

Opasraportti

FSci - Degree programme in Biology (2020 - 2021)

University's new study guide for academic year 2020-2021 is published at <https://opas.peppi oulu.fi>.

The study guide includes information on degrees, curriculums, courses and course timetables. Course registrations are still done in Oodi.

If you have questions on information in the study guide, please contact the study field's Academic Affairs Service Team <https://www oulu.fi/forstudents/faculty-study-affairs>.

Tutkintorakenteet

M.Sc. Degree in Biology (Subject Teacher, Biology). Major studies minimum 60 ECTS.

Tutkintorakenteen tila: published

Lukuvuosi: 2020-21

Lukuvuoden alkamispäivämäärä: 01.08.2020

Compulsory major studies in biology (vähintään 35 op)

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

750656S: Final examination in biology, 10 op

750678S: Master of science seminar, 5 op

750632S: Maturity exam, 0 op

Compulsory other studies (vähintään 25 op)

Pedagogical studies (vähintään 60 op)

050124A: Advanced Practice, 5 op

050121A: Basic Practice, 5 op

050122A: Broadly Based Subject Didactics, 5 op

410084P: Education as an Object of Scientific Research, 5 op

410085P: Growth, Development and Learning, 5 op

410088P: Philosophical and Ethical Foundations and Objectives of Education, 5 op

050123A: Research-Based Subject Didactics, 10 op

410087P: Sociocultural Contexts of Education, 5 op

050120A: Subject Didactics, 5 op

050125A: Teacher as a Researcher in Teaching Practice, 5 op

410086P: Teaching and Educational Interaction, 5 op

Other studies

M.Sc. Degree in Biology (Subject Teacher, Bioscience). Major studies minimum 60 ECTS.

Tutkintorakenteen tila: published

Lukuvuosi: 2020-21

Lukuvuoden alkamispäivämäärä: 01.08.2020

Compulsory genetics and physiology major studies (vähintään 55 op)

750656S: Final examination in biology, 10 op

750678S: Master of science seminar, 5 op

750632S: Maturity exam, 0 op

750658S: Pro gradu thesis in biology, 40 op

Compulsory other major studies (vähintään 5 op)

H750950: Subject teacher's optional advanced level studies in bioscience major, 5 - 80 op

Subsidiary Entity for Subject Teacher (vähintään 30 op)

For the subsidiary entity for subject teacher minimum 25 credits are completed in the B. Sc. degree and 25-35 credits in the M. Sc. degree. OodiHOPS presents teacher specialisation major biology - minor geography.

Geography (subsidiary entity for subject teacher)

Other Subsidiary Entity for Subject Teacher

Pedagogical studies (vähintään 60 op)

050124A: Advanced Practice, 5 op

050121A: Basic Practice, 5 op

050122A: Broadly Based Subject Didactics, 5 op

410084P: Education as an Object of Scientific Research, 5 op

410085P: Growth, Development and Learning, 5 op

410088P: Philosophical and Ethical Foundations and Objectives of Education, 5 op

050123A: Research-Based Subject Didactics, 10 op

410087P: Sociocultural Contexts of Education, 5 op

050120A: Subject Didactics, 5 op

050125A: Teacher as a Researcher in Teaching Practice, 5 op

410086P: Teaching and Educational Interaction, 5 op

Other studies

M.Sc. Degree in Biology (Subject Teacher, Ecology). Major studies minimum 60 ECTS.

Tutkintorakenteen tila: published

Lukuvuosi: 2020-21

Lukuvuoden alkamispäivämäärä: 01.08.2020

Compulsory major studies in ecology (vähintään 55 op)

750656S: Final examination in biology, 10 op

750678S: Master of science seminar, 5 op

750632S: Maturity exam, 0 op

750658S: Pro gradu thesis in biology, 40 op

Compulsory other major studies (vähintään 5 op)

H750900: Subject teacher's optional advanced level studies in ecology major, 5 - 80 op

Pedagogical studies (vähintään 60 op)

050124A: Advanced Practice, 5 op

050121A: Basic Practice, 5 op

050122A: Broadly Based Subject Didactics, 5 op

410084P: Education as an Object of Scientific Research, 5 op

410085P: Growth, Development and Learning, 5 op

410088P: Philosophical and Ethical Foundations and Objectives of Education, 5 op

050123A: Research-Based Subject Didactics, 10 op

410087P: Sociocultural Contexts of Education, 5 op

050120A: Subject Didactics, 5 op

050125A: Teacher as a Researcher in Teaching Practice, 5 op

410086P: Teaching and Educational Interaction, 5 op

Other studies

M.Sc. Degree in Biology (Ecology). Major studies minimum 80 ECTS.

Tutkintorakenteen tila: published

Lukuvuosi: 2020-21

Lukuvuoden alkamispäivämäärä: 01.08.2020

Compulsory major studies (vähintään 70 op)

755630S: Community ecology, 5 op

750656S: Final examination in biology, 10 op

750678S: Master of science seminar, 5 op

750632S: Maturity exam, 0 op

750615S: Practical training, 10 - 15 op

750658S: Pro gradu thesis in biology, 40 op

Compulsory major studies in specialization area (Animal Ecology/Plant Ecology) (3 - 10 op)

Compulsory major studies / Specialization in Animal Ecology

751666S: Animal behaviour, 5 op

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

Compulsory major studies / Specialization in Animal Ecology

Optional major studies (vähintään 2 op)

H750700: Optional advanced level studies in ecology major, 35 - 60 op

Optional bioscience minor (vähintään 15 op)

Optional minor (vähintään 15 op)

Other studies

M.Sc. Degree in Biology (Genetics and Physiology). Major studies minimum 80 ECTS.

