plant Cell Culture. Bios Scientific Publ.
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. Hely Häggman and Doc. Anna Mari Pirttilä..
Working life cooperation:
No.
Other information:
-

756351A: Basics in population ecology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kvist, Laura Irmeli, Orell, Markku Ilmari

Opintokohteen kielet: Finnish

Leikkaavuudet:

755336A	Population ecology	10.0 op
756323A	Population biology of plants	5.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
BSc. 3 rd autumn.
Learning outcomes:
Basic skills in methods of population biology.
Contents:
Demography and life history strategies of plants with emphasis on dynamics of structured plant populations in space and time. Moreover, ecological and evolutionary genetics of plants and interactions between plants and their environment are addressed. In exercises dynamics of populations is analysed with matrix models and simulation programs.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
32 h lectures, 18 h computer exercises, seminar.
Target group:
ECO: compulsory.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Silvertown & Charlesworth 2001: Introduction to Plant Population Biology (4 th edition), Blackwell Science.
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. Markku Orell and Dr. Laura Kvist
Working life cooperation:
No.
Other information:
-

757314A: Basics of bioinformatics, 5 op

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

750340A Basics of bioinformatics 3.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. studies, 2nd spring.
Learning outcomes:
After the course the student knows and is able to use the basic methods for handling the nucleotide and protein sequences. The aim is that the student learns how to use the databases, understands the background and principles of the analytic methods, is able to take up a critical attitude towards the used methods and gets a good background for applying new methods that are developed continuously.
Contents:
Searching of material from the databases, inferring the function of a gene and structure of a protein based on sequence data, comparing the sequences and evaluating the differences between them as well as examining the evolution history of the genes.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
12 h lectures, 2 h seminar, 20 h exercises, independent work.
Target group:
BT: compulsory, recommended for all biologists. Suitable also for biochemists.
Prerequisites and co-requisites:
Course Concepts of genetics (753124P) compulsory, also Molecular evolution (753327A) is recommended.
Recommended optional programme components:
-
Recommended or required reading:
Pevsner, Jonathan 2009: Bioinformatics and Functional Genomics.Wiley-Blackwell, cop. 2009.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Reports or exam, exercises, seminar presentation, independent work and student activity. Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Dr. Tanja Pyhäjärvi.
Working life cooperation:
No.

750124P: Basics of ecology, 5 op

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

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 1 st spring.
Learning outcomes:
After completion of the course both biology and minor studies students understand better function of nature and the ecological phenomena in individual, population, community and ecosystem level.
Contents:
The course gives a student a basic idea about ecological interactions in individual-, population-, community- and ecosystem levels. In individual level the focus is on environmental demands of plants and animals. In population level the birth- and death rate of age groups and their effect on population growth is focused. In interactions between different species the emphasis is on how the competition between species leads to differentiation of niches. Predation is viewed as the regulatory effect on the population dynamics of prey populations. In community level the biodiversity and the patterns of succession are the main questions. In ecosystem level the emphasis is on energy flows and nutrient cycling. Evolution and adaptation are important in different fields of ecology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
The course is divided into three parts which follow the course book Krebs, C. J. 2009: Ecology (6 th edition). 1 st part: 24 hours of lectures based mainly on parts 1-2 of the course book. 2 nd part: 24 hours of lectures are based on part 3 of the course book. 3 rd part: students read the part 4 from the course book. In the course exam, there will be three questions, one from each part and all the questions have to be passed.
Target group:
Compulsory biology students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Krebs, C. J. 2009: Ecology (6 th edition). Part I.
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. Markku Orell and Prof. Jari Oksanen.
Working life cooperation:
No.
Other information:
-

752388A: Basics of plant tissue culture, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha, Anna-Maria Pirttilä

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 2 nd or M.Sc. 1 st autumn.

Learning outcomes:
The course aims to help students learn to basic plant tissue culture concepts, to establish tissue culture systems and to understand totipotency.
Contents:
Preparation of culture media and establishment of sterile cultures starting from different plant organs and tissues. Cytodifferentiation and viability tests are also included in the course. Students are able to follow how plant hormones determine the differentiation of tissues.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
8 h lectures, 35 h demonstrations and exercises, essay, seminar.
Target group:
B.Sc. degree BS: optional, M.Sc. degree BSb: compulsory.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
Course gives ability to further studies in molecular biology.
Recommended or required reading:
Course handout the book: Collin, H. A. & Edwards, S. 1998: Plant Cell Culture. Bios Scientific Publ.
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. Hely Häggman and Doc. Anna Mari Pirttilä.
Working life cooperation:
No.
Other information:
-

755631S: Biodiversity in human changed environments, 5 op

Voimassaolo: 01.08.2015 - 31.07.2019
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Muotka, Timo Tapani, Orell, Markku Ilmari, Jouni Aspi
Opintokohteen kielet: Finnish
Leikkaavuudet:

750635S	Biodiversity in human changed environments	3.0 op

Ei opintojaksokuvauksia.

750373A: Biogeography, 5 op

Voimassaolo: 01.08.2015 - 31.07.2019
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Jari-Heikki Oksanen, Kvist, Laura Irmeli
Opintokohteen kielet: Finnish
Leikkaavuudet:

750173P	Biogeography	5.0 op

750363A Biogeography 4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 1 st autumn.
Learning outcomes:
The course introduces students to basic concepts of biogeography, patterns of distribution and historical and present factors affecting the distribution. Plant biogeography introduces students to modern and historical factors controlling the plant cover, and to the special methods of vegetation science.
Contents:
The course consists of general part and optional part on plant biogeography and vegetation science. The general part introduces basic models and theories of distribution of organisms in the environment. Historical, evolutionary, geographical, climatic and ecological explanations. Research methods used in biogeography. The part on plant biogeography and vegetation science introduces methods on factors controlling the structure and composition of vegetation, and describes major vegetation types in Finland and principal biomes in the World. Methods of vegetation science are briefly surveyed.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
24 h (z) + 24 h (b) = 48 h lectures, two exams.
Target group:
Compulsory to biology students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
Other recommended courses related to the field: Basics of Ecology (750124P), Evolution and systematics of organisms (750307A), Evolution, systematics and morphology of organisms, practicals (755312A), Biodiversity (750635S).
Recommended or required reading:
Cox, C. B. & Moore, P. D. 2005: Biogeography (7th ed.). Blackwell Science, Cambridge University Press. Eurola, S. 1999: Kasvipeitteemme alueellisuus. Oulanka Reports. Oulu 116 p., Cox, C. B. & Moore, P. D. 2000: Biogeography* (6 th ed.). Blackwell Science, Cambridge University
Press. 298 p. The availability of the literature can be checked from this link.
Assessment methods and criteria:
Two exams. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail. Final grade is average value of the two exams.
Person responsible:
Dr. Laura Kvist and Prof. Jari Oksanen.
Working life cooperation:
No.
Other information:
-

Compulsory

750373A-01: Biogeography, animals, 0 op

Voimassaolo: 01.08.2015 - 31.07.2019
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Kvist, Laura Irmeli
Opintokohteen kielet: Finnish
Leikkaavuudet:

750363A-02 Biogeography, Zoology 0.0 op

Ei opintojaksokuvauksia.

750373A-02: Biogeography, plants, 0 op

Voimassaolo: 01.08.2015 - 31.07.2019
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Jari-Heikki Oksanen
Opintokohteen kielet: Finnish
Leikkaavuudet:

750363A-01 Biogeography, Botany 0.0 op

Ei opintojaksokuvauksia.

750657S: Biology subject teacher pro gradu thesis, 20 - 40 op

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

755602S Master of science thesis in zoology 40.0 op
756602S Pro gradu thesis 40.0 op
757602S Master of science thesis in genetics 40.0 op

ECTS Credits:
20 op / 53 h opiskelijan työtä
Assessment methods and criteria:
Read more about assessment criteria at the University of Oulu webpage.

752362A: Botanical collection, 2 - 6 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Anna Ruotsalainen
Opintokohteen kielet: Finnish

ECTS Credits:
2-6 ECTS credits / 53-160 hours of work, 100 species = 2 cr.
Language of instruction:
Finnish / English.
Timing:
B.Sc. or M.Sc. degree.
Learning outcomes:
Preparation (including labels and coordinates) and identification of self-collected botanical specimen.

Contents:
The collection may contain solely vascular plants or together with moss and lichen specimens, for instance.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Vascular plants have to be pressed and dried. The samples have to be in folded paper or small box including the name and place tag. Before starting the collection work student has to consult the teacher. 100 plant species correspond to 2 credits.
Target group:
-
Prerequisites and co-requisites:
Identification of plant species (752303A) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Hämet-Ahti et al. 1998: Retkeilykasvio (Field Flora of Finland), Ed. 4. Finnish Museum of Natural History, Helsinki. 656 pp., and other field floras.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Collection is delivered to the person in responsible.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Dr. Anna Liisa Ruotsalainen.
Working life cooperation:
No.
Other information:
Contact the responsible teacher on details.

752662S: Botanical collection, 2 - 6 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Anna Ruotsalainen

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
2-6 ECTS / 53-160 hours of work, 100 species = 2 cr.
Language of instruction:
Finnish / English.
Timing:
B.Sc. or M.Sc. degree.
Learning outcomes:
Preparation (including labels and coordinates) and identification of self-collected botanical specimen.
Contents:
The collection may contain solely vascular plants or together with moss and lichen specimens, for instance.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Vascular plants have to be pressed and dried. The samples have to be in folded paper or small box including the name and place tag. Before starting the collection work student has to consult the teacher.
Target group:
-
Prerequisites and co-requisites:
Identification of plant species (752303A) or equivalent knowledge.
Recommended optional programme components:
-

Recommended or required reading:
Hämet-Ahti et al. 1998: Retkeilykasvio (Field Flora of Finland), Ed. 4. Finnish Museum of Natural History, Helsinki. 656 pp., and other field floras.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Collection is delivered to the person in responsible.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Dr. Anna Liisa Ruotsalainen.
Working life cooperation:
No.
Other information:
Contact the responsible teacher on details.

750121P: Cell biology, 5 op

Voimassaolo: - 31.07.2020

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha, Henrika Honkanen, Kuittinen, Helmi Helena

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 1 st autumn.
Learning outcomes:
The student is familiar with cellular structure and functioning in plant and animal cells, understands the social structures in multicellular species and knows why and how the genetic organizations (in nucleus, chloroplast and mitochondria) are co-operating, maintaining and regulating the cellular metabolism. Student understands the common origin and evolution of life on planet Earth, and understands the material basis and mechanisms of this continuity.
Contents:
During the recent years especially the development of molecular and microscopic and imaging techniques has increased our knowledge on cells and their social interactions. The structural and functional characteristics of plant and animal cells will be covered as well as the genetic organization maintaining and regulating the system.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
72 h lectures, three exams (zoology, botany, genetics). Home essays and internet material.
Target group:
Compulsory to the biology and biochemistry students.
Prerequisites and co-requisites:
Good basics in biology from elementary school.
Recommended optional programme components:
Cell biology is prerequisite for the following courses: Developmental biology-histology lectures and excercises (751367A, 755317A), Animal physiology lectures and exercises (751388A, 755318A), Functional plant biology lectures and exercises (752345A, 756341A), Concepts of genetics (753124P). Course also gives readiness for studies in molecular biology and biochemistry.
Recommended or required reading:
Textbooks Alberts, B. et al. 2008: Molecular Biology of the Cell (5e). Garland Science Publishing, London, 1268 p. ISBN: 0815341067. (Lodish et al. 2008: Molecular Cell Biology (6e). Freeman, New York, 1150 p.). The availability of the literature can be checked from this link.
The availability of the literature can be checked from this link.
Assessment methods and criteria:

Three exams.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail. Final grade is average value of the three exams.
Person responsible:
Prof. Seppo Saarela, Prof. Hely Häggman and Dr. Helmi Kuittinen.
Working life cooperation:
No.
Other information:
-

750121P-02: Cell biology, Botany, 0 op

Voimassaolo: - 31.07.2020
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Häggman, Hely Margaretha
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

750121P-03: Cell biology, Genetics, 0 op

Voimassaolo: - 31.07.2020
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Kuittinen, Helmi Helena
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

750121P-01: Cell biology, Zoology, 0 op

Voimassaolo: - 31.07.2020
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Saarela, Seppo Yrjö Olavi
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

755630S: Community ecology, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Muotka, Timo Tapani

Opintokohteen kielet: Finnish

Leikkaavuudet:

755310A	Community ecology	3.0 op
755610S	Community ecology	3.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B. Sc. 3 rd or M.Sc. 1 st spring, odd years.
Learning outcomes:
Students are introduced to essential concepts of modern community ecology. Course gives ability to understand ecological community research.
Contents:
Effects of biotic (e.g. interspecific competition, predation) and abiotic (e.g. environmental disturbances) factors on the structure of communities, temporal and spatial variation of community structure and species richness at different scales, detection of human impacts on biotic communities, macroecological phenomena.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
26 h lectures, computer demonstrations, seminar.
Target group:
Compulsory to ECOz in the M.Sc. degree 3 cr.
Prerequisites and co-requisites:
Basics of ecology (750124P).
Recommended optional programme components:
-
Recommended or required reading:
Handouts and book Morin, P. J. (1999): Community Ecology. Blackwell, 424 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:
-

751384A: Comparative animal physiology, 8 op

Voimassaolo: - 31.07.2017

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Henrika Honkanen, Hohtola, Esa Juhani

Opintokohteen kielet: Finnish

ECTS Credits:
8 ECTS credits / 213 hours of work.
Language of instruction:

Finnish.
Timing:
B.Sc. 3 rd or M.Sc. 1 st spring.
Learning outcomes:
After completing the course the student is able to form a general view of the similarities and differences in vital physiological functions between different animal species. The understanding of the regulation mechanisms of these physiological functions will be expanded by practical experiments conducted with several different animal species.
Contents:
Comparative animal physiology will be studied through the central physiological themes (nervous system, muscles, metabolism, thermoregulation, reproduction, circulation). The lectures consist of an introductory lecture on the given subject, and seminars. Physiological, cell physiological, neurophysiological, and histochemical methods are used in practical works related to the above mentioned themes. In the experiments invertebrate animals, frog, birds and mammals, including human being, will be used.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
32 h lectures, 128 h laboratory work, exam.
Target group:
B.Sc. degree optional to BS or M.Sc. degree compulsory to BSz.
Prerequisites and co-requisites:
Cell biology (750121P) and Animal physiology (751388A, 755318A) or equivalent knowledge.
Recommended optional programme components:
Prerequisite for the course Advanced course in animal physiology (751635S).
Recommended or required reading:
Course handout. Willemer, Pat (2000) Environmental physiology of animals.
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. Esa Hohtola
Working life cooperation:
No.
Other information:
-

751684S: Comparative animal physiology, 8 op

Voimassaolo: - 31.07.2017

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Hohtola, Esa Juhani

Opintokohteen kielet: Finnish

ECTS Credits:
8 ECTS credits / 213 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 3 rd or M.Sc. 1 st spring.
Learning outcomes:
After completing the course the student is able to form a general view of the similarities and differences in vital physiological functions between different animal species. The understanding of the regulation mechanisms of these physiological functions will be expanded by practical experiments conducted with several different animal species.
Contents:

Comparative animal physiology will be studied through the central physiological themes (nervous system, muscles, metabolism, thermoregulation, reproduction, circulation). The lectures consist of an introductory lecture on the given subject, and seminars. Physiological, cell physiological, neurophysiological, and histochemical methods are used in practical works related to the above mentioned themes. In the experiments invertebrate animals, frog, birds and mammals, including human being, will be used.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
32 h lectures, 128 h laboratory work, final exam.
Target group:
B.Sc. degree optional to BS or M.Sc. degree compulsory to BSz.
Prerequisites and co-requisites:
Cell biology (750121P) and Animal physiology (751388A, 755318A) or equivalent knowledge.
Recommended optional programme components:
Prerequisite for the course Advanced course in animal physiology (751635S).
Recommended or required reading:
Course handout. Willmer, Pat (2000) Environmental physiology of animals.
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. Esa Hohtola
Working life cooperation:
No.
Other information:
-

757109P: Concepts of genetics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Savolainen Outi

Opintokohteen kielet: Finnish

Leikkaavuudet:

753124P Concepts of genetics 4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 1 st spring.
Learning outcomes:
To understand and apply basic concepts of genetics, at Mendelian and molecular level.
Contents:
Part 1. Mendelian genetics, including the ideas of quantitative and population genetics. Part 2. Molecular genetics: replication, transcription, translation, genetic code, mutations, repair of DNA. Part 3. Selected topics on developmental genetics, and genetics of health and diseases.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
72 h lectures and seminars, 115 h independent studies, exam.
Target group:

Compulsory to the biology students (7 cr.) Biochemistry students: parts 1 and 3 (4 cr.) compulsory, biophysics students.
Prerequisites and co-requisites:
Cell biology (750121P) or equivalent knowledge.
Recommended optional programme components:
This course is prerequisite to all other genetics courses.
Recommended or required reading:
Materials are in Optima. Klug et al. 2012. Concepts of Genetics (10. ed). Pearson, 896 p. Alberts, B. et al. 2008: Molecular Biology of the Cell (5. ed). Garland Science Publishing, London, 1268 p.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Homeworks, home exams, lecture diary, exams. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Outi Savolainen.
Working life cooperation:
No.
Other information:
-

757122P: Concepts of genetics for biochemists, 3 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Savolainen Outi
Opintokohteen kielet: Finnish

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

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: Jari-Heikki Oksanen
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. 3 rd 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:
14 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.
Read more about assessment criteria at the University of Oulu webpage.

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

756647S: Conservation of biodiversity, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari-Heikki Oksanen

Opintokohteen kielet: English

Leikkaavuudet:

750621S	Conservation of biodiversity	3.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English.
Timing:
B.Sc. 3 rd 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:

14 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.
Read more about assessment criteria at the University of Oulu webpage.

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

757618S: DNA analysis in population genetics, 10 op

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

753631S	DNA analysis in population genetics, exercises	6.0 op
753616S	Spesific questions in population genetic and biology	4.0 op

Ei opintojaksokuvauksia.

755317A: Developmental biology-histology, exercises, 5 op

Voimassaolo: 01.08.2011 - 31.07.2019
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B. Sc. 1 st spring.
Learning outcomes:
After completing the developmental biology -part of the course the student is able to name the most important events of embryonic development and the structural changes related to them. The student is also able to describe the principles gene regulation related to embryonic development. After completing the histology-part of the course

the student is able to describe the various tissue types and the microscopic structure of important organs and is also able to identify tissue types and organs from microscopic sections.
Contents:
Motto: “It is not birth, marriage, or death, but gastrulation, which is truly the most important time in your life.” (Lewis Wolpert, 1986). Developmental biology will cover gametogenesis, fertilization, forming of embryonic tissue layers (gastrulation), embryonic induction, signal molecules and the differentiation of the most important tissues and organs (organogenesis). Histology will first cover various tissue types, their cell types and matrix composition. Thereafter, the microscopic structure and tissue composition of various organs and organ systems will be covered. In both parts, practical exercises on drawing from microscopic slides (see 755317A) will support lectures.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
44 h exercises, microscopic studying and drawing from the preparates.
Target group:
BS: compulsory, TEAbs optional.
Prerequisites and co-requisites:
Cell biology (750121P) or equivalent knowledge.
Recommended optional programme components:
Same time with Developmental biology-histology lectures (751367A).
Recommended or required reading:
Handout.
Assessment methods and criteria:
Exercise exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
N.N.
Working life cooperation:
No.
Other information:
-

755320A: Developmental biology-histology, lectures, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Hohtola, Esa Juhani

Opintokohteen kielet: Finnish

Leikkaavuudet:

751367A Developmental biology-histology, lectures 4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 1 st spring.
Learning outcomes:
After completing the developmental biology -part of the course the student is able to name the most important events of embryonic development and the structural changes related to them. The student is also able to describe the principles gene regulation related to embryonic development. After completing the histology-part of the course the student is able to describe the various tissue types and the microscopic structure of important organs and is also able to identify tissue types and organs from microscopic sections.
Contents:
Motto: “It is not birth, marriage, or death, but gastrulation, which is truly the most important time in your life.” (Lewis Wolpert, 1986). Developmental biology will cover gametogenesis, fertilization, forming of embryonic tissue

layers (gastrulation), embryonic induction, signal
molecules and the differentiation of the most important tissues and organs (organogenesis). Histology will first cover various tissue types, their cell types and matrix composition. Thereafter, the microscopic structure and tissue composition of various organs and organ systems will be covered. In both parts, practical exercises on drawing from microscopic slides (see 755317A) will support lectures.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
38 h lectures and two exams.
Target group:
Compulsory to biology students.
Prerequisites and co-requisites:
Cell biology (750121P) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Lecture notes, lecture handouts. Recommended reading: Sariola, Frilander ym., Solusta yksilöksi: Kehitysbiologia, Duodecim, Helsinki 2003; Gilbert: Developmental Biology, Sinauer Press, 6.ed. 2000, or newer; Young & Heath: Wheater's Functional Histology, Churchill Livingstone, 4. ed. 2000, or newer. The availability of the literature can be checked from this link.
Assessment methods and criteria:
2 lecture exams. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.

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

Compulsory

755320A-02: Developmental biology-histology, histology lectures, 0 op

Voimassaolo: 01.08.2015 - 31.12.2019
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

751367A-02 Developmental biology-Histology, Histology lectures 0.0 op

Ei opintojaksokuvauksia.

755320A-01: Developmental biology-histology, Developmental biology lectures, 0 op

Voimassaolo: 01.08.2015 - 31.12.2019
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Leikkaavuudet:

751367A-01 Developmental biology-histology, Developmental biology lectures 0.0 op

Ei opintojaksokuvauksia.

752672S: Distribution mapping of plants, 2 - 5 op

Voimassaolo: - 31.07.2019
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

ECTS Credits:
2-5 ECTS credits / 53-133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 3 rd summer or M.Sc. 1 st or 2 nd summer.
Learning outcomes:
Train oneself in floristic mapping skills.
Contents:
Floristic mapping of plants with special emphasis on endangered species. Participant should agree with the Botanical Museum in advance. Field work in the provinces of Oulu and Lapland, including sample collection, identification, preparation of herbarium specimens in consultation with the responsible teacher.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Field excursions.
Target group:
-
Prerequisites and co-requisites:
Identification of plant species (752303A), Field course in ecological botany (752304A) and Advanced identification of plant species (752608S) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
-
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Botanical museum.
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

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B. Sc. / M. Sc. / Ph.D.
Learning outcomes:
Student can identify the ecological and environmental effects of climate change and air pollution in the subarctic area. In addition, the student may learn basic research methods related to topic, and how to use the facilities provided by the subarctic research stations in the research.
Contents:
Lectures deal the ecological responses of global change and air pollution. The content is focused on the environmental effects and their ecological significance in the northern areas. During excursion the student familiarizes with the special features of northern areas and explores the action and research carried out in the northern research stations.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
(1) 24 h lectures with exam, and 15 h independent studies (assay and seminar work) (4 cp); **(2)** 4-5 days summer excursion and closing seminar (3 cp); participation in excursion necessitates accepted credits in the first part (lectures, independent studies).
Target group:
Ecology students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-ACIA (2005) Arctic Climate Impact Assessment, Cambridge University Press, 1042 p. -AMAP Assessment 2006: Acidifying Pollutants, Arctic Haze, and Acidification in the Arctic. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. Xii + 112pp. Bell JNB & Trehow M (eds.) 2002. Air pollution and plant life. Wiley. 2nd edition. 480 pages. The availability of the literature can be checked from this link.
Assessment methods and criteria:
Lectures, essay and seminar, excursion, closing report and seminar. Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail
Person responsible:
Dr. Kari Taulavuori.
Working life cooperation:
No.
Other information:
Field excursion is arranged if resources allow.

756648S: Ecological responses to global change and air pollution in the subarctic, 5 - 8 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

Leikkaavuudet:

750643S Ecological responses to global change and air pollution in the subarctic 4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B. Sc. / M. Sc. / Ph.D., (excursion arranged if resources alow).
Learning outcomes:
Student can identify the ecological and environmental effects of climate change and air pollution in the subarctic area. In addition, the student may learn basic research methods related to topic, and how to use the facilities provided by the subarctic research stations in the research.
Contents:
Lectures deal the ecological responses of global change and air pollution. The content is focused on the environmental effects and their ecological significance in the northern areas. During excursion the student familiarizes with the special features of northern areas and explores the action and research carried out in the northern research stations.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
1) 24 h lectures with exam, and 15 h independent studies (assay and seminar work) (4 cp); **(2)** 4-5 days summer excursion and closing seminar (3 cp); participation in excursion necessitates accepted credits in the first part (lectures, independent studies).
Target group:
Ecology students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-ACIA (2005) Arctic Climate Impact Assessment, Cambridge University Press, 1042 p. -AMAP Assessment 2006: Acidifying Pollutants, Arctic Haze, and Acidification in the Arctic. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. Xii + 112pp. Bell JNB & Trehow M (eds.) 2002. Air pollution and plant life. Wiley. 2nd edition. 480 pages. The availability of the literature can be checked from this link.
Assessment methods and criteria:
Lectures, assay and seminar, excursion, closing report and seminar. Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail
Person responsible:
Dr. Kari Taulavuori.
Working life cooperation:
No.
Other information:
Field excursion is arranged if resources allow.

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

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Negotiated Education

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Proficiency level:
B2/C1 on the Common European Framework of Reference scale.
Status:
This course is mandatory for students of the following degree programmes:
Faculty of Science
•Biology
•Chemistry
•Mathematical Sciences

•Physics
Oulu Mining School
•Geosciences degree programme
Faculty of Information Technology and Electrical Engineering
•Department of Information Processing Science

Students in the Department of Geography take English 3.

Engineering students in the following programmes take their English courses in the Faculty of Technology:
Oulu Mining School:
• Mining Technology and Mineral Processing degree programme

Faculty of Information Technology and Electrical Engineering
•Department of Electrical Engineering
•Department of Communications Engineering
•Department of Computer Science and Engineering

Please consult the Faculty Study Guide to establish the language requirements for your own degree program.
Required proficiency level:
English must have been the A1 or A2 language at school or equivalent English skills should have been acquired otherwise.
ECTS Credits:
2 ECTS credits (total work load 54 hours including classroom meetings.)
Language of instruction:
English
Timing:
Biology: 1st year spring term
Chemistry: 1st year autumn term
Geology: 1st year spring term
Information Processing Science: 1st year spring term
Mathematical Sciences (pedagogy): 1st year spring term
Mathematical Sciences: 2nd year autumn term
Physical Sciences: 1st year autumn term
Learning outcomes:
By the end of the course, you are expected to be able to

- have acquired effective vocabulary learning techniques
- be able to distinguish parts of words to infer meanings
- utilize your knowledge of text structure and cohesion markers to understand academic texts
- extract information and learn content from English readings in scientific and professional contexts

Contents:
The course will focus on reading strategies; these include recognizing how texts are organized, identifying key points in a text, and understanding words in context. Vocabulary work in the course will focus on a) academic vocabulary, as used in formal scientific writing, and b) using your knowledge of the meanings of parts of words (affixes) to infer meaning.
Mode of delivery:
Contact teaching
Learning activities and teaching methods:
The scope of the course is 2 op (54 hours student workload).
Target group:
1st year students of Biology, Chemistry, Geology, Information Processing Science, Physics, and Mathematics (pedagogy); 2nd year students of Mathematics
Prerequisites and co-requisites:
-
Recommended optional programme components:
Students are also required to take 902004Y Scientific Communication, which is taken AFTER completion of this course.
Recommended or required reading:
Photocopies will be provided by the teacher and/or required texts will be accessible online or from the university library.
Assessment methods and criteria:
Student work is monitored by continuous assessment. You are required to participate regularly and actively in all contact teaching provided, and successfully complete all required coursework. There will be three monthly tests on material covered so far.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
Pass/Fail
Person responsible:
Karen Niskanen and Patrick Nesbitt
Working life cooperation:
-
Other information:
N.B. Students with grades */audatur* or *eximia* in their A1 English school-leaving examination can be exempted from this course and will be granted the credits by the Faculty of Science.

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

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Negotiated Education

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Leikkaavuudet:

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

Proficiency level:
B2/C1 on the CEFR scales
Status:
This course is mandatory for all 2nd year students (except **geographers**) who will have English as their foreign language in their B.Sc. degree. This includes the students who were exempted from 'Reading for Academic Purposes'(902002Y). Please consult the faculty study guide to establish the language requirements on your own degree programme.
Required proficiency level:
Students taking this course must have had English as the A1 or A2 language at school or the equivalent English skills should have been acquired otherwise. The course 'Reading for Academic Purposes' (902002Y) is a pre-requisite, unless exempted.
ECTS Credits:
The student workload is 53 hrs work/ 2 ECTS credits.
Language of instruction:
English
Timing:
Biology: 2nd year autumn term
Chemistry: 2nd year spring term
Geology: 2nd year spring term
Information Processing Science : 2nd year autumn term
Mathematics: 2nd year spring term
Physics: 2nd year autumn term
Learning outcomes:
By the end of the course, you are expected:

1. to have demonstrated your use of appropriate strategies and techniques for communicating effectively in English in an academic context.
2. to have demonstrated the ability to prepare and present scientific subjects to your classmates, using appropriate field-related vocabulary.

Contents:
Skills in listening, speaking, and presenting academic topics are practised in the classroom, where there is an emphasis on working in pairs and small groups. Homework tasks include online lecture listening and reading, preparation for classroom discussions and written work to support the classroom learning.
Mode of delivery:
Contact teaching
Learning activities and teaching methods:
Contact teaching 28 hours, homework 28 hours
Target group:
2nd year students of Biology, Chemistry, Geology, Information Processing Science, Mathematics, Physics
Prerequisites and co-requisites:

-
Recommended optional programme components:
Also required: 902002Y Reading for Academic Purposes Englannin kieli 1
Recommended or required reading:
Course materials will be provided by the teacher.
Assessment methods and criteria:
Continuous assessment is based on regular attendance, active participation in all lessons and the successful completion of all homework tasks.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / fail.
Person responsible:
Karen Niskanen and Patrick Nesbitt
Working life cooperation:
-
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 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:
Dr. Kari Taulavuori.
Working life cooperation:
No.
Other information:
-

750626S: Environmental impact assessment (EIA) and ecological inventory of natural resources, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola, Seppo Rytkönen

Opintokohteen kielet: Finnish

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

Language of instruction:
Finnish.

Timing:
M.Sc. degree, (arranged if resources allow).
Learning outcomes:
After finishing the course student get acquainted to inventory approaches of natural ecosystems and is able to apply knowledge to environmental impact assessments. Student has skills to fulfill environmental impact assessments based on different types of case studies. Additionally, student knows the legal procedure to act as responsible person for EIA.

Contents:
The course gives an overview of Environmental Impact Assessment (EIA) and its tasks according to the present legislation of the European Community. The course includes ecological impacts on e.g. hydrology, water quality, ecology, ecological inventories of nature. Course includes obligatory exercise work.

Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
24 h lectures, 18 h seminars.

Target group:
-
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
http://ec.europa.eu/environment/eia/eia-support.htm

Assessment methods and criteria:
Exam and report.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Failed.
Person responsible:

Prof. Jari Oksanen.

Working life cooperation:
No.
Other information:
-

750372A: Evolution and systematics of organisms, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari-Heikki Oksanen, Kaitala Arja, Annamari Markkola

Opintokohteen kielet: Finnish

Leikkaavuudet:

750307A Evolution and systematics of organisms 4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 2nd autumn.
Learning outcomes:
Students will learn a general picture of the diversity of life-forms as to understand the evolutionary history of organisms.
Contents:
The course provides an insight into the biological evolution and evolutionary processes reflected by the systematic classification of the organisms. Also basic principles and concepts of systematics and classification are presented.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
36 h lectures.
Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
Lectures give basic ability to different biology subjects.
Recommended or required reading:
Net material and supplementary reading: Bell, P.R. & Helmsley, A.R. 2000: Green Plants. Their origin and diversity. 2 nd ed. Cambridge University Press., Willis, K.J. & McElwain, J.C. 2002: The evolution of plants. Oxford University Press. Hickman, C. P. et al. 2009. Animal Diversity, 5th edition, McGraw Hill New York. The availability of the literature can be checked from this link.
Assessment methods and criteria:
Lecture exam. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Arja Kaitala, Prof. Jari Oksanen and Dr. Annamari Markkola.
Working life cooperation:
No.
Other information:
-

750374A: Evolution, systematics and morphology of organisms, 3 op

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

755312A	Evolution, systematics and morphology of animals, practicals	4.0 op

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

750336A: Evolutionary ecology, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Kaitala Arja
Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / (English).
Timing:
B.Sc. degree 2 nd autumn.