Tutkintorakenteen tila: published

Lukuvuosi: 2020-21

Lukuvuoden alkamispäivämäärä: 01.08.2020

Compulsory major studies (vähintään 70 op)

750656S: Final examination in biology, 10 op

750678S: Master of science seminar, 5 op

750632S: Maturity exam, 0 op

757617S: Molecular methods II, 5 op

750615S: Practical training, 10 - 15 op

750658S: Pro gradu thesis in biology, 40 op

Compulsory major studies / Specialization in Genetics/Plant Physiology (vähintään 10 op)

Compulsory major studies / Specialization in Genetics

757613S: Basics in population genetics, 5 op

757618S: DNA analysis in population genetics, 10 op

Compulsory major studies / Specialization in Plant Physiology

752688S: Basics of tissue culture, 5 op

Optional Studies in Plant Physiology

756615S: Physiology of forest trees, 5 op

756627S: Plant hormones, 5 op

Optional major studies (vähintään 5 op)

H750750: Optional advanced level studies in Genetics and Physiology, 35 - 60 op

Optional ecology minor (vähintään 15 op)**Optional minor (vähintään 15 op)****Other studies (vähintään 1 op)****International Master´s Degree Programme in Ecology and Population Genetics (Major in Ecology).**

Tutkintorakenteen tila: archived

Lukuvuosi: 2020-21

Lukuvuoden alkamispäivämäärä: 01.08.2020

Compulsory major studies in Ecology (vähintään 80 op)

Compulsory studies in major for ECOGEN students who will specialize in ecology.

- 750656S: Final examination in biology, 10 op
- 756650S: Introduction to molecular ecology, 5 op
- 756651S: Introduction to population ecology, 5 op
- 750678S: Master of science seminar, 5 op
- 750632S: Maturity exam, 0 op
- 755625S: Methods in ecology I, 5 op
- 755629S: Methods in ecology II, 5 op
- 750658S: Pro gradu thesis in biology, 40 op

Optional major studies in Ecology (vähintään 10 op)

Ecology ECOGEN student has to choose minimum 10 cp advanced ecology studies so that the major will be minimum 80 cp.

H750600: EcoGen optional advanced level studies in ecology major, 10 - 80 op

Optional Bioscience minor (vähintään 15 op)

Ecology ECOGEN student can take optional minor in bioscience (is granted only for the biology degree students).

Studies of 15 ECTS credits or more entitles for the mark and grade of a minor subject. Courses can be basic, intermediate or advanced level studies.

If the student choose to make this minor the compulsory course 757611S Molecular methods I 5 cp will be included to it. Otherwise the compulsory course 757622S is in *Other studies*.

Other studies (vähintään 6 op)

May include also for example Finnish language studies.

- 030008P: Information Skills for foreign degree students, 1 op
- 757611S: Molecular methods I, 5 op

International Master´s Degree Programme in Ecology and Population Genetics (Major in Genetics).

Tutkintorakenteen tila: published

Lukuvuosi: 2020-21

Lukuvuoden alkamispäivämäärä: 01.08.2020

Compulsory major studies (vähintään 75 op)

Compulsory studies in major for ECOGEN students who will specialize in genetics.

- 757613S: Basics in population genetics, 5 op
- 757618S: DNA analysis in population genetics, 10 op
- 750656S: Final examination in biology, 10 op
- 750678S: Master of science seminar, 5 op
- 750632S: Maturity exam, 0 op
- 757611S: Molecular methods I, 5 op
- 750658S: Pro gradu thesis in biology, 40 op

Compulsory major studies in Genetics (vähintään 20 op)

- 757613S: Basics in population genetics, 5 op
- 757618S: DNA analysis in population genetics, 10 op
- 757611S: Molecular methods I, 5 op

Optional major studies in Genetics (compulsory 5 cp) (vähintään 5 op)

ECOGEN students who will specialize in genetics have to do minimum 5 cp advanced studies in major in order to gain the minimum 80 cp.

H750650: EcoGen optional advanced level studies in Genetics major, 5 - 80 op

Optional Ecology minor (vähintään 15 op)

Genetics ECOGEN student can take optional minor in ecology (is granted only for the biology degree students).

Studies of 15 ECTS credits or more entitles for the mark and grade of a minor subject. Courses can be basic, intermediate or advanced level studies.

Other studies (vähintään 1 op)

May include also for example Finnish language studies.

030008P: Information Skills for foreign degree students, 1 op

B.Sc. Degree in Biology (Bioscience).

Tutkintorakenteen tila: published

Lukuvuosi: 2020-21

Lukuvuoden alkamispäivämäärä: 01.08.2020

Language and Communication Studies (vähintään 6 op)

Compulsory

- 902002Y: English 1 (Reading for Academic Purposes), 2 op
 902004Y: English 2 (Scientific Communication), 2 op
 750032Y: Orientation course for new students, 2 op
 901035Y: Second Official Language (Swedish), Oral Skills, 1 op
 901034Y: Second Official Language (Swedish), Written Skills, 1 op

Optional

Biology, major subject (vähintään 73 op)

In the biology degree programme the line of study and the major subject in the Bachelor of Science degree is biology.