Learning outcomes:
To understand main principles of evolution and the concepts of natural selection, fitness and adaptation. Learn basics of life-history adaptation, speciation processes and social evolution.
Contents:
The aim of the course is to introduce a student with lectures and seminars to the main topics of evolutionary ecology, for example basic concepts of natural selection and evolution, selection level, speciation, evolution of life cycles, interactions between and within species are included. Review to the latest research results.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
36 h lectures and compulsory seminars, exam.
Target group:
BS and ECO compulsory, TEAeco optional.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Additional reading: Björklund, Mats 2009 Evoluutiobiologia. Gaudeamus, Sterans, S. and Hoekstra, R. F. 2005: Evolution, An Introduction. Oxford University Press, New York, 575 p.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Seminar and exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.

Person responsible:
Prof. Arja Kaitala.
Working life cooperation:
No.
Other information:
-

750149P: Examinations on optional topics in biology, 2 - 10 op

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

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

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

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

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

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

750649S: Examinations on optional topics in biology, 2 - 10 op

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

751654S	Examination on optional topics	2.0 op
752652S	Examinations on optional topics	2.0 op
753651S	Examinations on optional topics	2.0 op

Voidaan suorittaa useasti: Kyllä

Assessment methods and criteria:

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

757621S: Experimental course in evolutionary genomics, 5 op

Voimassaolo: 01.08.2015 - 31.07.2020
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Phillip Watts
Opintokohteen kielet: Finnish
Leikkaavuudet:

753624S Experimental course in evolutionary genomics 4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English.
Timing:
M.Sc. 2nd spring.
Learning outcomes:
After the course the student will be able to analyze DNA sequence differences between species, applying the knowledge obtained during courses in bioinformatics and molecular evolution. The student will know how to retrieve information from public sequence databases, characterize sequences, estimate nucleotide substitutions, align sequences, build phylogenetic trees and estimate their confidence. The student will be capable of making a hypothesis related to molecular evolution and test it using sequence data.
Contents:
Sequence databases, methods and computer programs for handling and analysing sequences obtained from databases. Research appropriate scientific literature. Work is done mainly in the computer classroom.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
48 hr exercises including demonstrations and seminar, independent work including reports.
Target group:
BSg students.
Prerequisites and co-requisites:
Advanced course in bioinformatics (757619S) and Molecular evolution (757312A) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Reports, independent work and seminar.
Grading:
1-5 / Fail.
Person responsible:
Phillip Watts.
Working life cooperation:
No.
Other information:
-

757110P: Experimental course in general genetics, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kuittinen, Helmi Helena

Opintokohteen kielet: Finnish

Leikkaavuudet:

753104P Experimental course in general genetics 6.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B. Sc degree, 1 st spring.
Learning outcomes:
After passing the course students have elementary knowledge of basic phenomena of genetics, important working methods and laboratory organisms. Student has the basic ability to understand, apply and analyse simple genetical works and phenomena.
Contents:
To investigate Mendelian inheritance, gene mapping and additive? effects of genes using cross-breeding, basics of population genetics, to investigate regulation of promoter and recombination using microbial genetic methods, to investigate mitosis and meiosis using cytogenetical methods and studying basic methods of DNA techniques: isolating DNA, digesting DNA using restriction enzymes, PCR, electrophoresis and cloning.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
18 h demonstrations, 45 h exercises, independent work, exam.
Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
Concepts of genetics (753124P) or equivalent knowledge.
Recommended optional programme components:
Course is prerequisite to all the following genetics courses.
Recommended or required reading:
Course handout.
Assessment methods and criteria:
Report, final exam. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.

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

755321A: Field course in aquatic animals, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kaisa-Leena Huttunen, Heikki Mykrä

Opintokohteen kielet: Finnish

Leikkaavuudet:

751307A Field course in aquatic animals 4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 1 st summer.
Learning outcomes:
To learn basic methods in identifying and sampling of freshwater animals.
Contents:
Identification of the most important freshwater fishes and invertebrates. Demonstrations of the most frequently-used sampling methods.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Summer: 6 h lectures in Oulu and 70 h of field work and demonstrations at the Oulanka research station.
Target group:
Compulsory (4 cr) to ECO. TEAeco: either Field course in aquatic animals 4 cr or Field course in terrestrial animals 4 cr is compulsory for biology major, the other field course can be included to the ecology minor. TEAbs, alternatively compulsory to TEAbs either Field course in aquatic animals 4 cr or Field course in terrestrial animals 4 cr (at least 9 cr compulsory, two field courses, one animal and other botany field course).
Prerequisites and co-requisites:
Basic identification of animals (751373A) or equivalent knowledge (if necessary, selection to the course 751307A can be based on success in course 751373A).
Recommended optional programme components:
This course is a prerequisite for the following: Winter ecology and physiology (750325A), Special course in aquatic invertebrates (751648S), Assessment and monitoring of the ecological status of water bodies (754613S), Field methods in freshwater biomonitoring (754616S), Research seminar in fish ecology (754618S), Special course in fish ecology (754619S).
Recommended or required reading:
Handouts and lectures given during the course.
Assessment methods and criteria:

On the final course day species identification exam on the species met during the course, practical exam on the sampling methods and
theoretical exam based on the literature and demonstration material. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail.
Person responsible:
M.Sc. Kaisa-Leena Huttunen.
Working life cooperation:
No.
Other information:
-

755621S: Field course in aquatic animals, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kaisa-Leena Huttunen

Opintokohteen kielet: English

Leikkaavuudet:

751607S	Field course in aquatic animals	4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.
Language of instruction:
English.
Timing:
ECOGEN ECOz 1 st summer.
Learning outcomes:
To learn basic methods in identifying and sampling of freshwater animals.
Contents:
Identification of the most important freshwater fishes and invertebrates. Demonstrations of the most frequently-used sampling methods.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Summer: 6 h lectures in Oulu and 70 h of field work and demonstrations at the Oulanka research station.
Target group:
ECOGEN.
Prerequisites and co-requisites:
Basic identification of animals (751373A) or equivalent knowledge (if necessary, selection to the course 751307A can be based on success in course 751373A).
Recommended optional programme components:
This course is a prerequisite for the following: Winter ecology and physiology (750325A), Special course in aquatic invertebrates (751648S), Assessment and monitoring of the ecological status of water bodies (754613S), Field methods in freshwater biomonitoring (754616S),
Research seminar in fish ecology (754618S), Special course in fish ecology (754619S).
Recommended or required reading:
Handouts and lectures given during the course.
Assessment methods and criteria:

On the final course day species identification exam on the species met during the course, practical exam on the sampling methods and theoretical exam based on the literature and demonstration material. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail.
Person responsible:
M.Sc. Kaisa-Leena Huttunen.
Working life cooperation:
No.
Other information:
-

752342A: Field course in arctic-alpine ecology and vegetation, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Virtanen, Risto Juhani

Opintokohteen kielet: Finnish

ECTS Credits:
4 ECTS credits / 107 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 2 nd or 3 rd autumn. M.Sc. 1 st or 2 nd autumn. Every second year at the Kilpisjärvi biological station. Arranged if resources allow.
Learning outcomes:

By passing this course a student is able to identify plant and animal species, nature types, vegetation of NW Fennoscandian mountain areas, understand ecology of northern ecosystems, ecological interactions and adaptation. Advanced training in experimental and observational field research.
Contents:
Arctic-alpine ecosystems as one the main biomes of the world. Plant and animal species of arctic-alpine areas. Vegetation and ecology of NW Fennoscandian mountain areas. Plant-herbivore interactions in tundra ecosystems.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Field course.
Target group:
Ecology students.
Prerequisites and co-requisites:
Field course in ecological botany (752304A) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Disseminated during course, internet resources. Literature on arctic-alpine ecosystems.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Field course, field exercise. Planning of the study, field work and analyzing data. Making a report with reference to scientific literature. Oral presentation of the study (Power Point).
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Field exam including questions about the species and northern arctic-alpine nature. Pass / Fail.
Person responsible:
Dr. Risto Virtanen.
Working life cooperation:
No.
Other information:
Arranged with cooperation of the University of Eastern Finland.

752642S: Field course in arctic-alpine ecology and vegetation, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Virtanen, Risto Juhani

Opintokohteen kielet: Finnish

ECTS Credits:
4 ECTS credits / 107 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 2 nd or 3 rd autumn. M.Sc. 1 st or 2 nd autumn. Every second year at the Kilpisjärvi biological station. Arranged if resources allow.
Learning outcomes:
By passing this course a student is able to identify plant and animal species, nature types, vegetation of NW Fennoscandian mountain areas, understand ecology of northern ecosystems, ecological interactions and adaptation. Advanced training in experimental and observational field research.
Contents:
Arctic-alpine ecosystems as one the main biomes of the world. Plant and animal species of arctic-alpine areas. Vegetation and ecology of NW Fennoscandian mountain areas. Plant-herbivore interactions in tundra ecosystems.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Field course.
Target group:
Ecology students.

Prerequisites and co-requisites:
Field course in ecological botany (752304A) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Disseminated during course, internet resources. Literature on arctic-alpine ecosystems.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Field course, field exercise. Planning of the study, field work and analyzing data. Making a report with reference to scientific literature. Oral presentation of the study (Power Point).
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Field exam including questions about the species and arctic-alpine nature. Pass / Fail.
Person responsible:
Dr. Risto Virtanen.
Working life cooperation:
No.
Other information:
Arranged with cooperation of the University of Eastern Finland.

756643S: Field course in ecological botany, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola

Opintokohteen kielet: English

Leikkaavuudet:

752604S	Field course in ecological botany	5.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English.
Timing:
ECOGEN ECOz and ECOb 1 st summer.
Learning outcomes:
Student is able to identify most common boreal plant species in the field, to plan and conduct ecological field experiments and use basic methods in vegetation analyses.
Contents:
Vegetation in the coast of Bothnian Bay (4 days) and basics of boreal forest and mire vegetation classification and types at Oulanka Research Station (8 days).
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures 10 h, field demonstrations and exercises ca. 84 h. Field exams for plant identification and mire ecology. Seminar, report.
Target group:
ECOGEN.
Prerequisites and co-requisites:
Identification of plant species (752603S) 3 cr. or equivalent knowledge.
Recommended optional programme components:
Course has capacity for 32 or 40 students. Possible elimination of the candidates is done by study success and Plant identification (752603S) grade. This course is a prerequisite for courses Plant ecology (752600S), Mire ecology (752692S) and Field course in Arctic-Alpine ecology and vegetation (752642S).
Recommended or required reading:
Laitinen et al. 2012: Field course in ecological botany; Hanhela, P. & Halonen, P. 1995: Plant identification; Huttunen, A: 1995: Introduction to forest types; Eurola, S., Hicks, S. and Kaakinen, H. 1994: Key to Finnish mire

types, pp. 12-117 in: Moore, P. D. (ed.), 1994 European mires, London Academic Press, London, 367 p. The availability of the literature can be checked from this link.
Assessment methods and criteria:
Reports, field exams. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.

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

756343A: Field course in ecological botany, 5 op

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

752304A Field course in ecological botany 5.0 op

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

755322A: Field course in terrestrial animals, 5 op

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

751306A Field course in terrestrial animals 4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. - 1 st summer. NNE.
Learning outcomes:
The aim of the course is to learn the basics of field identification and ecology of terrestrial animals in northern Finland. The student will understand that proper skills in species identification and knowledge of species' ecology are the basis of ecological research.
Contents:
The fauna in different kinds of terrestrial habitats is studied using several ecological sampling and research methods. The course is hold at the Oulanka Research Station, Kuusamo, and deals with identification and

ecology of invertebrates, mammals (especially small mammals), gallinaceous birds and birds of prey. The exercises take place partly in the field and partly in the laboratory. Data gained during the course is analyzed. The results are reported (in PowerPoint) and presented in the final seminar in Kuusamo.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
70 h demonstrations and practicals, one species and theory exam, seminar.
Target group:
Compulsory (4 cr) to ECO. TEAeco: either Field course in terrestrial animals 4 cr or Field course in aquatic animals 4 cr is compulsory for biology major, the other field course can be included to the ecology minor. TEAbs: alternatively compulsory to TEAbs either Field course in terrestrial animals 4 cr. or Field course in aquatic animals 4 cr (at least 9 cr compulsory, two field courses, one animal and other botany field course).
Prerequisites and co-requisites:
Basic identification of animals (751373A) or equivalent knowledge.
Recommended optional programme components:
This course is a prerequisite to course Winter ecology and physiology (750325A). Recommended course after this is Special course in ornithology (755614S).
Recommended or required reading:
Compulsory at Oulanka: 1) Rytkönen, S. ym. 2003: 751306 Maaeläimistön tuntemus ja ekologia. - Biologian laitoksen monisteita 3/2003. Oulun yliopisto, Oulu. 2), Itämies, J. & Viro, P. 1995: Eläinten lajintuntemus, selkärangattomat. Eläintieteen laitoksen monisteita 1/1995, Oulun yliopisto, Oulu. Insect book recommended: Chinery, M. 1988 Pohjois-Euroopan hyönteisheimojen määritysopas, Tammi, Helsinki, 2. painos. The availability of the literature can be checked from this link.
Assessment methods and criteria:
Exam, seminar presentation. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.

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

755622S: Field course in terrestrial animals, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Seppo Rytkönen

Opintokohteen kielet: English

Leikkaavuudet:

751606S Field course in terrestrial animals 4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English.
Timing:
ECOGEN ECOz 1st summer.
Learning outcomes:
The aim of the course is to learn the basics of field identification and ecology of terrestrial animals in northern Finland. The student will understand that proper skills in species identification and knowledge of species' ecology are the basis of ecological research.
Contents:

The fauna in different kinds of terrestrial habitats is studied using several ecological sampling and research methods. The course is hold at the Oulanka Research Station, Kuusamo, and deals with identification and ecology of invertebrates, mammals (especially small mammals), gallinaceous birds and birds of prey. The exercises take place partly in the field and partly in the laboratory. Data gained during the course is analyzed. The results are reported (in PowerPoint) and presented in the final seminar in Kuusamo.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
70 h demonstrations and practicals, one species and theory exam, seminar.
Target group:
ECOGEN.
Prerequisites and co-requisites:
Basic identification of animals (751373A) or equivalent knowledge.
Recommended optional programme components:
This course is a prerequisite to course Winter ecology and physiology (750325A). Recommended course after this is Special course in ornithology (755614S).
Recommended or required reading:
Compulsory at Oulanka: 1) Rytkönen, S. ym. 2003: 751306 Maaeläimistön tuntemus ja ekologia. - Biologian laitoksen monisteita 3/2003. Oulun yliopisto, Oulu. 2), Itämies, J. & Viro, P. 1995: Eläinten lajintuntemus, selkärangattomat. Eläintieteen laitoksen monisteita 1/1995, Oulun yliopisto, Oulu. Insect book recommended: Chinery, M. 1988 Pohjois-Euroopan hyönteisheimojen määritysopas, Tammi, Helsinki, 2. painos. The availability of the literature can be checked from this link.
Assessment methods and criteria:
Exam, seminar presentation. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Dr. Seppo Rytkönen.
Working life cooperation:
No.
Other information:
Binoculars, bird identification book, suitable outfit. Preparation knife, preparation scissors and sharp cusp tweezers.

754626S: Field methods in freshwater biomonitoring, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Muotka, Timo Tapani

Opintokohteen kielet: Finnish

Leikkaavuudet:

754616S	Field methods in freshwater biomonitoring	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
M.Sc. 1.-2. year. Arranged if resources allow.
Learning outcomes:
The course familiarises students with methods used in biomonitoring of lakes and rivers.
Contents:
Sampling methods as well as biological and ecotoxicological laboratory analysis are practiced. Survey methods used to describe the state of habitats are applied to lake and river environments.
Mode of delivery:

Blended teaching.
Learning activities and teaching methods:
10 h lectures, 30 h field and laboratory exercises, group works.
Target group:
ECOz, ECOb.
Prerequisites and co-requisites:
Field course in aquatic animals (751307A) and Basic course in hydrobiology (754308A) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Internet material, sample taking standards and instructions.
Assessment methods and criteria:
Group work. Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Timo Muotka.
Working life cooperation:
No.
Other information:
-

750656S: Final examination in biology, 10 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

751699S	Final examination in zoology	10.0 op
752699S	Final examination in botany	10.0 op
753699S	Final examination in genetics	10.0 op

ECTS Credits:
10 ECTS credits / 267 hours of work.
Language of instruction:
Depending on the book, exam answers Finnish / English.
Timing:
M.Sc. 1 st or 2 nd year.
Learning outcomes:
TEAz and BSz student will understand profoundly certain (usually related to the pro gradu thesis) animal physiology's methods,
results and theories. TEAz and ECOz student will understand profoundly animal ecology's essential methods, results and theories.
Contents:
Examination on selected literature of a specific subject.
Exam books has to be agreed in beforehand with the professor.
MAJOR ECOLOGY
Animal ecology orientation (prof. Markku Orell):

- Begon, M., Townsend, C.R. & Harper, J.L. 2006: Ecology. From Individuals to Ecosystems. - Blackwell, 658 p., (8 ECTS)
- Ridley, M. 2004: Evolution - Blackwell, 198 p. (pp. 347-520 ja 590-613), (2 ECTS) OR
- Futuyma, D.J. 2005: Evolution - Sinauer, 200 p. (chapters 2-6, 13, 15-16, 21), (2 ECTS).

Or other litterature agreed with the proferssor

Plant ecology orientation (prof. Jari Oksanen):

- Schultze, E.-D., Beck, E., K. Muller-Hohenstein. 2002. Plant ecology. Springer.

- Crawford, R.M.M. 2008. Plants at the margin. Cambridge. (Professor needs a copy of the book in order to make the exam questions)
- Keddy, P.A. Plants and Vegetation. Origin, processes, consequences. Cambridge.
- Chapin, Matson & Mooney 2002. Principles of terrestrial ecosystem ecology. Springer.
  Or other litterature agreed with the proferssor

MAJOR BIOSCIENCE

Genetics orientation (prof. Outi Savolainen):

- Lewin Genes (VIII tai IX) (or equal)

Some part of the book can be replaced with other books for example

- Nielsen, R. ja Slatkin, M. 2013 An introduction to population genetics. Sinauer, 287 p.
  OR
- Conner, J. K. ja Hartl. D. L. 2004. A primer of ecological genetics. Sinauer. 304 p.

Or other litterature agreed with the proferssor, for example human genetics, quatintative genetics or bioinformatics.

Animal physiology orientation (prof. Esa Hohtola):

- Compulsory book: Willmer, Stone, Johnston: Environmental Physiology of Animals, 2nd ed, Blackwell, 754 p. 8 ECTS
- Litterature related to the pro gradu thesis 200-250 pages.2 ECTS

Plant physiologi orientation (prof. Hely Häggman)

- Beeckman 2009. Root Development. Annual Plant Reviews 37. - Wiley-Blackwell. ISBN 978-1-4051-6150-3
- Coruzzi Gutierrez 2009. Plant Systems Biology. Annual Plant Reviews 35. - Wiley-Blackwell. ISBN 978-1-4051-6283-8.
- Dickison, W.C. 2000. Integrative plant anatomy. 533 s. ISBN 0-12-215170-4
- Fahn, A. 1990. Plant anatomy. 4. rev. ed. 588 s. ISBN 0-08-037490
- Gan 2007. Senescence processes in plants. - Wiley-Blackwell. ISBN 978-0-8138-1963-1
- Hayat, Mori, Pichtel & Ahmad 2010. Nitric oxide in plant physiology. - Wiley-Blackwell. ISBN 978-3-527-32519-1
- Hvoslef-Eide, A.K. & Preil, W. 2005. Liquid culture systems for in vitro plant propagation. Springer ISBN 1-4020-3199-8
- Jenks & Wood 2009. Genes for Plant Abiotic Stress. - Wiley-Blackwell. ISBN 978-1-4051-3984-7
- Kinight, Perroud, Cove 2009. The Moss Physcomitrella- Annual Plant Reviews, volume 36 - Wiley-Blackwell. ISBN 978-1-4051-8189-1.
- Lambers, H., Chapin III, F.S., Pons, T.L. 2008. Plant physiological ecology. Springer. 610 p. ISBN 978-0-387-78340-6
- Osbourn, A.E. & Lanzotti, V. 2009. Plant-derived natural products: synthesis, function, and application. 587 s. Springer. (Printed or electronical book version in the library)
- Parker 2008. Molecular aspects of plant disease resistance. Annual Plant Reviews , volume 34. - Wiley-Blackwell. ISBN 978-1-4051-7532-6
- Reed, B.M. 2008. Plant Cryopreservation: A Practical Guide. Springer ISBN 978-0-387-72275-7
- Smith & Read 2008. Mycorrhizal symbiosis. 3. painos. Academic Press. 800 p.
- Taiz, L. & Zeiger, E. 2010. Plant Physiology. Fifth Edition.782 p. Sinauer Associates, Inc. ISBN-10: 0878938664
- Wink 2010. Biochemistry of plant secondary metabolism. Annual Plant Reviews, volume 40. - Wiley-Blackwell. ISBN 978-1-4051-83970. Electronical book. Link can be found for example from OULA library cataloque. Dawsonera can be accessed with koivu/paju password. http://www.dawsonera.com/depp/reader/protected/external/AbstractView/S9781444320510
- Yeo & Flowers 2007. Plant Solute Transport. - Wiley-Blackwell. ISBN 978-1-4051-3995-3
- Yoshioka & Shinozaki 2009. Signal Crosstalk in Plant Stress Responses - Wiley-Blackwell. ISBN 978-0-8138-1963-1

The availability of the literature can be checked from this link.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Book exam (4 h). Exam is held in Examinarium, instructions: http://www.oulu.fi/english/studying/examinarium

Target group:

TEAz, ECOz and BSz: compulsory.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

ECOz: Begon, M., Townsend, C.R. & Harper, J.L. 2006: Ecology. From Individuals to Ecosystems. - Blackwell, 658 s., (8 ECTS). Ridley, M. 2004: Evolution - Blackwell, 198 p. (pages 347-520 and 590-613), (2 ECTS) or Futuyma, D.J. 2005: Evolution - Sinauer, 200 p. (chapters 2-6, 13,
15-16, 21), (2 ECTS). BSz: Compulsory Willmer, Stone, Johnston 2004: Environmental Physiology of Animals, 2. ed, Blackwell, 754 p. Literature
related to the pro gradu thesis 200-250 pages. The literature has to be agreed upon with the professor in advance! Read more about assessment criteria at the University of Oulu webpage.

Assessment methods and criteria:
Book exam in biology public exam day. Read more about assessment criteria at the University of Oulu webpage. Exam in Examinarium: http://www.oulu.fi/english/studying/examinarium
Grading:
1-5 / Fail.
Person responsible:
Professors.
Working life cooperation:
No.
Other information:
-

754623S: Final examination in hydrobiology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Muotka, Timo Tapani

Opintokohteen kielet: Finnish

Leikkaavuudet:

754612S Final examination in hydrobiology 7.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English.
Timing:
M.Sc. 1 st or 2 nd year.
Learning outcomes:
The student will understand profoundly certain hydrobiology’s methods, results and theories.
Contents:
The examination is compulsory to the students taking the hydrobiology study package. Reading material selected in agreement with the teacher in charge.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Book exam.
Target group:
-
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Exam books agreed with the teacher.
Assessment methods and criteria:
Final exam in biology public exam day. 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:
-

755624S: Functional animal ecology, 5 op

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

751678S Functional animal ecology 6.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Lectures in Finnish, exercises in Finnish / English.
Timing:
B.Sc. 2 nd spring or M.Sc. 1 st spring. NNE.
Learning outcomes:
The aim of the course is to understand the relationship between morphology and function by the means of general ecomorphological model. The student will get both theoretical and practical basics for ecomorphological (and. general scientific) research procedures: scientific hypothesizing, sampling, data analysis and reporting and interpreting the results.
Contents:
The course focuses on the relationship between phenotype and function, especially the correlation between animal morphology and behaviour. The course consists of two parts: A) Lectures in Finnish. However, articles about each subject are available for foreign students, including ecomorphological models and correlations, measurement error, allometry, fluctuating asymmetry and phylogenetic analyses. B) Exercises consisting of miniature studies, field and laboratory work, and seminar. The results of the mini studies, in form of PowerPoint presentations, are presented in the seminar. Before the exercises, students write a home essay (or take an exam).
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
12 h lectures, 40 h exercises, seminar and essay or exam.
Target group:
Recommended for ECOe.
Prerequisites and co-requisites:
Recommended Evolution, systematics and morphology of animals, practicals (755312A) and Basics of statistics I (806109P).
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Essay or exam. Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Dr. Seppo Rytkönen.
Working life cooperation:
No.
Other information:
-

755324A: Functional animal ecology, 5 op

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

751378A Functional animal ecology 6.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Lectures in Finnish, exercises in Finnish / English.
Timing:
B.Sc. 2 nd spring or M.Sc. 1 st spring. NNE.
Learning outcomes:
The aim of the course is to understand the relationship between morphology and function by the means of general ecomorphological model. The student will get both theoretical and practical basics for ecomorphological (and. general scientific) research procedures: scientific hypothesizing, sampling, data analysis and reporting and interpreting the results.
Contents:
The course focuses on the relationship between phenotype and function, especially the correlation between animal morphology and behaviour. The course consists of two parts: A) Lectures in Finnish. However, articles about each subject are available for foreign students, including ecomorphological models and correlations, measurement error, allometry, fluctuating asymmetry and phylogenetic analyses. B) Exercises consisting of miniature studies, field and laboratory work, and seminar. The results of the mini studies, in form of PowerPoint presentations, are presented in the seminar. Before the exercises, students write a home essay (or take an exam).
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
12 h lectures, 40 h exercises, seminar and essay or exam.
Target group:
Recommended for ECOe.
Prerequisites and co-requisites:
Recommended Evolution, systematics and morphology of animals, practicals (755312A) and Basics of statistics I (806109P).
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Essay or exam. Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Dr. Seppo Rytkönen.
Working life cooperation:
No.
Other information:
-

756652S: Genetic transformation of plants, 5 - 8 op

Voimassaolo: 01.08.2015 - 31.12.2019
Opiskelumuoto: Advanced Studies
Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha

Opintokohteen kielet: Finnish

Leikkaavuudet:

756625S Genetic transformation of plants 4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st or 2 nd autumn, every second year.
Learning outcomes:
The student will assess and apply the concept of genetical modification. The student will apply the different techniques of genetic transformation and will judge their pros and cons.
Contents:
The lectures will cover gene constructs, marker-genes, different genetic transformation methods, legislation, and commercial cultivations. The exercises will familiarize the students with the most common genetic transformation methods including Agrobacterium-mediated transformation, electroporation, biolistic transformation and VIGS.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lab course + demonstrations (45 h) and lectures (20 h), reports, seminar or essay, lecture exam and final conclusions.
Target group:
BSb: compulsory MSc studies either course Advanced course in plant biology (752682S) 9 cr or Genetic transformation of plants (756625S) 8 cr.
Prerequisites and co-requisites:
Lectures of Advanced course in plant biology (752682S) helps in following the course.
Recommended optional programme components:
-
Recommended or required reading:
Handout and supplementary reading given in lectures and exercises.
Assessment methods and criteria:
Report, seminar and exam. Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Hely Häggman.
Working life cooperation:
No.
Other information:
-

757315A: Human genetics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Tanja Pyhäjärvi

Opintokohteen kielet: Finnish

Leikkaavuudet:

753307A Human genetics 4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. or M.Sc. degree. Odd years, autumn.
Learning outcomes:
To understand human evolution and man as a biological species.
Contents:
Human evolution in Africa, spread of different human species to other continents, research methods including population genetics and genomics, molecular human genetics: inherited diseases and susceptibilities.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures, home works.

Target group:
Arranged every second autumn (odd years). Course neccessary for students of genetics, not compulsory. Suitable also for biochemistry students and education students.
Prerequisites and co-requisites:
Concepts of genetics (753124P) or equivalent knowledge.
Recommended optional programme components:
Educational, voluntary.
Recommended or required reading:
Jobling et al. 2014: Human evolutionary genetics. 2nd ed. Garland Science, ISBN 9780815341482. The availability of the literature can be checked from this link.
Assessment methods and criteria:
Learning diary, controlled exam and student activity. Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Dr. Tanja Pyhäjärvi
Working life cooperation:
No.
Other information:
-

757615S: Human genetics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Savolainen Outi

Opintokohteen kielet: Finnish

Leikkaavuudet:

753607S Human genetics 4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. or M.Sc. degree. Odd years, autumn.
Learning outcomes:
To understand human evolution and man as a biological species.
Contents:
Human evolution in Africa, spread of different human species to other continents, research methods including population genetics and genomics, molecular human genetics: inherited diseases and susceptibilities.

Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures, home works.
Target group:
Arranged every second autumn (odd years). Course neccessary for students of genetics, not compulsory. Suitable also for biochemistry students and education students.
Prerequisites and co-requisites:
Concepts of genetics (753124P) or equivalent knowledge.
Recommended optional programme components:
Educational, voluntary.
Recommended or required reading:
http://www.oulu.fi/genet/HumGen/Jobling et al. 2014: Human evolutionary genetics. 2nd ed. Garland Science, ISBN 9780815341482. The availability of the literature can be checked from this link.
Assessment methods and criteria:
: Learning diary, controlled exam and student activity. Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Outi Savolainen.
Working life cooperation:
No.
Other information:
-

751673S: Identification of animals, 5 op

Voimassaolo: 01.08.2011 - 31.07.2016

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Koivula

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English.
Timing:
ECOGEN ECOz 1 st autumn and spring.
Learning outcomes:
Main point of the course is to learn to indentify Finnish animal species (vertebrate) and families (invertebrate) from museum samples. Basics of species' ecology and classification of organisms.
Contents:
During the autumn semester (2 h lectures, 16 h exercises, exam), the Finnish vertebrate fauna is studied using stuffed museum samples. In the spring semester (14 h lectures, 24 h exercises, exam) the invertebrate taxons (mostly family- or genus-level) common in Finland are studied using museum samples.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
16 h lectures, 40 h exercises, 2 exams.
Target group:
ECOGEN.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
This course is needed for attending courses Field course in terrestrial animals (751306A) and Field course in aquatic animals (751307A).
Recommended or required reading:

Course handouts, Itämies J. ja Viro P. 1995: Eläinten lajintuntemus, selkärangattomat, 73 p.; Putaala, A., Marjakangas, A. & Rytkönen, S. 2001: Eläinten lajintuntemus, selkärankaiset, 42 p.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Two species exams.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Dr. Kari Koivula.
Working life cooperation:
No.
Other information:
-

751373A: Identification of animals, 5 op

Voimassaolo: - 31.07.2016

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Pudas, Tuula Kaarina, Kari Koivula

Opintokohteen kielet: Finnish

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

Language of instruction:
Finnish / English.
Timing:
B.Sc. 1 st autumn and spring. NNE.
Learning outcomes:
Main point of the course is to learn to indentify Finnish animal species (vertebrate) and families (invertebrate) from museum samples. Basics of species' ecology and classification of organisms.
Contents:
During the autumn semester (2 h lectures, 16 h exercises, exam), the Finnish vertebrate fauna is studied using stuffed museum samples. In the spring semester (14 h lectures, 24 h exercises, exam) the invertebrate taxons (mostly family- or genus-level) common in Finland are studied using museum samples.

Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
16 h lectures, 40 h exercises, 2 exams.

Target group:
Compulsory to the biology students.

Prerequisites and co-requisites:
No.
Recommended optional programme components:
This course is needed for attending courses Field course in terrestrial animals (751306A) and Field course in aquatic animals (751307A).
Recommended or required reading:
Course handouts, Itämies J. ja Viro P. 1995: Eläinten lajintuntemus, selkärangattomat, 73 p.; Putaala, A., Marjakangas, A. & Rytkönen, S. 2001: Eläinten lajintuntemus, selkärankaiset, 42 p.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Two species exams.
Read more about assessment criteria at the University of Oulu webpage.
Grading:

1-5 / Fail.
Person responsible:
Dr. Kari Koivula.
Working life cooperation:
No.
Other information:
-

756311A: Identification of garden plant species, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Anna Ruotsalainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay756311A	Identification of garden plant species (OPEN UNI)	5.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 2 nd summer.
Learning outcomes:
Capability to indentify garden and crop species. Emphasising species thriving in northern conditions.
Contents:
Independent study of approximately 400 species in the Botanical Gardens with the help of a handout.
Mode of delivery:
Face-to-face teaching. Self-learning in the collections (species list is given, explanations in Finnish only).
Learning activities and teaching methods:
Independent studying in the garden. Botanical Gardens personnel will help finding the species on demand.
Target group:
ECOb, BSb and TEA.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
Course generally promotes studies in species identification and biodiversity. It is separate course but linked with the Plant evolution and systematics, exercises (752609S).
Recommended or required reading:
Hiltunen, R. & Hyvärinen, M. 2009: Puutarhakasvien lajintuntemus. Biologian laitoksen monisteita, Yliopistopaino, Oulu.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Final exam in August or beginning of September in the Botanical Gardens.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Anna Liisa Ruotsalainen.
Working life cooperation:
No.
Other information:
Contact the responsible teacher on details.