Basic Studies in Biology

- 750124P: Basics of ecology, 5 op
 750173P: Biogeography, 5 op
 757109P: Concepts of genetics, 5 op
 757110P: Experimental course in general genetics, 5 op
 750122P: Introduction to cell biology and physiology, 5 op

Compulsory

- 750122P-01: Introduction to cell biology and physiology, genetics, 0 op
 750122P-02: Introduction to cell biology and physiology, animal cell biology, 0 op
 750122P-03: Introduction to cell biology and physiology, plant cell biology, 0 op
 750122P-04: Introduction to cell biology and physiology, animal physiology, 0 op

Intermediate Studies in Biology

- 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
 755335A: Identification of animals, invertebrates, 4 op
 755334A: Identification of animals, vertebrates, 4 op
 756354A: Identification of plant species, extensive, 5 op
 756346A: Plant biology lectures, 5 op
 756343A: Plant ecology field course, 5 op

Compulsory biology major 5 cr either course 755321A tai 755322A or compulsory

Optional Studies in Biology

Bioscience, minor studies (vähintään 25 op)

Student will choose major subject biology and other minor subject in biology (bioscience or ecology) to their B.Sc. degree. The selection of minor subject will already direct the student towards the line of study and the major subject of the M.Sc. studies (bioscience: genetics and physiology).

Optional

Subsidiary Entity for Subject Teacher (vähintään 60 op)

Geography (subsidiary entity for subject teacher)

Other studies (vähintään 18 op)

Compulsory

806119P: A Second Course in Statistics, 5 op
 780120P: Basic Principles in Chemistry, 5 op
 030005P: Information Skills, 1 op
 806118P: Introduction to Statistics, 5 op
 750032Y: Orientation course for new students, 2 op

Optional**B.Sc. Degree in Biology (Subject Teacher, Ecology).**

Tutkintorakenteen tila: published

Lukuvuosi: 2020-21

Lukuvuoden alkamispäivämäärä: 01.08.2020

Language and Communication Studies (vähintään 6 op)**Compulsory**

902002Y: English 1 (Reading for Academic Purposes), 2 op
 902004Y: English 2 (Scientific Communication), 2 op
 750032Y: Orientation course for new students, 2 op
 901035Y: Second Official Language (Swedish), Oral Skills, 1 op
 901034Y: Second Official Language (Swedish), Written Skills, 1 op

optional**Biology, major studies (vähintään 73 op)**

In the biology degree programme the line of study and the major subject in the Bachelor of Science degree is biology.

Basic Studies in Biology

750124P: Basics of ecology, 5 op
 750173P: Biogeography, 5 op
 757109P: Concepts of genetics, 5 op
 757110P: Experimental course in general genetics, 5 op
 750122P: Introduction to cell biology and physiology, 5 op

Compulsory

750122P-01: Introduction to cell biology and physiology, genetics, 0 op
 750122P-02: Introduction to cell biology and physiology, animal cell biology, 0 op
 750122P-03: Introduction to cell biology and physiology, plant cell biology, 0 op
 750122P-04: Introduction to cell biology and physiology, animal physiology, 0 op

Intermediate Studies in Biology

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
 750372A: Evolution and systematics of organisms, 5 op
 755335A: Identification of animals, invertebrates, 4 op
 755334A: Identification of animals, vertebrates, 4 op
 756354A: Identification of plant species, extensive, 5 op
 756346A: Plant biology lectures, 5 op

756343A: Plant ecology field course, 5 op

Compulsory biology major either course 755321A or 755322A total 5 cr

Optional Studies in Biology

Ecology, minor studies (vähintään 25 op)

Student will choose major subject biology and other minor subject in biology (bioscience or ecology) to their B.Sc. degree. The selection of minor subject will already direct the student towards the line of study and the major subject of the M.Sc. studies (ecology).

Compulsory

756343A: Plant ecology field course, 5 op

Optional

Subsidiary Entity for Subject Teacher (vähintään 60 op)

Geography (subsidiary entity for subject teacher)

Other Subsidiary Entity for Subject Teacher

Other studies (vähintään 18 op)

Compulsory

806119P: A Second Course in Statistics, 5 op

780120P: Basic Principles in Chemistry, 5 op

030005P: Information Skills, 1 op

806118P: Introduction to Statistics, 5 op

750032Y: Orientation course for new students, 2 op

Optional

B.Sc. Degree in Biology (Bioscience).

Tutkintorakenteen tila: archived

Lukuvuosi: 2020-21

Lukuvuoden alkamispäivämäärä: 01.08.2020

Language and Communication Studies (vähintään 6 op)

Compulsory

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

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

750032Y: Orientation course for new students, 2 op

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

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

Optional

Biology, major subject (vähintään 72 op)

In the biology degree programme the line of study and the major subject in the Bachelor of Science degree is biology.

Basic Studies in Biology

750124P: Basics of ecology, 5 op

750173P: Biogeography, 5 op

757109P: Concepts of genetics, 5 op

757110P: Experimental course in general genetics, 5 op

750122P: Introduction to cell biology and physiology, 5 op

Compulsory

750122P-01: Introduction to cell biology and physiology, genetics, 0 op

750122P-02: Introduction to cell biology and physiology, animal cell biology, 0 op

750122P-03: Introduction to cell biology and physiology, plant cell biology, 0 op

750122P-04: Introduction to cell biology and physiology, animal physiology, 0 op

Intermediate Studies in Biology

755323A: Animal physiology, 5 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

750372A: Evolution and systematics of organisms, 5 op

750336A: Evolutionary ecology, 5 op

755335A: Identification of animals, invertebrates, 4 op

755334A: Identification of animals, vertebrates, 4 op

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

757312A: Molecular evolution, 5 op

756346A: Plant biology lectures, 5 op

Optional Studies in Biology

Bioscience, minor studies (vähintään 25 op)

Student will choose major subject biology and other minor subject in biology (bioscience or ecology) to their B.Sc. degree. The selection of minor subject will already direct the student towards the line of study and the major subject of the M.Sc. studies (bioscience: genetics and physiology).