756642S: Identification of plant species, 3 - 4 op

Voimassaolo: 01.08.2015 - 31.07.2017

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola

Opintokohteen kielet: English

Leikkaavuudet:

752603S Identification of plant species 3.0 op

ECTS Credits:
3-4 ECTS credits / 80-107 hours of work.
Language of instruction:
English.
Timing:
M.Sc. 1st autumn ECOGEN ECOb.
Learning outcomes:
Student is able to identify most common boreal plant species in herbarium specimens.
Contents:
Demonstrations (16 h) and/or independent study of ca. 350 vascular plants, mosses and lichens in the boreal vegetation zone. 3 cr. without the literature in the exam and 2 cr. with the literature in the exam. In the identification exam student has to know specimens scientific name and
family in latin.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
16 h demonstrations and learning from the herbarium samples. In the identification exam student has to know specimens scientific name and family in latin.
Target group:
ECOGEN.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
Course is prerequisite for the Field course in ecological botany (752304A) and for the advanced plant species identification courses.
Recommended or required reading:
Booklet Hanhela, P. & Halonen, P. 1995: Plant Identification. The availability of the literature can be checked from this link.
Assessment methods and criteria:
Species exam. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Dr. Annamari Markkola.
Working life cooperation:
No.
Other information:
-

756342A: Identification of plant species, 3 - 4 op

Voimassaolo: 01.08.2015 - 31.07.2017

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola

Opintokohteen kielet: Finnish

Leikkaavuudet:

756355A	Identification of plant species, brief	3.0 op
750303A	Nature conservation and land use	3.0 op

ECTS Credits:
3-4 ECTS credits / 80-107 hours of work. NNE.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 1 st autumn.
Learning outcomes:
Student is able to identify most common boreal plant species in herbarium specimens.
Contents:
Demonstrations (16 h) and/orindependent study of ca. 350 vascular plants, mosses and lichens in the boreal vegetation zone. 3 cr. without the literature in the exam and 2 cr. with the literature in the exam. In the identification exam student has to know specimens scientific name and family in latin.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
16 h demonstrations and learning from the herbarium samples. In the identification exam student has to know specimens scientific name and family in latin.
Target group:
3 cr compulsory to TEA and ECO, 2 cr compulsory to BS.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
Course is prerequisite for the Field course in ecological botany (752304A) and for the advanced plant species identification courses.
Recommended or required reading:
Booklet Hanhela, P. & Halonen, P. 1995: Plant Identification.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Species exam. 3 cr. without the literature and 2 cr. with the help of the literature. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.

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

751642S: Identification of vertebrates in the field, 2 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Koivula

Opintokohteen kielet: Finnish

ECTS Credits:
2 ECTS credits / 53 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st spring.

Learning outcomes:
After having the course the students have a basic knowledge (a level expected from a professional biologist) about identification of vertebrate animals in the field.
Contents:
Identification exam on birds and mammals in the field. Their natural history: tracks, droppings, nests etc.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Independent learning, exam.
Target group:
Compulsory to ECOz.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Field exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Dr. Kari Koivula.
Working life cooperation:
No.
Other information:
-

030005P: Information Skills, 1 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Technology

Arvostelu: 1 - 5, pass, fail

Opettajat: Ursula Heinikoski, Sassali, Jani Henrik

Opintokohteen kielet: Finnish

Leikkaavuudet:

030004P	Introduction to Information Retrieval	0.0 op

ECTS Credits:
1 ECTS credit
Language of instruction:
Finnish
Timing:
2nd or 3rd year
Learning outcomes:
Students know the different phases of information retrieval process and basic techniques of scientific information retrieval. They will find the most important reference databases of their discipline and know how to evaluate information sources and retrieval results.
Contents:
Retrieval of scientific information, the retrieval process, key databases of the discipline, and evaluation of information retrieval and information sources.
Mode of delivery:
Blended teaching: classroom training, web-based learning material and exercises in Optima environment, a final assignment on a topic of the student’s own choice
Learning activities and teaching methods:
Training sessions 8h, group working 7h, self-study 12h
Target group:

Compulsory for all students of the Faculty of Technology, the Faculty of Information Technology and Electrical Engineering and the Faculty of Architecture. In the Faculty of Science compulsory for students of biology, physics, geosciences, chemistry and geography. Optional for students of biochemistry and mathematics.
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
Web learning material https://wiki.oulu.fi/display/030005P.
Assessment methods and criteria:
Passing the course requires participation in the training sessions and successful completion of the course assignments.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
pass/fail
Person responsible:
Science and Technology Library Tellus, tellustieto (at) oulu.fi
Working life cooperation:
-
Other information:
-

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	Introduction to 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:
-

756650S: Introduction to molecular ecology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Tanja Pyhäjärvi, Kvist, Laura Irmeli

Opintokohteen kielet: English

Leikkaavuudet:

750645S	Molecular ecology	2.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English.
Timing:
B.Sc. 2 nd spring BSg, M.Sc. 1 st spring, ECOGEN ECO and BS. Introduction to Population genetics compulsory to BSg in M.Sc degree.
Learning outcomes:
This course introduces genetic theories, basics of phylogenetics and usage of molecular biology methods in ecology. The aim is that students know the basic methodology, can apply them into variety of genetic and ecological questions and is familiar with basics of population genetics and phylogenetics in order to be able to analyze and interpret genetic data.
Contents:
Basics of population genetics (variation, effective population size, bottlenecks, population structure, gene flow), relationships between molecular and adaptive variation, phylogenetic methods and phylogeography. Usage of molecular methods for identification of species, sex and individuals, behavioural ecology (mating systems, cooperation, mating success) and conservation.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Population genetics: 20 h lectures, 4 h seminars, 24 h exercises (problem solving, laboratory and computer exercises), report, essays, home exam, final exam. *Molecular ecology:* 20 h lectures, 4 h seminars, 36 h exercises (laboratory and computer exercises), final exam.
Target group:
BSc: BS optional 2nd spring; MSc: 1st spring BSg compulsory. ECOGEN: BS and ECO.
Prerequisites and co-requisites:
Concepts of genetics (757109P) and Experimental course in general genetics (757110P) and Molecular evolution (757312A) or equivalent knowledge.
Recommended optional programme components:
Population genetics BS: Recommended prerequisite for course Quantitative genetics and plant and animal breeding (757616S). Compulsory prequisite for courses Experimental course in evolutionary genomics (757621S), Advanced course in bioinformatics (757619S) and DNA analysis in population genetics (757618S). *Molecular ecology ECO*: Basics in population ecology (756351A) and advanced course in population ecology (755626S).
Recommended or required reading:

Hedrick 2005: Genetics of populations 3. or 4. ed. Beebee, T and Rowe G.2004 or 2008. An introduction to molecular ecology. Oxford University Press.
Assessment methods and criteria:
Population genetics: Home exam, final exam, seminar, essays, reports.
Molecular ecology: Final exam and seminar.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Dr. Laura Kvist and Dr. Tanja Pyhäjärvi.
Working life cooperation:
No.
Other information:
Note that Introduction to Molecular ecology and Introduction to population genetics courses are alternative; students cannot get credits from both.

Compulsory

756650S-02: Introduction to molecular ecology, exercises, 0 op

Voimassaolo: 01.08.2015 - 31.07.2019
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: English

Ei opintojaksokuvauksia.

756650S-01: Introduction to molecular ecology, lectures, 0 op

Voimassaolo: 01.08.2015 - 31.07.2019
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: English

Ei opintojaksokuvauksia.

750629S: Kaamos symposium, 2 - 4 op

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

ECTS Credits:
2-4 ECTS credits / 53-107 hours of work.
Language of instruction:
English.
Timing:
M.Sc., Ph.Lic. and Ph.D. autumn.
Learning outcomes:

Students get acquainted to preparing, presenting and evaluating a scientific oral presentation.
Contents:
The Kaamos Symposium consisting of presenting current research projects is held every year at the end of autumn period. Through presenting their research work and projects and obtaining feedback from the audience (students and the staff of the department) post graduate students gain experience in holding a scientific presentation.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Own presentation and the whole symposium 4 cr (postgraduate students), Organizing the symposium 3 cr (postgraduate students), poster 2 cr (postgraduate students), summary of five presentations and symposium 2 cr (undergraduate students).
Target group:
Undergraduate and postgraduate biology students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Abstract book.
Assessment methods and criteria:
Presentation or reports.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Timo Muotka.
Working life cooperation:
No.
Other information:
-

750329A: Kaamos-symposium, 2 op

Voimassaolo: 01.08.2011 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Muotka, Timo Tapani

Opintokohteen kielet: English

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
2 ECTS credits / 53 hours of work.
Language of instruction:
English.
Timing:
B. Sc., M. Sc., autumn.
Learning outcomes:
Undergraduate students get acquainted to listening and evaluating scientific oral presentations.
Contents:
Keynote spekers and Ph.D. students seminar presentations in The Kaamos Symposium.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Own presentation and the whole symposium 4 cr (postgraduate students), Organizing the symposium 3 cr (postgraduate students), poster 2 cr (postgraduate students), summary of five presentations and symposium 2 cr (undergraduate students).
Target group:

Undergraduate and postgraduate biology students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Abstract book.
Assessment methods and criteria:
Reports.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Timo Muotka.
Working life cooperation:
No.
Other information:
-

750316A: Legislation in environmental protection, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay750316A Legislation in environmental protection (OPEN UNI) 5.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 2nd or 3rd or M.Sc. 1 st autumn - spring. Every second year.
Learning outcomes:
To familiarise students with environmental legislation in European Union with regard to environmental protection and natural resources. Student is able to apply his knowledge to different environmental questions and analyze the needed means. Student knows the environmental administration and organisations in environmental protection and natural resources.
Contents:
Environmental protection and natural resources legislation in Finland and in Europe. Environmental administration and organisations, use and protection of natural resources, prevention of environmental destruction, assessment of environmental effect as well as principles of environmental legislation and main international conventions, environmental issues in UNEP and OECD are covered.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
24 h lectures, 18 h exercises including demonstrations and literature.
Target group:
Compulsory to students who are doing the environmental protection 25 cr. study module.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
Compulsory to students who are doing the environmental protection 25 cr. study module.
Recommended or required reading:
Erkki J. Hollo 2001: Ympäristönsuojeluoikeus, WSOY, 592 s, Kokkonen, Tuomas (toim.): Ympäristölainsäädäntö 2011. 1269 s Talentum.
The availability of the literature can be checked from this link.

Assessment methods and criteria:
Exam or learning diary.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Dr. Kari Taulavuori.
Working life cooperation:
No.
Other information:
Also the environmental legislation course that Faculty of technology arranges is accepted.

750616S: Legislation in environmental protection, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 2nd or 3rd or M.Sc. 1 st autumn - spring. Every second year.
Learning outcomes:
To familiarise students with environmental legislation in European Union with regard to environmental protection and natural resources. Student is able to apply his knowledge to different environmental questions and analyze the needed means. Student knows the environmental administration and organisations in environmental protection and natural resources.
Contents:
Environmental protection and natural resources legislation in Finland and in Europe. Environmental administration and organisations, use and protection of natural resources, prevention of environmental destruction, assessment of environmental effect as well as principles of environmental legislation and main international conventions, environmental issues in UNEP and OECD are covered.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
24 h lectures, 18 h demonstrations and exercises.
Target group:
Compulsory to students who are doing the environmental protection 25 cr study module.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Erkki J. Hollo 2001: Ympäristönsuojeluoikeus, WSOY, 592 s, Kokkonen, Tuomas (toim.): Ympäristölainsäädäntö 2011. 1269 s Talentum.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Final exam or learning diary.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Dr. Kari Taulavuori.
Working life cooperation:
No.
Other information:

Also the environmental legislation course that Faculty of technology arranges is accepted.

752316A: Macro fungi, 3 op

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

ay752316A Macro fungi (OPEN UNI) 3.0 op

ECTS Credits:
3 ECTS credits / 80 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 3 rd autumn. NNE.
Learning outcomes:
Student is able to identify most common macrofungal species as fresh specimens and knows basics of fungal ecology.
Contents:
Demonstrations of macrofungi in the field, basics of identification, ecology and distribution.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
14 h lectures, 25 h exercises including excursions, identification exam.
Target group:
Optional.

Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Course handout, Salo, P. and Nummela-Salo, U. 2002: Sienikurssi (752316). Toinen uusittu painos. Lajiesittelyt. Biologian laitoksen monisteita 2/2002, 41 p. and mushroom guides.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Species identification exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Dr. Annamari Markkola.
Working life cooperation:
No.
Other information:
-

752616S: Macro fungi, 3 op

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

ECTS Credits:
3 ECTS credits / 80 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 3 rd autumn. NNE.

Learning outcomes:
Student is able to identify most common macrofungal species as fresh specimens and knows basics of fungal ecology.
Contents:
Demonstrations of macrofungi in the field, basics of identification, ecology and distribution.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
14 h lectures, 25 h exercises including excursions, identification exam.
Target group:
Optional course.

Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Course handout, Salo, P. and Nummela-Salo, U. 2002: Sienikurssi (752316). Toinen uusittu painos. Lajiesittelyt. Biologian laitoksen monisteita 2/2002, 41 p. and mushroom guides.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Species exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Dr. Annamari Markkola.
Working life cooperation:
No.
Other information:
-

750678S: Master of science seminar, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Orell, Markku Ilmari

Opintokohteen kielet: Finnish

Leikkaavuudet:

750696S	Master of science seminar	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st - 2 nd year.
Learning outcomes:
The seminar gives advanced scientific communication and information retrieval skills.

Contents:
Instructions for the M.Sc. thesis and interactive reporting of the work in progress.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Student will give two seminar presentations and one research seminar and one result seminar presentation opponenting, eight research seminar and eight result seminar attendances. Research plan seminar and results seminar presentations cannot be given at same day. Topics and dates have to be agreed with the professor in beforehand. See notice board for the schedule and instructions.
Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Seminar presentations, attendance and opponenting. Detailed instructions on the department's notice board. Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Markku Orell.
Working life cooperation:
No.
Other information:
-

750632S: Maturity exam, 0 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
0 ECTS credits / 1 hours of work.
Language of instruction:
Finnish / Swedish / English.
Timing:
M.Sc. degree.
Learning outcomes:
Student will present and analyze research material, methods and results.
Contents:
After completing the Master of Science Thesis, the student will give summary in Finnish, Swedish or English to show his/her familiarity with the topic of the thesis.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Instructions at the Faculty of Science internet homepage. One teacher examine the maturity exam and Pro gradu working group accepts it.
Target group:
Compulsory to the biology students. After completing the thesis.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-

Assessment methods and criteria:
Summary form at the Faculty of Science internet homepage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Professor of the student's major subject.
Working life cooperation:
No.
Other information:
-

755325A: Methods in ecology I, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Koivula

Opintokohteen kielet: Finnish

Leikkaavuudet:

750347A Ecological methods I 6.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 3 rd autumn.
Learning outcomes:
Students are familiar to scientific method and can separate scientific information from other contents of culture. Students have learned to assess the uncertainty of information and can evaluate the quality of information with respect to its applied value. Students also learn the build a valid theoretical or empirical strategy to solve scientific problems.
Contents:
The aim of the course is to introduce the students in scientific modes of argumentation and research methods in modern ecology. Both the empirical and theoretical methods and their relationship in theory formation are discussed. Hypothesis testing; observational method, experimental method and comparative method are the empirical methods introduced. Autumn period ends in a seminar where scientific publications are analysed.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures, seminar, exercises and exam.
Target group:
Compulsory to ECO.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Exam. Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Dr. Kari Koivula, Dr. Seppo Rytkönen and Prof. Markku Orell.
Working life cooperation:
No.

Other information:
-

755625S: Methods in ecology I, 5 op

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

750644S Methods in ecology I 6.0 op

Ei opintojaksokuvauksia.

755329A: Methods in ecology II, 5 op

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

750647S Methods in ecology II 7.0 op

Ei opintojaksokuvauksia.

755629S: Methods in ecology II, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Jari-Heikki Oksanen, Seppo Rytkönen
Opintokohteen kielet: English
Leikkaavuudet:

750647S Methods in ecology II 7.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish, exercises also in English.
Timing:
M. Sc. 1 st spring, ECOGEN ECOz and ECOb 1st spring.
Learning outcomes:
The aim of the course is to learn in practice how to apply scientific method in ecological research. The student learns how to select appropriate methods for different ecological problems, and a toolkit for study design and data analysis.

Contents:
Continuation to course Ecological methods I 6cr (750347A). This course focuses on applying the scientific method in ecological research. The course consists mainly of computer exercises in the following subjects: sampling, sample size determination, experimental design and statistical analysis esp. analysis of variance, comparative methods (independent contrasts - analysis), multivariate methods (cluster analysis, ordination) and meta-analysis. Also other current issues can be included. The course ends in a Master Thesis seminar where students can discuss and develop their thesis plans with students and instructors.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures, seminar, exercises and exam.
Target group:
Compulsory to ECOz and ECOb and ECOGEN ECOz and ECOb.
Prerequisites and co-requisites:
Course Ecological methods I (750347A). Recommended: Basics of statistics I (806109P).
Recommended optional programme components:
-
Recommended or required reading:
Handout.
Assessment methods and criteria:
Exam. Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Pass.
Person responsible:
Prof. Jari Oksanen and Dr. Seppo Rytkönen.
Working life cooperation:
No.
Other information:
-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Savolainen Outi

Opintokohteen kielet: Finnish

Leikkaavuudet:

753612S Methods in genomics and genomics evolution 6.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1st spring.
Learning outcomes:
Student knows focal features of genome structure, evolution and research methods.
Contents:
Genome structure, composition, comparative genomics, recombination and evolutionary factors affecting genome composition. Theory and methods.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
24 h lectures, 24 h seminars, independent work 70 h, exam, reports.
Target group:
BSg.
Prerequisites and co-requisites:

No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Reports and exam. Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Outi Savolainen.
Working life cooperation:
No.
Other information:
-

750179P: Minor subject examination in biology, 5 op

Voimassaolo: 01.08.2015 - 31.07.2017
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Muotka, Timo Tapani
Opintokohteen kielet: Finnish
Leikkaavuudet:

750160P	Minor subject examination in biology	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Book in English.
Timing:
B.Sc. / M.Sc.
Learning outcomes:
The book exam gives to the non-biology student basics in biology so that he/she can follow the hydrobiology courses arranged by the biology degree programme.
Contents:
Basics in biology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Book exam.
Target group:
A book exam compulsory to non-biology students who do the hydrobiology study package.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
A compulsory book exam to non-biology students taking the hydrobiology study package.
Recommended or required reading:
Reece, J.B. Urry, L.A. Cain, M.L., Wasserman, S.A. Minorsky, P.V. & Jackson R.B. 2011: Campbell Biology (9th ed). Pearson, Global Edition, 1309 p. The availability of the literature can be checked from this link.
Assessment methods and criteria:
Book 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:
-

752692S: Mire ecology, 5 op

Voimassaolo: 01.08.2003 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Virtanen, Risto Juhani
Opintokohteen kielet: Finnish
Leikkaavuudet:

ay752692S Mire ecology 5.0 op

ECTS Credits:
4 ECTS credits / 107 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 2 nd or 3 rd autumn. M.Sc. 1 st or 2 nd autumn. Every second year at the Oulanka research station. Arranged if resources allow.
Learning outcomes:
By passing this course a student is able to identify plant species (bryophytes and vascular plants), mire types, vegetation of boreal areas, species indicator values, determine mire types, interpret ecology of mire systems and make inventories on mire landscapes.
Contents:
Plant species (bryophytes and vascular plants), mire types, vegetation of boreal areas. Regional patterns in mire vegetation, mire types and underlying ecological gradients. Mire hydrotopography and peat stratigraphy. Red list status of mire vegetation.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures 9 h, field course, demonstations and field exercises 47 h.
Target group:
Plant ecology students.
Prerequisites and co-requisites:
Field course in ecological botany (752304A) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
To be announced.
Assessment methods and criteria:
Mire type and species exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Mire types and species exam. 1-5 / Fail.
Person responsible:
Dr. Risto Virtanen.
Working life cooperation:
No.
Other information:
Organised together with the University of Eastern Finland.

752392A: Mire ecology, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Virtanen, Risto Juhani

Opintokohteen kielet: Finnish

ECTS Credits:
4 ECTS credits / 107 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 2 nd or 3 rd autumn. M.Sc. 1 st or 2 nd autumn. Every second year at the Oulanka research station. Arranged if resources allow.
Learning outcomes:
By passing this course a student is able to identify plant species (bryophytes and vascular plants), mire types, vegetation of boreal areas, species indicator values, determine mire types, interpret ecology of mire systems and make inventories on mire landscapes.
Contents:
Plant species (bryophytes and vascular plants), mire types, vegetation of boreal areas. Regional patterns in mire vegetation, mire types and underlying ecological gradients. Mire hydrotopography and peat stratigraphy. Red list status of mire vegetation.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures 9 h, field course and field exercises 47 h.
Target group:
Plant ecology students.
Prerequisites and co-requisites:
Field course in ecological botany (752304A).
Recommended optional programme components:
-
Recommended or required reading:
Eurola, S., Huttunen, A. & Kukko-oja. K. 1995: Suokasvillisuusopas. Oulanka Reports 14: 1-85 ja Eurola, S., Bendiksen, K. & Rönkä, A. 1990: Suokasviopas. Oulanka Reports 9: 1-205.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Lectures, field exercises, team work in small groups.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Mire types and species exam. 1-5 / Fail.
Person responsible:
Dr. Risto Virtanen.
Working life cooperation:
No.
Other information:
Organised together with the University of Eastern Finland.

757312A: Molecular evolution, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kuittinen, Helmi Helena

Opintokohteen kielet: Finnish

Leikkaavuudet:

753327A	Molecular evolution	4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 2nd autumn or M.Sc. 1st autumn.
Learning outcomes:
After the course the student knows some basic methods that are used to study the history of living organisms and the evolutionary mechanisms. The student knows the main concepts in the field and can read scientific articles in molecular evolution.
Contents:
Basic methods of estimation of nucleotide substitution rates, building of phylogenetic trees with distance based methods and parsimony. Evolution of the genome structure and size. Scientific articles.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
24 h lectures, 12 h exercises/seminar, 40 h independent studies including home work, study diary/exam.
Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
Concepts of genetics (753124P) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Additional reading Graur, D. and Li, W.-H. 1999: Fundamentals of Molecular Evolution. Sinauer, Massachusetts.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Exam/home exam, homework. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.

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

757611S: Molecular methods I, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Kuittinen, Helmi Helena
Opintokohteen kielet: English
Leikkaavuudet:

750664S	Molecular methods I	4.0 op

Ei opintojaksokuvauksia.

757311A: Molecular methods I, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kuittinen, Helmi Helena

Opintokohteen kielet: Finnish

Leikkaavuudet:

750364A Molecular methods I 4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
BS: B.Sc. 2nd autumn, ECO: M.Sc. 1st autumn.
Learning outcomes:
After the course the student is able to use the basic methods of DNA work. The student can isolate DNA from different organisms, estimate the quality and quantity of the DNA, amplify DNA fragments with the polymerase chain reaction, design PCR primers, sequence DNA, and do fragment analysis. The student is able to evaluate his results and optimize methods to some degree.
Contents:
Isolation of genomic DNA, amplification of DNA by PCR, primer design, DNA sequencing, and fragment analysis (for example, microsatellites). Computer programs needed for DNA-sequence and fragment analysis.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
48 h exercises including demonstrations, 50 h independent work including homework and reports.
Target group:
Compulsory to BS, suitable for ECO students who are interested in population and evolutionary ecology.
Prerequisites and co-requisites:
Consepts of genetics (753104A).
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Reports. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.

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

757617S: Molecular methods II, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Anna-Maria Pirttilä, Henrika Honkanen

Opintokohteen kielet: Finnish

Leikkaavuudet:

750365A Molecular methods II 4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
BS: B.Sc. 3 rd autumn.
Learning outcomes:
The student knows how to study gene expression at different levels (transcription, translation) and understands the benefits and limitations of each method used.
Contents:
The course consists of laboratory work elaborating principles of gene expression by molecular biology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
50 h exercises including demonstrations, 50 h independent work, work reports.
Target group:
Compulsory to BS.
Prerequisites and co-requisites:
Molecular methods I (750364A).
Recommended optional programme components:
-
Recommended or required reading:
Course handout.
Assessment methods and criteria:
Demonstrations, exercises, reports. Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Anna Maria Pirttilä and N.N. (animal physiology).
Working life cooperation:
No.
Other information:
-

750699S: Optional examinations in environmental protection, 2 - 6 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
2-6 ECTS credits / 53-160 hours of work. About 100 pages / 1 ECTS credit.
Language of instruction:
Most books are in English.
Timing:
B.Sc. or M.Sc. degree.
Learning outcomes:
To understand environmental protection in global context.
Contents:
Depends on the book.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Three times per both semesters in biology public 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:
Dr. Kari Taulavuori.
Working life cooperation:
No.
Other information:
Student has to consult about the selected literature before exam.

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 biology public 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:
Dr. Kari Taulavuori.
Working life cooperation:
No.
Other information:
Student has to consult about the selected literature before exam.

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

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Kari Taulavuori
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

ECTS Credits:
2-6 ECTS credits / 53-160 hours of work. About 100 pages / 1 ECTS credit.
Language of instruction:
Most books are in English.
Timing:
B.Sc. or M.Sc. degree.
Learning outcomes:
To understand environmental protection in global context.
Contents:
Depends on the book.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Three times per both semesters in biology public 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:
Dr. Kari Taulavuori.
Working life cooperation:
No.
Other information:
Student has to consult about the selected literature before exam.

750031Y: Orientation course for new students, 1 op

Voimassaolo: - 31.07.2017
Opiskelumuoto: General Studies
Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Vanhatalo, Minna-Liisa

Opintokohteen kielet: Finnish

Leikkaavuudet:

750032Y Orientation course for new students 2.0 op

ECTS Credits:
1 ECTS credit / 27 hours of work
Language of instruction:
Finnish.
Timing:
B.Sc. 1 st autumn - spring.
Learning outcomes:
The aim of the course is to introduce new biology students to the university, academic studies, the department and the studies of biology, give knowledge of the social relevance of the degree programme and student is able to set own goals for the studies.
Contents:
Students orientate themselves with the help of group meetings, presentations and seminar to the academic studies. During the course students make their first personal study plan (HOPS) for the first study year.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Tutorials, presentations and seminar of major subjects, independent studying, total 30 h.
Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Study guide.
Assessment methods and criteria:
Participation to the tutorials, presentations, seminar and doing the personal study plan for the first year.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Ph.Lic. Minna Vanhatalo.
Working life cooperation:
No.
Other information:
-

756615S: Physiology of forest trees, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha

Opintokohteen kielet: Finnish

ECTS Credits:
4 ECTS credits / 107 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st or 2 nd spring, (arranged if resources allow).

Learning outcomes:
The student is able to assess the specific features of forest tree physiology and from this basis can judge the effect of climate change to forestry.
Contents:
Trees are long-living, often wind-pollinated, tall organisms. The juvenile phase may be long and the adult phase is characterized by both reproductive and vegetative growth which causes competition on both carbohydrates and nutrients. Cold- and drought resistance, water relations, carbon allocation and mineral nutrition will be discussed. Partly due to forest tree's economic importance biotechnological applications have been developed e.g. for the production of health promoting substances or vegetative propagation. Forest trees are interesting from the point of molecular biology- what makes a tree tree? The course will cover these topics but the emphasis may vary during the years.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures, literature, seminar, final exam.
Target group:
-
Prerequisites and co-requisites:
Lectures of Basics of functional plant biology (752345A) helps the following of the course.
Recommended optional programme components:
-
Recommended or required reading:
Literature agreed on lectures.
Assessment methods and criteria:
Exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Hely Häggman.
Working life cooperation:
No.
Other information:
-

756346A: Plant biology lectures, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha, Anna-Maria Pirttilä

Opintokohteen kielet: Finnish

Leikkaavuudet:

752345A	Basics of functional plant biology, lectures	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 2 nd spring.
Learning outcomes:
The student can understand and explain the function and regulation of plant cells, tissues and entire plants.
Contents:
The most important phenomena of plant life, like photosynthesis, nitrogen metabolism, function of cell membranes and plant hormones are discussed.
Mode of delivery:
Face-to-face teaching.

Learning activities and teaching methods:
Lectures (26 h) and exam.
Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
Cell biology (750121P) or equivalent knowledge and course Plant morphology (752337A, 756340A) helps in following this course. This course is a prerequisite for course Advanced course in plant biology (752682S).
Recommended optional programme components:
-
Recommended or required reading:
Taiz, L. & Zeigler, E. 2010: Plant Physiology (parts), Sinauer Ass., Sunderland Mass. 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.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail.
Person responsible:
Prof. Hely Häggman and Doc. Anna Mari Pirttilä.
Working life cooperation:
No.
Other information:
-

756341A: Plant biology practicals, 5 op

Voimassaolo: 01.08.2011 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Anna-Maria Pirttilä

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 2nd spring.
Learning outcomes:
Student extends the basic laboratory skills and associate physiological phenomena from literature to practice. After completing the course, the student is able to plan small physiological research projects and can analyze, interpret and report the results in a scientific form.
Contents:
The course comprises of 10 laboratory exercises from various areas of plant physiology. The students will themselves plan the schedule for the experiments and write the results in the form of a scientific publication. The reports will be graded and the score will be part of the mark.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
45 h laboratory exercises which precedes pre exam in Optima (questions from handout). Exercises are done in pairs and reports are made as team work.
Target group:
BS: compulsory, TEAbs optional.
Prerequisites and co-requisites:
Cell biology (750121P) and Basics in functional plant biology, lectures (752345A). Also Basic course in plant morphology (752337A, 756340A) helps in following the course.
Recommended optional programme components:

Basics in functional plant biology lectures and exercises (752345A, 756341A) is prerequisite to Advanced course in plant biology (752682S).
Recommended or required reading:
Taiz, L. & Zeigler, E. 2010: Plant Physiology (parts), Sinauer Ass., Sunderland Mass.; Hohtola ym.: Harjoitustyömoniste.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Laboratory exercises, reports.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail.
Person responsible:
Doc. Anna Maria Pirttilä.
Working life cooperation:
No.
Other information:
-

756353A: Plant developmental biology, 5 op

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

756332A	Plant developmental biology	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 3rd spring.
Learning outcomes:
The student has a comprehensive view on plant development and show knowledge of the recent methods used in the research of plant developmental biology.
Contents:
Modern methods in plant biology and especially the mutant or genetically modified plants have been in a key role to understand factors, mechanisms and regulation affecting plant development. The lectures include cell level information (cell division, growth and differentiation), embryo development, meristem formation and maintenance, organ development and cell death as a role of normal plant development. Moreover, the role of environmental factors in plant development will be covered.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Developmental biology 20 h lectures, home essay / seminar and final exam.
Target group:
Compulsory to BS and ECO, TEA: optional.
Prerequisites and co-requisites:
Basic course in plant morphology, lectures (755337A) is recommended.
Recommended optional programme components:
-
Recommended or required reading:
Lectures and supplementary material. Timmermans, M.C.P.: Plant Development. 2010. Elsevier. 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. Hely Häggman.
Working life cooperation:
No.
Other information:
-

756344A: Plant ecology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori, Annamari Markkola

Opintokohteen kielet: Finnish

Leikkaavuudet:

752300A Plant ecology 7.0 op

ECTS Credits:
5-7 ECTS credits / 133-187 hours of work.
Language of instruction:
Lectures Finnish, Exercises Finnish / English.
Timing:
B.Sc. 2nd autumn. NNE.
Learning outcomes:
Student will get basic knowledge how plants adapt to different environmental factors.
Contents:
The main subject of this course is the heterogeneity of environment and the capacity of plants to adapt flexibly to different light and nutrient conditions. For carbon economy the main questions are variation in photosynthetic potential, extrinsic factors which restrict the photosynthesis and the structural and physiological adaptations to different light conditions. Nutrient economy is not only dependent on the soil of the habitat but also on the capacity of plant to change the ions from the surface of soil particles. Symbiosis has a great importance on nutrient economy of boreal plants. The balance between benefits and costs defines whether the symbiosis with the nitrogen fixation bacteria or with mycorrhizal fungi is beneficial for the plant or not. There is competition between plants for soil nutrients and for light. How is it possible that plants competing for the same basic nutrients can live in the same habitat? Isn’t the niche theory valid for plants?
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
24 h lectures and exam, 30 h demonstrations and exercises in field and laboratory (basic methods in plant ecology and laboratory work), 10 h seminars on the literature of plant ecology; 4 h final seminars. International students will compensate lectures by reading book Ridge, I. 2002: Plants, Oxford Univ. Press.
Target group:
Compulsory to ECO.
Prerequisites and co-requisites:
Basics of ecology (750124P) and Field course in ecological botany (752304A) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Ridge, I. 2002: Plants. The availability of the literature can be checked from this link.
Assessment methods and criteria:
Lecture exam, laboratory diary and seminar presentation. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.
Person responsible:
Kari Taulavuori ja Annamari Markkola (lectures), Kari Taulavuori (exercises).
Working life cooperation:
No.
Other information:
-

756644S: Plant ecology, 5 - 7 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Kari Taulavuori, Annamari Markkola
Opintokohteen kielet: English
Leikkaavuudet:

752600S Plant ecology 7.0 op

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

756604S: Plant ecophysiology in changing environments, 5 op

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

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 3 rd or M.Sc. 1 st spring.
Learning outcomes:
After finishing the course student understands interactions between plant and environment, and has become acquainted to most important experimental methods in physiological plant ecology and student can apply research parameters. Student can apply the knowledge to plant production and environmental protection issues.