Compulsory

757314A: Basics of bioinformatics, 5 op

757311A: Molecular methods I, 5 op

756341A: Plant biology practicals, 5 op

756353A: Plant developmental biology, 5 op

Optional in BSc, compulsory in MSc

Optional

Other compulsory minor subject (vähintään 25 op)

Choose 25 ECTS minor subject studies.

Studies in Science (optional) (vähintään 25 op)

Other studies (vähintään 23 op)

Compulsory

806119P: A Second Course in Statistics, 5 op
 780120P: Basic Principles in Chemistry, 5 op
 030005P: Information Skills, 1 op
 780116P: Introduction to Organic Chemistry, 5 op
 806118P: Introduction to Statistics, 5 op
 750032Y: Orientation course for new students, 2 op

Optional

B.Sc. Degree in Biology (ecology).

Tutkintorakenteen tila: published

Lukuvuosi: 2020-21

Lukuvuoden alkamispäivämäärä: 01.08.2020

Language and Communication Studies (vähintään 6 op)

Compulsory

902002Y: English 1 (Reading for Academic Purposes), 2 op
 902004Y: English 2 (Scientific Communication), 2 op
 901035Y: Second Official Language (Swedish), Oral Skills, 1 op
 901034Y: Second Official Language (Swedish), Written Skills, 1 op

Optional

Major Studies in Biology (vähintään 73 op)

In the biology degree programme the line of study and the major subject in the Bachelor of Science degree is biology.

Basic Studies in Biology

750124P: Basics of ecology, 5 op
 750173P: Biogeography, 5 op
 757109P: Concepts of genetics, 5 op
 757110P: Experimental course in general genetics, 5 op
 750122P: Introduction to cell biology and physiology, 5 op

Compulsory

750122P-01: Introduction to cell biology and physiology, genetics, 0 op
 750122P-02: Introduction to cell biology and physiology, animal cell biology, 0 op
 750122P-03: Introduction to cell biology and physiology, plant cell biology, 0 op
 750122P-04: Introduction to cell biology and physiology, animal physiology, 0 op

Intermediate Studies in Biology

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
 750372A: Evolution and systematics of organisms, 5 op
 750336A: Evolutionary ecology, 5 op
 755335A: Identification of animals, invertebrates, 4 op

755334A: Identification of animals, vertebrates, 4 op
 756354A: Identification of plant species, extensive, 5 op
 757312A: Molecular evolution, 5 op
 756346A: Plant biology lectures, 5 op

Optional Studies in Biology

Ecology, minor studies (vähintään 40 op)

Student will choose major subject biology and other minor subject in biology (bioscience or ecology) to their B.Sc. degree. The selection of minor subject will already direct the student towards the line of study and the major subject of the M.Sc. studies (ecology).

Compulsory

755321A: Aquatic ecology field course, 5 op
 756351A: Introduction to population ecology, 5 op
 755325A: Methods in ecology I, 5 op
 755329A: Methods in ecology II, 5 op
 756344A: Plant ecology, 5 op
 756343A: Plant ecology field course, 5 op
 755322A: Terrestrial animals field course, 5 op

Optional in BSc, compulsory in MSc

Optional

Other compulsory minor subject (vähintään 25 op)

Choose 25 ECTS minor subject studies.

Other studies (vähintään 18 op)

Compulsory

806119P: A Second Course in Statistics, 5 op
 780120P: Basic Principles in Chemistry, 5 op
 030005P: Information Skills, 1 op
 806118P: Introduction to Statistics, 5 op
 750032Y: Orientation course for new students, 2 op

Optional

Opintojaksojen kuvaukset

Tutkintorakenteisiin kuuluvien opintokohteiden kuvaukset

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 - 40 ECTS credits / 267-533 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 1st or 2nd year.

Learning outcomes:

Student knows the research methods in specific field of biology teaching or biological research. 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 teaching (didactics) or executes small research work 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. The M.Sc. maturity exam will be the abstract that the student will load to the Laturi system with the M.Sc. thesis.

Didactics thesis will be 30-40 pages long (20 cr.) because the structure diverges from the biology thesis. In educational sciences concepts and methods is described wider than in science.

The M.Sc. maturity exam will be the abstract that the student will load to the Laturi system with the M.Sc. thesis. 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:

TEA: compulsory 20 cr, teacher student can also do 40 cr research pro gradu thesis in biology (750658S).

Prerequisites and co-requisites:

Sufficient amount of basic and subject level studies in order to be able to do independent research work.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

Literary work. Credits gained is determined as follows: mere quantitative content assessment = 20 cr.. Both quantitative and qualitative content assessment = 40 cr. The credit amount is defined when the student will fill the registration form for pro gradu thesis. This is done before the student will start the actual work.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä, Prof. Hely Häggman or Prof. Timo Muotka.

Working life cooperation:

Thesis is made in research groups.

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. 1st or 2nd year.

Learning outcomes:

Student will understand profoundly own major's essential methods, results and theories.

Contents:

Exam books have to be agreed with the responsible teacher in beforehand.

Mode of delivery:

Itsenäinen opiskelu: kirjatentti.

Learning activities and teaching methods:

Book exam (3 h). Exam is held in Examinarium, instructions: <https://www oulu.fi/forstudents/e-exam>

Target group:

TEA, ECO and BS: compulsory.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

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. Timo Muotka):

- 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 literature agreed with the professor

Plant ecology orientation (Doc. Annu Ruotsalainen):

- 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 literature agreed with the professor

MAJOR BIOSCIENCE

Genetics orientation (Assoc. Prof. Heikki Helanterä):

- Lewin Genes (XI) (or equal)

Some part of the book can be replaced with other literature agreed with the responsible teacher, for example human genetics, evolutionary, population or conservation genetics or bioinformatics.