Contents:
The aim of the course is to initiate the students into the basics of plant ecophysiology in changing environments. The physical, chemical (abiotic) and biotic factors in the environment affects plant's growth and survival. Plant ecophysiology is an experimental science, which studies the physiological functions and adjustments underlining the ecological observations from the viewpoint of growth and survival. Different environmental stresses restrict the plant growth. Plant ecophysiology is experimental science which studies the physiological functions and regulation mechanisms on growth, survival, abundance and distribution. Effects of abiotic and biotic factors are studied. How elevated temperature, CO2, drought stress, nutrient imbalance, air pollutants, metals, UV radiation and plant pathogens affect on plants' gas exchange, primary metabolism, carbon allocation and growth. The exercises can also focus on the effects of environmental factors on photosynthesis, respiration, transport of photosynthetic products, water economy, energy economy and nutrient economy. Special features of ecophysiology of boreal plants are also dealt with.
Mode of delivery:

Face-to-face teaching.
Learning activities and teaching methods:
20 h lectures and demonstrations, 35 h exercises, exam and report.

Target group:
ECOb, BSb, Ph.D. students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
Course is related both to plant ecology and plant physiology basic studies.
Recommended or required reading:
Hans Lambers, F.Stuart Chapin III, Thijs L. Pons 2008: Plant Physiological Ecology. Springer Verlag. 540 s. Second edition.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Seminar and report.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Dr. Kari Taulavuori.
Working life cooperation:
No.
Other information:
-

756304A: Plant ecophysiology in changing environments, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 3 rd or M.Sc. 1 st spring.
Learning outcomes:
After finishing the course student understands interactions between plant and environment, and has become acquainted to most important experimental methods in physiological plant ecology and student can apply research parameters. Student can apply the knowledge to plant production and environmental protection issues.

Contents:
The aim of the course is to initiate the students into the basics of plant ecophysiology in changing environments. The physical, chemical (abiotic) and biotic factors in the environment affects plant's growth and survival. Plant ecophysiology is an experimental science, which studies the physiological functions and adjustments underlining the ecological observations from the viewpoint of growth and survival. Different environmental stresses restrict the plant growth. Plant ecophysiology is experimental science which studies the physiological functions and regulation mechanisms on growth, survival, abundance and distribution. Effects of abiotic and biotic factors are studied. How elevated temperature, CO2, drought stress, nutrient imbalance, air pollutants, metals, UV radiation and plant pathogens affect on plants' gas exchange, primary metabolism, carbon allocation and growth. The exercises can also focus on the effects of environmental factors on photosynthesis, respiration, transport of photosynthetic products, water economy, energy economy and nutrient economy. Special features of ecophysiology of boreal plants are also dealt with.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:

20 h lectures and demonstrations, 35 h exercises, exam and report.
Target group:
ECOb, BSb, Ph.D. students (if not in the undergraduate degree).
Prerequisites and co-requisites:
-
Recommended optional programme components:
Course is related both to plant ecology and plant physiology basic studies.
Recommended or required reading:
Hans Lambers, F.Stuart Chapin III, Thijs L. Pons 2008: Plant Physiological Ecology. Springer Verlag. 540 s. Second edition.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Seminar and report.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Dr. Kari Taulavuori.
Working life cooperation:
No.
Other information:
-

756627S: Plant hormones, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha

Opintokohteen kielet: Finnish

ECTS Credits:
4 ECTS credits / 107 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st or 2 nd spring, (arranged if resources allow).
Learning outcomes:
The students will assess the plant hormone action, understand hormone interactions and the significance of the hormone balance as well as the molecular mechanisms.
Contents:
Plant hormones are signalling molecules with profound effects on growth and development at trace quantities. Until quite recently plant development was considered to be regulated by auxins, gibberellins, cytokinins, ethylene and abscisic acid. New analytical and molecular methods have evidenced new plant hormone receptors and signalling pathways. During the lectures the mode of action of the hormones and the latest literature is used to gain the most recent view of the topic.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
20 h and exam.
Target group:
Suitable for BSb and ecophysiologists.
Prerequisites and co-requisites:
Basics of functional plant biology lectures and exercises (752345A, 756341A).
Recommended optional programme components:
-
Recommended or required reading:
Chapters concerning plant hormones from Taiz, L. & Zeiger, E. 2010: Plant Physiology. Sinauer Associates Inc. 5. ed. and literature given in the lectures.
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. Hely Häggman.
Working life cooperation:
No.
Other information:
-

750615S: Practical training, 10 - 15 op

Opiskelumuoto: Advanced Studies

Laji: Practical training

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
10-15 ECTS credits / 380-570 hours of traineeship work.
Language of instruction:
Finnish / English.
Timing:
Registration B.Sc. 3 rd autumn, training B.Sc. 3 rd summer - M.Sc. 1 st autumn.
Learning outcomes:
The aim of the course is for students to gain work experience in their own field of biology. Student applies the theoretical knowledge gained during the studies in practice.
Contents:
Minimum training period is two months full day work (10 cr). Students can obtain 15 credits for three months versatile training depending on the length and intensity of it. Student can do the training period in Finland or during her/his exchange period or train otherwise abroad.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
The trainee has to keep a journal of the work and its background factors. This journal and a summary of 6-8 pages have to be handed in to the responsible contact person after the training period. The summary should contain information on the training place, the ongoing research, the trainee’s own work and its results. The journal is returned to the student after the summary has been approved. The student has also to be given a reference of the work. Offered training placements are announced in the internet page of Extension School. Entering for the practical training is made in 3rd autumn. Normally, the student has to find him/herself a placement in public or private sectors or abroad.

Target group:
Compulsory to BS and ECO in the M.Sc. degree.
Prerequisites and co-requisites:
About 80 credit amount of biology courses.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Journal and final report.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Contact person Minna Vanhatalo. The supervisors of the practical training are Prof. Markku Orell (ECOz), Prof. Juha Tuomi (ECOb), Prof. Hely Häggman (BSb), Prof. Esa Hohtola (BSz) and Prof. Outi Savolainen (BSg).
Working life cooperation:

Yes. Participating to biology project gives working life skills.
Other information:
The student has to contact the professor and discuss about the suitability of the internship place in beforehand.

751660S: Preparation of an insect collection, 2 - 6 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Marko Mutanen
Opintokohteen kielet: Finnish

ECTS Credits:
2-6 ECTS credits / 53-160 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. degree.
Learning outcomes:
Preparation (including labels) and identification of self-collected insects.
Contents:
Preparation of a collection on one insect order. The specimens have to be preserved adequately, identified and provided with labels. In consultation with the responsible teacher.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Independent studying.
Target group:
-
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Literature related to the topic.
Assessment methods and criteria:
Collection is delivered to the person in responsible.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Dr. Jouni Aspi.
Working life cooperation:
No.
Other information:
-

750658S: Pro gradu thesis in biology, 40 op

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

755602S	Master of science thesis in zoology	40.0 op

756602S	Pro gradu thesis	40.0 op
757602S	Master of science thesis in genetics	40.0 op

ECTS Credits:
40 ECTS credits / 1067 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st or 2 nd year.
Learning outcomes:
Student knows the research methods in specific field of biology. She is conversant with her field of thesis and is able to scientific thinking, estimating the results, analysing, drawing conclusions and scientific communicating.
Contents:
Literary work which in general includes experimental research work. Student gets profoundly acquainted on certain special field in biology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Independent research work on a scientific subject in agreement with the responsible professor and under the supervision of the Department. The supervisors may be professors of the department, docents and other teachers and researchers who have the docent's status. The student may
have several supervisors, the other supervisor may be from other department, university (also abroad) or from research institute. The subject must be agreed on with the professor in advance. The research work can contain fieldwork, laboratory work, theoretical work or work on collections in museum. The work always includes a literature survey. After having completed the´thesis, the student writes the Maturity Exam. The programme director will order the final examiners by the proposal of the professor. Pro gradu working group accepts and grades the thesis on the basis of the final examiners' opinions.
Target group:
TEAz: compulsory 20 cr, ECOz and BSz: compulsory 40 cr.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Literary work. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Professors.
Working life cooperation:
No.
Other information:
-

757616S: Quantitative genetics and plant and animal breeding, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Mikko Sillanpää

Opintokohteen kielet: Finnish

Leikkaavuudet:

753394A	Quantitative genetics and plant and animal breeding	6.0 op
753694S	Quantitative genetics and plant and animal breeding	6.0 op

Ei opintojaksokuvauksia.

750661S: Research group seminar, 2 - 4 op

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

ECTS Credits:
2-4 ECTS credits / 53-107 hours of work.
Language of instruction:
Finnish / English.
Timing:
Autumn-spring.
Learning outcomes:
Students concern themselves to special features of biological research.
Contents:
Workshop type seminars in different fields of biology help by research groups. Advanced or postgraduate studies. 2 cr. per different seminar series.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
26 h seminars / workshops.
Target group:
M.Sc. or Ph.D. degree.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Active participation to seminars.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Professors.
Working life cooperation:
No.
Other information:
-

750613S: Research training, 2 - 15 op

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

ECTS Credits:
1-14 ECTS credits / 27-378 hours of work.
Language of instruction:
Finnish / English.

Timing:
M.Sc. degree.
Learning outcomes:
Student applies the education given knowledge and skills in working life to gain hands-on experience.
Contents:
Work on special projects in the different biology research groups at the department or elsewhere or independent project work including field and/or laboratory work or work at the biological stations. The work is not included to other study modules in biology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
The topic and the study plan have to be agreed on in advance (registration form). The student has to keep diary and prepare a report on the work.
Target group:
-
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Report.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Professor of the student's major subject.
Working life cooperation:
Yes. Participating to biology project gives working life skills.
Other information:
-

750313A: Research training, 2 - 15 op

Opiskelumuoto: Intermediate Studies

Laji: Practical training

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
1-14 ECTS credits / 27-378 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. degree.
Learning outcomes:
Student applies the education given knowledge and skills in working life to gain hands-on experience.
Contents:
Work on special projects in the different biology research groups at the department or elsewhere or independent project work including field and/or laboratory work or work at the biological stations. The work is not included to other study modules in biology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
The topic and the study plan have to be agreed on in advance (registration form). The student has to keep diary and prepare a report on the work.
Target group:
-

Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Report.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Professor of the student's major subject.
Working life cooperation:
Yes. Participating to biology project gives working life skills.
Other information:
-

755632S: Restoration ecology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Tolvanen, Anne Kristiina, Annamari Markkola

Opintokohteen kielet: Finnish

Leikkaavuudet:

756607S	Restoration ecology	2.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
M.Sc. degree.
Learning outcomes:
Lectures: the student understands the ecological principles of restoration and remembers the basics of restoration options in different ecosystems. Exercises and excursion: the student is able to evaluate the need for restoration and possibilities of an ecosystem to regenerate, and apply the restoration techniques in practical restoration planning.
Contents:
Land-use impacts and ecosystem malfunctions caused by humans, ecological principles of restoration, prevention and restoration of manmade damage in the ecosystems. Examples from restoration options and practical techniques in terrestrial and aquatic ecosystems, and cultural landscapes.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
24 h lectures, exercises and an excursion. Total 45 h.
Target group:
ECO.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Andre Clewell, James Aronson 2008: Ecological Restoration, Principles, Values, and Structure of an Emerging Profession, Island Press, 230 p. and articles in the Restoration Ecology journal. The availability of the literature can be checked from this link.
Assessment methods and criteria:

Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Anne Tolvanen.
Working life cooperation:
No.
Other information:
-

901035Y: Second Official Language (Swedish), Oral Skills, 1 op

Voimassaolo: 01.08.2014 -
Opiskelumuoto: Language and Communication Studies
Laji: Course
Vastuuyksikkö: Negotiated Education
Opintokohteen kielet: Swedish
Leikkaavuudet:

901061Y Second Official Language (Swedish), Oral Skills 1.0 op
ay901035Y Second Official Language (Swedish), Oral Skills (OPEN UNI) 1.0 op
901004Y Swedish 2.0 op

901034Y: Second Official Language (Swedish), Written Skills, 1 op

Voimassaolo: 01.08.2014 -
Opiskelumuoto: Language and Communication Studies
Laji: Course
Vastuuyksikkö: Negotiated Education
Opintokohteen kielet: Swedish
Leikkaavuudet:

901060Y Second Official Language (Swedish), Written Skills 1.0 op
ay901034Y Second Official Language (Swedish), Written Skills (OPEN UNI) 1.0 op
901004Y Swedish 2.0 op

756612S: Soil ecology, 3 - 5 op

Voimassaolo: - 31.07.2019
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Annamari Markkola
Opintokohteen kielet: Finnish

ECTS Credits:
3-5 ECTS credits / 80-133 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st or 2 nd year spring, (arranged if resources allow).
Learning outcomes:

Student will learn common basics of soil organisms and their interactions.
Contents:
Current soil ecological research and methods, planning and conducting experiments.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures, exercises, seminars, exam.
Target group:
-
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Additional reading Smith, S.E. & Read, D.J. 1997. Mycorrhizal symbiosis. Academic Press, San Diego and London. 605 p.; Van der Hejden, M.G.A. & Sanders, I.R. (eds) 2002. Mycorrhizal ecology. Springer, Berlin. 469 p.; Bardgett, R. D. 2005. The biology of soil: a community and ecosystem approach. Biology of Habitats series. Oxford University Press, Oxford, UK. 256 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:
Dr. Annamari Markkola.
Working life cooperation:
No.
Other information:
-

754627S: Special course in aquatic invertebrates, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Muotka, Timo Tapani

Opintokohteen kielet: Finnish

Leikkaavuudet:

751648S Special course in aquatic invertebrates 2.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st or 2 nd year. Every third year.
Learning outcomes:
After the course, the student will have basic knowledge on quantitative sampling of benthic invertebrates in various inland waters (mainly streams) and species level identification of benthic invertebrates.
Contents:
Field sampling and identification practices in the laboratory.
Mode of delivery:
Blended teaching.
Learning activities and teaching methods:
40 h demonstrations, lectures and exercises.
Target group:
ECOz, elective.

Prerequisites and co-requisites:
Courses Field course in aquatic animals (751307A) and Introduction to hydrobiology (754308A).
Recommended optional programme components:
-
Recommended or required reading:
Course material.
Assessment methods and criteria:
- Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Timo Muotka.
Working life cooperation:
No.
Other information:
-

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

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

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

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

750653S: Special seminar in biology, 2 - 5 op

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

755616S	Seminars on special topics in zoology	2.0 op
753613S	Special seminar in genetics	4.0 op
752695S	Seminar on special topics in botany	2.0 op
753630S	Genetics research seminar	2.0 op
754618S	Research seminar in fish ecology	2.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
2-4 ECTS credits / 53-107hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc., Ph.D. degree, (arranged if resources allow).
Learning outcomes:

Student will be acquainted to current issues in animal physiology or animal ecology.
Contents:
Current special problems in zoology. Lectures by specialists and latest literature. Topics vary every year.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Course specific.
Target group:
BSz and ECOz.
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Course specific. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail or Pass / Fail.
Person responsible:
Professors and docents.
Working life cooperation:
No.
Other information:
-

754628S: Stream ecology, 5 op

Voimassaolo: 01.08.2015 - 31.07.2019

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Muotka, Timo Tapani

Opintokohteen kielet: Finnish

Leikkaavuudet:

755336A	Population ecology	10.0 op
754320A	Stream ecology	4.0 op
754620S	Stream biology	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 3 rd year / M.Sc. 1 st or 2 nd year. Every 2 nd year.
Learning outcomes:
Basic principles of the structure and function of aquatic ecosystems.
Contents:
Interspecific competition, predation and environmental disturbance as factors regulating aquatic communities. Prey choice mechanisms of aquatic predators and avoidance behaviour of prey species. Trophic interactions in aquatic ecosystems. Biomanipulation as a management tool in water protection.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
20 h lectures, home essays.
Target group:
ECOz, optional.