Plant physiologi orientation (Prof. Hely Häggman)

- Taiz, L. et al. 2015. Plant Physiology and Development. Sixth Edition. 761 p. Sinauer Associates, Inc. ISBN-9781605352558

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Book exam in biology public exam day.

Exam in Examinarium: <http://www oulu fi/english/studying/examinarium>

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä, Prof. Hely Häggman, Doc. Anna Liisa Ruotsalainen or Prof. Timo Muotka.

Working life cooperation:

No.

Other information:

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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: Lumi Viljakainen, Muotka, Timo Tapani

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. 1st - 2nd 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 opposing, 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 Moodle 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 opposing. Detailed instructions on the degree programme's notice board.

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:

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 thesis, Ecogen student will write maturity exam (if not done in the BSc degree) in Examinarium. For Finnish student who has already made maturity exam for the B.Sc. degree the M.Sc. maturity exam will be the abstract that the student will load to the Laturi system with the M.Sc. 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 accepts it.

Target group:

Compulsory to the biology students. During 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:

Prof. Hely Häggman, Prof. Timo Muotka and Assoc. Prof. Heikki Helanerä.

Working life cooperation:

No.

Other information:

-

050124A: Advanced Practice, 5 op**Voimassaolo:** 01.08.2017 -**Opiskelumuoto:** Intermediate Studies**Laji:** Course**Vastuuyksikkö:** Faculty of Education**Arvostelu:** 1 - 5, pass, fail**Opintokohteen kielet:** Finnish**ECTS Credits:**

5 ECTS

Language of instruction:

Finnish

Learning outcomes:

Having completed the study module, the student knows how to

- plan independently for work with pupils and students
- apply his/her knowledge about assessment and plan for and implement assessment of study attainments
- apply in practice the knowledge and skills s/he has learnt before
- apply social, multicultural and legal questions related to education in various situations of everyday life
- discuss the significance of teacher responsibility and take independent responsibility of work as a teacher
- explain the meaning of collaboration between school and home.

Contents:

The study module includes the following:

- elaboration of the student's own objectives for the practice
- goal-oriented planning, implementation and assessment of lessons based on curricula so that the self-direction of the pupils is also taken into account
- observation and analysis of teaching
- getting to know the three-tier support in basic education
- utilization of the information and communication technologies in teaching
- familiarization with the collaboration between home and school
- special traits of your own subject.

Mode of delivery:

Supervised teaching practice in the basic education grades 7–9 and in the upper secondary school at the Oulu Teacher Training School.

Face-to-face teaching

Learning activities and teaching methods:

5 credits = 135 lessons (45 minutes each), out of which 50 lessons (45 min each) of face-to-face teaching and 85 lessons (45 min each) of independent work.

Face-to-face teaching:

- lessons to be given 7–9 (75 min each)
- minimum of lessons to be observed 18 (75 min each)
- individual and group supervision 3–3,5 lessons/week (à 75 min)
- working as a co-teacher in the student's own supervision group
- participation in the practice period information meeting and the lectures forming part of the study module

Target group:

Students in the secondary teacher education programme

Prerequisites and co-requisites:

Subject didactics

Basic practice

Education as an Object of Scientific Research

Recommended optional programme components:

The study module is part of the pedagogical studies in secondary teacher education.

Recommended or required reading:

To be agreed on at the start of the study module.

Assessment methods and criteria:

Pass

A pass for the study module requires observance of the given programme at a level corresponding to the grade "good" and participation in the information meetings, lectures, supervision sessions and events to be announced separately. The study module calls for good mastery of the subjects to be taught by the student. The assessment criteria focus on commitment, interaction, goal-orientedness and assessment.

Fail

The student's performance is deficient or does not show any accomplishment in line with the expected learning outcomes of the study module.

Grading:

Pass/fail

Person responsible:

Katja Leinonen and Emilia Manninen

Working life cooperation:

Non

050121A: Basic Practice, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Learning outcomes:

Having completed the study module, the student knows how to

- describe the meaning of a teacher's pedagogical thinking and activity and interaction in educational and teaching situations
- construct an idea of the school's activity, the learners, the teacher's work and school as a work community
- put into use in the lessons the contents of both the core curriculum and ones specific to the subject
- develop his/her capability to encounter different learners in all teaching and learning situations
- identify the teacher's task to guide the learners into active agents who set objectives for their own learning and solve problems.

Contents:

- supervised and independent observation of teaching
- getting to know the school practices and teachers' work and curricula
- familiarisation with the practice plan and assessment criteria
- setting of objectives for yourself
- planning of teaching based on curricula
- implementation and assessment of lessons alone and as a co-teacher
- design of teaching materials and lessons in such a way that the learners are taken into account as active agents
- development of skills of interaction and getting to know the students, encounters with different learners
- getting to know the educational technology used in the school
- special traits of your own subject.

Mode of delivery:

Supervised teaching practice in the lower and upper secondary levels of Oulu Teacher Training School

Face-to-face teaching

Learning activities and teaching methods:

5 credits = 135 lessons (45 minutes each), out of which face-to-face teaching 50 lessons (45 min each) and independent work 85 lessons (45 min each).

Face-to-face teaching:

- participation in the planning, implementation and assessment of 6–8 lessons (75 min each)
- observation of at least 15 lessons (75 min each), which must also include lessons in subjects other than your own
- working as a co-teacher in your own small group
- individual and group supervision 3–3,5 times (75 min each) per week
- participation in the practice information meeting and lectures belonging to the practice period

Target group:

Secondary teacher education students

Prerequisites and co-requisites:

Subject didactics

Education as an Object of Scientific Research

Recommended optional programme components:

The study module is part of the pedagogical studies in secondary teacher education

Recommended or required reading:

To be agreed on at the start of the study module

Assessment methods and criteria:

Pass

To pass the course the student shall successfully follow the programme assigned to him/her and attend the information meeting, lectures, supervision sessions and any specifically required events. Passing the course requires mastery of the subjects taught by the student. The assessment criteria focus on commitment and interaction.

Fail

The student's performance in the study module is deficient or does not show accomplishment in line with the expected learning outcomes.

Grading:

Pass/fail

Person responsible:

Katja Leinonen and Emilia Manninen

Working life cooperation:

Non

050122A: Broadly Based Subject Didactics, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Learning outcomes:

Having completed the course, the student knows how to

- discuss the meaning of the curriculum in the planning and assessment of teaching.
- apply the general and subject-specific foundations and main working and teaching methods laid down in the curriculum in various learning environments.
- apply what s/he has learnt in his/her teaching and school community.
- discuss research in subject didactics.
- describe the most essential contents of a special course selected by him/herself, and apply it in his/her work as a teacher.

Contents:

- curriculum
- preconceptions
- motivation
- interaction
- lesson plan
- illustration
- educational technology
- assessment
- orientation to research in subject didactics

The contents of the special course are permanent and/or annually changing courses supporting the general objectives of teachers' pedagogical studies, offered by the Teacher Training School, educational sciences, subject didactics, and subject departments. There will be an effort to organise courses in the following areas, among others: ICT, ethics, inquiring orientation in teaching and as part of professional deintity, civic skills and active citizenship, responsibility for the environment, multiculturalism and interculturalism, encountering difference, multiprofessional collaboration, functional mathematics, teaching literature and writing, etc.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 4h

Subject didactics/Oulu Teacher Training School: small group teaching, a maximum of 10h (45 minutes each)

University subject didactics: small group teaching, 8h

Implementation of the special course: face-to-face teaching 16h, independent work 97h

Target group:

Students in the secondary teacher education programme

Recommended optional programme components:

The study module is part of the pedagogical studies for secondary teachers.

Recommended or required reading:

To be agreed on at the start of the study module.

Assessment methods and criteria:

For example, active participation in teaching, completion of independent and online assignments, visit, planning of a teaching episode, production of learning materials, diary, blog, video, examination, etc.

Pass

The student's performance shows accomplishment in line with the expected learning outcomes at an acceptable level. S/he deals with the theoretical substance of the study module analytically enough, and applies it in an appropriate manner.

Fail

The student's performance reveals deficiencies in accomplishment relative to the expected learning outcomes, or is unfinished.

Grading:

Pass/fail

Person responsible:

Minna Sääskilähti

Working life cooperation:

Non

410084P: Education as an Object of Scientific Research, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opettajat: Katariina Holma

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay410084P Education as an Object of Scientific Research (OPEN UNI) 5.0 op

ECTS Credits:

5 ECTS credits

Language of instruction:

Finnish

Timing:

1st year

Learning outcomes:

- identify basic concepts and approaches in education
- identify the main research areas of educational research
- describe the main traditions and research approaches in education
- apply educational concepts and research findings in describing and analyzing educational practices

Contents:

- Orientation to basic studies in educational sciences
- Specific features of scientific knowledge
- Specific features of educational research
- Education as a professional practice and research subject

Mode of delivery:

Teaching and independent study

Learning activities and teaching methods:

Basic part: 3 ECTS: Mutual Lectures 14 h, independent Work 67h.

Seminar part: 2 ECTS: seminar groups in training programs 10 h, Independent Work 44 h.

Target group:

Students in Education from different training programs

Prerequisites and co-requisites:

No

Recommended optional programme components:

The course is part of basic studies in education

Recommended or required reading:

- Siljander, P. (2014). Systemaattinen johdatus kasvatustieteeseen: Peruskäsitteet ja pääsuuntauukset. Tampere: Vastapaino. (myös [Ellibs](#)) or literature agreed with the teacher in charge

- Training program-specific study materials

Assessment methods and criteria:

Basic part 3 op

Requirements: Active participation in lectures and independent study of the study material. Written assignment.

Seminar Part 2 ECTS

Requirements: Active participation in seminars. Tasks given by the seminar teacher. The achievement of learning outcomes is assessed on the basis of a written assignment.

To pass the course, the student has to be able to summarize the key themes, concepts and research topics relevant to educational research, and to consider their significance in educational practices or educational research. The student is also expected to relate educational concepts and approaches to each other and apply them in analyzing practical educational situations.

Grading:

Pass/Fail

Person responsible:

Katariina Holma

Working life cooperation:

In seminar groups

410085P: Growth, Development and Learning, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opettajat: Hanni-Mari Muukkonen-van der Meer

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay410085P Growth, Development and Learning (OPEN UNI) 5.0 op

ECTS Credits:

5 ECTS credits

Language of instruction:

Finnish

Timing:

1st year

Learning outcomes:

After completing the course, the students is able to

- Define and analyse learning from the perspectives of educational psychology and research on learning
- Identify the most prominent paradigms and tasks in educational of psychology
- Apply acquired knowledge of psychological trends and theories in classroom discussions considering different learning and teaching environments
- Compare different perspectives of educational psychology focusing on age- and culture-specific aspects in education and upbringing
- Reflect on own practices as a learner and a teacher based on knowledge in educational psychology

Contents:

- Individual growth, development and learning in the context of human development, cultural-historical environment, daily life and work
- The principal tasks of educational psychology as applied, new knowledge generating and critical science
- Research traditions, main concepts and research approaches in educational psychology
- The professional applications in supporting growth

Mode of delivery:

Blended teaching

Learning activities and teaching methods:

Lectures 14h, seminars 10h, and independent study 111 h

Target group:

Students in all study programmes of Faculty of Education

Prerequisites and co-requisites:

No

Recommended optional programme components:

The course is part of Basic Studies in Education

Recommended or required reading:

Ormrod, J. E., Anderman, E. M. & Anderman, L.H. (2019). Educational Psychology: Developing Learners (10th Edition). Pearson.