Prerequisites and co-requisites:
Basic course in hydrobiology (754308A) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Handouts and Allan, J. D. & Castillo, M. M. (2007). Stream Ecology: Structure and Function of Running Waters. Springer Verlagen. The availability of the literature can be checked from this link.
Assessment methods and criteria:
Home essays. Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Timo Muotka.
Working life cooperation:
No.
Other information:
-

756626S: Stress physiology of plants, 4 op

Voimassaolo: - 31.07.2020

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Anna-Maria Pirttilä, Häggman, Hely Margaretha

Opintokohteen kielet: Finnish

ECTS Credits:
4 ECTS credits / 107 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st or 2 nd spring, (arranged if resources allow).
Learning outcomes:
The student will assess the effect of abiotic and biotic stresses on plant metabolism and the means of plants to cope with them.
Contents:
The course will cover all the stresses affecting plant metabolism at biochemical or molecular level. The signal transduction caused by the stresses will be followed as well as plant defense reactions. Plant pathogen biocontrol methods are introduced.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
20 h lectures, independent exercises or seminar and exam.
Target group:
Mainly for BS but also suitable for ECO.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Lecture handouts and literature given during the course.
Assessment methods and criteria:
Exam, essay/seminar.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Hely Häggman and Doc. Anna Maria Pirttilä.
Working life cooperation:

No.
Other information:
-

756622S: Structure and dynamics of plant communities, 5 op

Voimassaolo: - 31.07.2017
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Jari-Heikki Oksanen
Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. degree, (arranged if resources allow).
Learning outcomes:
The student knows the most important processes controlling the structure and dynamics of plant communities, and the major theories concerning those processes. The students can apply theories in the research of plant communities.
Contents:
Models on structure of communities, in particular the neutral models, and assembly rules. The estimation of biological diversity. The relationship between species and their environment, and its consequences: the analysis of ecological communities and bioindication. The course follows the scientific development, and its contents will be adjusted for the current scientific literature, and the exact contents will vary among years.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
24 h lectures, essay.
Target group:
-
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Current article collection and course handout.
Assessment methods and criteria:
Essay.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
-
Person responsible:
Prof. Jari Oksanen.
Working life cooperation:
No.
Other information:
-

750133P: Studies in biology abroad, 1 - 60 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Basic Studies
Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Leikkaavuudet:

751193P	Foreign studies	0.0 op
752186P	Foreign studies	0.0 op
753193P	Foreign studies	0.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
-
Language of instruction:
Varying.
Timing:
B.Sc. or M.Sc. degree.
Learning outcomes:
Student will be acquainted to varying issues in biology.
Contents:
Studies done under international exchange programs (ERASMUS, NORDPLUS, ISEP) in foreign universities. Courses are either credit transferred or substituted.
Mode of delivery:
Varying.
Learning activities and teaching methods:
Varying.
Target group:
Varying.
Prerequisites and co-requisites:
Exchange programme university’s prerequisites for the courses.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Credit transfer. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail or Pass / Fail.
Person responsible:
Professors.
Working life cooperation:
No.
Other information:
-

750633S: Studies in biology abroad, 1 - 60 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Leikkaavuudet:

751693S	Foreign studies	0.0 op
752686S	Foreign studies	0.0 op
753693S	Foreign studies	0.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
-
Language of instruction:
Varying.
Timing:
M.Sc. degree.
Learning outcomes:
Student will be acquainted to varying issues in biology.
Contents:
Studies done underinternational exchange programs (ERASMUS, NORDPLUS, ISEP) in foreign universities. Courses are either credit transferred or substituted.
Mode of delivery:
Varying.
Learning activities and teaching methods:
Varying.
Target group:
Varying.
Prerequisites and co-requisites:
Exchange programme university's prerequisites for the courses.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Credit transfer. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail or Pass / Fail.
Person responsible:
Professors.
Working life cooperation:
No.
Other information:
-

750333A: Studies in biology abroad, 1 - 60 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Leikkaavuudet:

751393A	Foreign studies	0.0 op
752386A	Foreign studies	0.0 op
753393A	Foreign studies	0.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
-
Language of instruction:
Varying.
Timing:
B.Sc. or M.Sc. degree.
Learning outcomes:

Student will be acquainted to varying issues in biology.
Contents:
Studies done under international exchange programs (ERASMUS, NORDPLUS, ISEP) in foreign universities. Courses are either credit transferred or substituted.
Mode of delivery:
Varying.
Learning activities and teaching methods:
Varying.
Target group:
Varying.
Prerequisites and co-requisites:
Exchange programme university's prerequisites for the courses.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Credit transfer. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail or Pass / Fail.
Person responsible:
Professors.
Working life cooperation:
No.
Other information:
-

750155P: Studies in biology in other Finnish universities, 1 - 60 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

756105P	Studies in botany in other Finnish universities	0.0 op
757105P	Studies in genetics in other Finnish universities	0.0 op
755105P	Studies in zoology in other Finnish universities	0.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
-
Language of instruction:
Varying.
Timing:
B.Sc. or M.Sc. degree.
Learning outcomes:
Student will be acquainted to varying issues in biology.
Contents:
Studies done in other Finnish universities credit transferred on agreement.
Mode of delivery:
Varying.
Learning activities and teaching methods:
Varying.
Target group:
Varying.
Prerequisites and co-requisites:

-
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Credit transfer. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail or Pass / Fail.
Person responsible:
Professors.
Working life cooperation:
No.
Other information:
-

750355A: Studies in biology in other Finnish universities, 1 - 60 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

755305A	Studies in zoology in other Finnish universities	0.0 op
756305A	Studies in botany in other Finnish universities	0.0 op
757305A	Studies in genetics in other Finnish universities	0.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
-
Language of instruction:
Varying.
Timing:
B.Sc. or M.Sc. degree.
Learning outcomes:
Student will be acquainted to varying issues in biology.
Contents:
Studies done in other Finnish universities credit transferred on agreement.
Mode of delivery:
Varying.
Learning activities and teaching methods:
Varying.
Target group:
Varying.
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Credit transfer. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail or Pass / Fail.
Person responsible:

Professors.
Working life cooperation:
No.
Other information:
-

750655S: Studies in biology in other Finnish universities, 1 - 60 op

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

755605S	Studies in Zoology in other Finnish Universities	0.0 op
756605S	Studies in Botany in other Finnish Universities	0.0 op
757605S	Studies in Genetics in other Finnish Universities	0.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
-
Language of instruction:
Varying.
Timing:
B. Sc. or M.Sc. degree.
Learning outcomes:
Student will be acquainted to varying issues in biology.
Contents:
Studies done in other Finnish universities credit transferred on agreement.
Mode of delivery:
Varying.
Learning activities and teaching methods:
Varying.
Target group:
Varying.
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Credit transfer. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail or Pass / Fail.
Person responsible:
Professors.
Working life cooperation:
No.

756649S: Symbiosis, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Anna-Maria Pirttilä

Opintokohteen kielet: Finnish

Leikkaavuudet:

750346A	Symbiosis	4.0 op
750646S	Symbiosis	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. degree 3rd spring, M.Sc. 1. or 2nd spring, arranged if resources allow.
Learning outcomes:
The student knows the concept of symbiosis, understands the extent of diversity of symbiotic interactions both at the community and molecular level.
Contents:
Practically every plant is living in symbiosis with other organisms. Lately new forms of symbiosis have been discovered, extending the diversity of plant interactions, and the significance of plant symbiosis in biotechnology and biocontrol has increased. Various forms of symbiosis, their importance for the plant and interaction at the molecular level are covered.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
30 h Lectures / laboratory work / demonstrations, seminar, lecture diary.
Target group:
BS and ecophysiology students.
Prerequisites and co-requisites:
Studies in bioscience.
Recommended optional programme components:
-
Recommended or required reading:
Lecture notes.
Assessment methods and criteria:
Seminar, lecture diary. Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Anna Maria Pirttilä.
Working life cooperation:
No.
Other information:
-

752656S: Taxonomy and ecology of plants, 2 - 4 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
2-4 ECTS credits / 53-107 hours of work.
Language of instruction:
Finnish / English.
Timing:

M.Sc. 1 st or 2 nd year. Arranged if resources allow every second year. See announcements at the notice board of the department.
Learning outcomes:
By passing this course a student is able to identify species of the given taxonomic group, understand the ecology of the species, and know their distribution and systematic position.
Contents:
A laboratory course, field course or blended course. Species identification by means of macroscopic or microscopic characters. Making a collection of specimens, sampling and handling of the material. Preparation of herbarium specimens. Field instruction on species mapping and quantitative approach. Species' characters (morphological and chemical). Inventory methods on red listed species. Alternative themes (lichens, polypores and other fungi, and bryophytes).
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Demonstrations, identification exercises and field exercises.
Target group:
Students of plant ecology.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Material given in the course.
Assessment methods and criteria:
Species exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Botanical museum.
Working life cooperation:
No.
Other information:
Course subject vary (lichens, polypore and other fungi, bryophytes).

750618S: Thursday seminar in biology, 2 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Hohtola, Esa Juhani

Opintokohteen kielet: English

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
2 ECTS credits / 53 hours of work.
Language of instruction:
English.
Timing:
M.Sc., Ph.Lic. or Ph.D. degree.
Learning outcomes:
Students get knowledge about the current results and theories in biology.
Contents:
Lectures in English on current topics in biology given by guest lecturers from Finland and abroad.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Guest lectures on Thursdays 12 am-1 pm. See notice boards for the lecture schedule. See seminar programme: http://cc.oulu.fi/~ehohtola/tose.htm
Target group:

Undergraduate and postgraduate students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
10 participations and 10 one page long reports.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Esa Hohtola.
Working life cooperation:
No.
Other information:
-

750318A: Thursday seminar in biology, 2 op

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

ECTS Credits:
2 ECTS credits / 53 hours of work.
Language of instruction:
English.
Timing:
B.Sc., M.Sc., Ph.Lic. or Ph.D. degree.
Learning outcomes:
Students get knowledge about the current results and theories in biology.
Contents:
Lectures in English on current topics in biology given by guest lecturers from Finland or abroad.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Guest lectures on Thursdays 12 am-1 pm. See notice boards for the lecture schedule. See seminar programme: http://cc.oulu.fi/~ehohtola/tose.htm
Target group:
Undergraduate and postgraduate students interested in biology.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
10 participations and 10 one page long reports.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Esa Hohtola

Working life cooperation:
No.
Other information:
-

750033Y: Tutorial for new students, 1 op

Opiskelumuoto: General Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Vanhatalo, Minna-Liisa
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

ECTS Credits:
1 ECTS credit / 27 hours of work
Language of instruction:
Finnish.
Timing:
B.Sc. 3 rd autumn / M.Sc. 1 st autumn.
Learning outcomes:
Course develops students' skills to guide, make presentations, work in group and organize. It also advances planning, arrangement and guidance abilities as well as responsibility.
Contents:
The student guides a group of new students during the orientation course introducing them to the university, academic learning environment, the department, curriculum and other students with the help of small group meetings and presentations.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Tutorials and presentations. Minimum 15 hours. In addition indenpendent work includes the preparation of the tutorials.
Target group:
Second and third year biology students.
Prerequisites and co-requisites:
Course 750031Y.
Recommended optional programme components:
-
Recommended or required reading:
Study guide and training material.
Assessment methods and criteria:
Tutoring report.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Ph.Lic. Minna Vanhatalo.
Working life cooperation:
No.
Other information:
-

040911S: Using animals in research - carrying out procedures, 3 op

Voimassaolo: 01.08.2012 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Laboratory Animal Centre

Arvostelu: 1 - 5, pass, fail
Opettajat: Voipio Hanna-marja
Opintokohteen kielet: Finnish
Leikkaavuudet:

040900S Using animals in research - carrying out procedures 2.5 op

Ei opintojaksokuvauksia.

755628S: Wildlife management and game animal ecology, 5 op

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

751668S Wildlife management and game animal ecology 6.0 op

Ei opintojaksokuvauksia.

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

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

751368A Wildlife management and game animal ecology 6.0 op

Ei opintojaksokuvauksia.

750677S: Winter ecology and physiology, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Hohtola, Esa Juhani, Kari Taulavuori, Orell, Markku Ilmari
Opintokohteen kielet: Finnish
Leikkaavuudet:

750625S Winter ecology and physiology 3.0 op

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

English.
Timing:
B.Sc. 3 rd or M.Sc. 1 st spring. NNE.
Learning outcomes:
Student obtains basic knowledge of animal and plant acclimations and adaptations to winter, and can evaluate the effects of cold temperatures and snow on overwintering, and learns central methodology in winter ecology and physiology.
Contents:
Three independent units: 1) Winter ecology and physiology course (7 h lectures and 13 h laboratory practicals and 4 h seminar in Oulu, and 4 day long field excursion to the Oulanka Research Station (total about 50 h, 3 cr); 2) Book exam on a common exam day 2 cr: Marchand, P. J. 1996: Life in the cold. An introduction to winter ecology. 1) Book exam on a common exam day Thermal biology and energetics 3 cr (prof. Esa Hohtola). Examinations on the parts are held independently from each other. Selected literature will be provided.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures, exercises, report and seminar presentation.
Target group:
Biology students.
Prerequisites and co-requisites:
Courses Basics of ecology (750124P), Field course in ecological botany (752304A), Cell biology (750121P), Field course in terrestrial animals (751306A), Field course in aquatic animals (751307A) and Basics of functional plant biology, lectures (752345A) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Marchand, P. J. 1996: Life in the cold. An introduction to winter ecology. (3rd edition). University Press of New England. 304 p. The availability of the literature can be checked from this link.
Assessment methods and criteria:
Seminar presentation and book exam. Read more about assessment criteria at the University of Oulu webpage.
Grading:
Course + Seminar: Pass / Fail, book exam: 1-5 / Fail.
Person responsible:
Dr. Kari Taulavuori, Prof. Esa Hohtola and Prof. Markku Orell.
Working life cooperation:
No.
Other information:
-

750377A: Winter ecology and physiology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori, Hohtola, Esa Juhani, Orell, Markku Ilmari

Opintokohteen kielet: Finnish

Leikkaavuudet:

750325A	Winter ecology and physiology	3.0 op

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

Student obtains basic knowledge of animal and plant acclimations and adaptations to winter, and can evaluate the effects of cold temperatures and snow on overwintering, and learns central methodology in winter ecology and physiology.

Contents:

Three independent units: 1) Winter ecology and physiology course (7 h lectures and 13 h laboratory practicals and 4 h seminar in Oulu, and 4 day long field excursion to the Oulanka Research Station (total about 50 h, 3 cr); 2) Book exam on a common exam day 2 cr: Marchand, P. J. 1996: Life in the cold. An introduction to winter ecology. 1) Book exam on a common exam day Thermal biology and energetics 3 cr (prof. Esa Hohtola). Examinations on the parts are held independently from each other. Selected literature will be provided.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures, exercises, report and seminar presentation.

Target group:

Biology students.

Prerequisites and co-requisites:

Courses Basics of ecology (750124P), Field course in ecological botany (752304A), Cell biology (750121P), Field course in terrestrial animals (751306A), Field course in aquatic animals (751307A) and Basics of functional plant biology, lectures (752345A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

Marchand, P. J. 1996: Life in the cold. An introduction to winter ecology. (3rd edition). University Press of New England. 304 p. The availability of the literature can be checked from this link.

Assessment methods and criteria:

Seminar presentation and book exam. Read more about assessment criteria at the University of Oulu webpage.

Grading:

Course + seminar: Pass / Fail, book exam: 1-5 / Fail.

Person responsible:

Dr. Kari Taulavuori, Prof. Esa Hohtola and Prof. Markku Orell.

Working life cooperation:

No.

Other information:

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