Crain W. (2010). Theories of Development: concepts and applications. 6th ed. Psychology Press

Assessment methods and criteria:

Active participation, essay

Grading:

Pass/Fail

Person responsible:

Hanni Muukkonen

Working life cooperation:

Seminar phase of the course work includes observation task in educational settings.

410088P: Philosophical and Ethical Foundations and Objectives of Education, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Basic Studies**Laji:** Course**Vastuuyksikkö:** Faculty of Education**Arvostelu:** 1 - 5, pass, fail**Opettajat:** Hanna-Maija Huhtala**Opintokohteen kielet:** Finnish**Leikkaavuudet:**

ay410088P Philosophical and Ethical Foundations and Objectives of Education (OPEN UNI) 5.0 op

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Timing:

1st year

Learning outcomes:

Upon completion of the course, the student will be able to:

- summarize and contrast central concepts and approaches of educational philosophy
- compare international perspectives on ethics
- apply concepts related to philosophy and ethics to discuss educational tasks and relationships in global contexts
- describe their current educational philosophy and explain and illustrate their approach to professional ethics

Contents:

- Western and non-western schools of educational philosophy
- Perspectives on global and professional ethics
- Educational implications of different approaches
- Ethical dilemmas in educational contexts

Mode of delivery:

Blended teaching

Learning activities and teaching methods:

Lectures 20h, seminars 10h, and independent study 105h

Course essay

Target group:

Students in all study programmes of Faculty of Education

Prerequisites and co-requisites:

No

Recommended optional programme components:

The course is part of Basic Studies in Education

Recommended or required reading:

Freire, P. (1998). *Pedagogy of Freedom: Ethics, Democracy, and Civic Courage*. Oxford: Rowman & Littlefield Publishers.

Noddings, N. (2005). *Challenge to care in Schools*. 2 nd ed. New York: Teachers' College Press.

Assessment methods and criteria:

Active participation,

Essay

Grading:

Pass/Fail

Person responsible:

Hanna-Maija Huhtala

Working life cooperation:

Seminar phase of the course work includes observation task on field.

050123A: Research-Based Subject Didactics, 10 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

10 ECTS

Language of instruction:

Finnish

Timing:

4. year autumn, 1. period

Learning outcomes:

The student knows how to

- describe the starting-points of educational research and explain the basics of qualitative and quantitative research.
- make use of didactic research in his/her own subject and compose a thesis in subject didactics.
- choose a relevant research method for his/her study and analyze the research data.
- assess the significance of research in subject didactics for the teaching of his/her own subject and construct the thinking of an inquiring teacher.
- apply the knowledge acquired in the study related to subject didactics in supervised teaching practice.

Contents:

Planning and implementation of and reporting on a study in subject didactics. The study can be about

- a teaching experiment
- a study related to the curriculum
- research into knowledge of subject contents
- research on learning materials
- research of learning environments and use of new technologies in teaching
- research on attitudes
- research on hobby activities connected with the subject
- research on assessment methods

The study can be related to primary, secondary or tertiary education. The study can also be involved with the third sector.

Supervised teaching practice involves

- planning and implementation of lessons and blocks of teaching making use of knowledge acquired in studies on subject didactics.
- observation of lessons from the viewpoint of subject didactics

Mode of delivery:

Face-to-face teaching, supervised teaching practices in grades 7-9 and in the upper secondary grades of the Oulu Teacher Training School, the Faculty

Learning activities and teaching methods:

Lectures 8h, methodological exercises and seminar work, a maximum of 42h, and independent work 195h, including the production of a seminar thesis, preparation to act as opponent to another thesis, and familiarization with the other theses.

In supervised teaching practice, 1 credit equals 27 lessons (45 min each) = 16–17 lessons (75 min each).

- lessons to be given: 2–3 (75 min each)
- lessons to be monitored: 3 (75 min)
- independent work

Target group:

Students in the secondary teacher education programme

Prerequisites and co-requisites:**Recommended optional programme components:**

The study module is part of the pedagogical studies in secondary teacher education

Recommended or required reading:

Curricula in the Oulu Teacher Training School and the literature to be agreed on at the start of the study module

Assessment methods and criteria:

Active participation in teaching, completion of independent assignments, conducting, and acting as an opponent to, a scientific study. Active and committed involvement in supervised teaching practice and related activities.

Pass

The student's performance shows accomplishment in line with the expected learning outcomes at an acceptable level. S/he deals with the theoretical substance of the study module analytically enough, and applies it in an appropriate manner.

In supervised teaching practice, a pass requires observance of the given programme in a manner that corresponds to the grade "good". The study module calls for a good mastery of the subjects to be taught by the student, and application of didactic knowledge in the subjects. The assessment criteria focus on commitment, interaction, target orientation, assessment, and expertise.

Grading:

Pass/fail

Person responsible:

Raimo Kaasila

Working life cooperation:

Non

410087P: Sociocultural Contexts of Education, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opettajat: Vesa Puuronen

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay410087P Sociocultural Contexts of Education (OPEN UNI) 5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Timing:

1st year

Learning outcomes:

Upon completion of the course, the student will be able to:

- use the central concepts of social sciences in educational research and analyze the related basic issues in various contexts of education and growth.
- identify, among other things, the significance of social status and gender in the discussion related to education and schooling (incl. intersectionality).
- apply social, multicultural, juridical and responsibility issues related to education and schooling in everyday life situations.
- describe the historical, socio-political and professional starting points of Finnish education system.

Contents:

- The basics of social sciences in educational research.
- The possibilities and limitations of education and growth determined by the context, i.e., culture, society and environment (incl., e.g., the political, economic and gendered points of view).
- The social, multicultural, juridical and responsibility issues related to education (incl. e.g., from the point of view of gender, sexuality and intersectionality).
- Education systems and their gender as part of the historical development of society (incl. education politics as a part of social politics).
- Gender equality politics as a part of education politics and social politics.

Mode of delivery:

Blended teaching and learning. The course is implemented in Moodle learning environment.

Learning activities and teaching methods:

Lectures 24 h, independent working 111 h.

Learning activities are composed of studying lectures (contact/online/recorded) and their materials, course literature, and carrying out the learning task (e.g., essay), which combines the contents of lectures, course literature and the phenomena of student's own life-world experiences. The learning task is sketched in Moodle workspace of the course, together with the support and guidance by peer students and teacher.

Target group:

Students in all study programmes of Faculty of Education

Prerequisites and co-requisites:

No

Recommended optional programme components:

The course is part of the Basic Studies in Education (25 ECTS)

Recommended or required reading:

Antikainen, A., Rinne, R. & Koski, L. (2000 tai myöhempi painos). Kasvatussosiologia. Jyväskylä: PS-kustannus. (myös e-kirjana)

Saresma, T., Rossi, L-M. & Juvonen, T. (toim.). (2010 tai myöhempi painos). Käsikirja sukupuoleen. Tampere: Vastapaino. (myös e-kirjana)

Assessment methods and criteria:

The adoption of learning outcomes is measured by learning task (e.g., essay), which combines the contents of lectures, course literature and the phenomena of student's own life-world experiences.

Assessment criteria of learning task are:

0 = Work is unfinished, fragmentary, and handled matters are not connected to the theme of the course. References are poorly used.

1 = Work is very superficial in relation to the theme of the course, and handled matters are disconnected from each other. References are weakly used.

2 = Work is superficial in relation to the theme of the course, and handled matters are in some places partly disconnected from each other. References are satisfactorily used.

3 = Work is structured in relation to the theme of the course, handled matters are connected to each other, and there is a visible plot in the work. Using of references is at a good level.

4 = Work is presented and structured in somewhat analytical way in relation to the theme of the course, and handled matters are well connected to each other. Using of references is mainly at a very good level.

5 = Work is presented and structured in a systematic and analytical way in relation to the theme of the course, and handled matters are connected to each other very well. Using of references is at excellent level.

Grading:

0-5

Person responsible:

Vesa Puuronen (Mervi Heikkinen and Veli-Matti Ulvinen)

Working life cooperation:

The adoption of learning outcomes of the course may contain working life cooperation, which relates to the professional contents of each student's own study programme.

050120A: Subject Didactics, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Timing:

3. year, 3. period

Learning outcomes:

Having completed the study module, the student knows how to

- identify the fundamentals of his/her own subject in terms of subject didactics.
- describe different approaches to and methods of teaching, learning environments and teaching aids in his/her own subject..
- identify the meaning of interaction in teaching.
- apply national curricula to plan teaching in his/her own subject.
- develop working methods that take into account the pupils' special needs.
- develop capabilities to assess their own teaching and the students' knowledge.

Contents:

- curricula
- the grounds of the didactics of their own subject
- teaching methods, learning environments, teaching aids
- interaction in teaching
- differentiation and encountering difference
- assessment

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 4 h, small group teaching 34 h, independent work 95h

Target group:

Secondary teacher students

Recommended optional programme components:

The study module is part of the pedagogical studies for secondary teachers.

Recommended or required reading:

To be agreed on at the start of the study module.

Assessment methods and criteria:

Assessment may be based, among other things, on active participation in teaching, completion of independent and online assignments, visits, planning of a teaching episode, production of learning materials, diary, blog, video, examination, etc.

pass

The student's performance shows accomplishment that is in line with the expected learning outcomes on an acceptable level. S/he deals with theoretical substance analytically enough and applies it in an appropriate manner.

fail

The student's performance shows shortcomings in accomplishments based on the expected learning outcomes, or is unfinished.

Grading:

Pass/ fail

Person responsible:

Sari Harmoinen

Working life cooperation:

Non

050125A: Teacher as a Researcher in Teaching Practice, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Learning outcomes:

Having completed the study module, the student knows how to

- apply his/her knowledge of educational philosophy in a constructive way when working with other actors in the field of education in the context of philosophical and ethical issues in education
- apply the knowledge and skills s/he has learnt and carry independent responsibility for his/her work as a teacher
- explain the meaning of multiprofessional collaboration in a teacher's work
- discuss the significance of student welfare services in a teacher's work
- analyze and apply the knowledge and skills acquired in previous studies in independent work with pupils and students
- sum up the meaning of assessment in a teacher's work and apply this knowledge in the planning and implementation of assessment.

Contents:

The study module includes

- deepening one's own objectives in teaching practice
- observation and analysis of teaching and modules of teaching
- independent, goal-oriented planning, implementation and assessment of a broad teaching package based on curricula in such a way that self-regulation of learning is also taken into account
- taking independent responsibility for teaching
- deepening the teacher's job description (the pupil and familiarization with student welfare, encountering different learners and situations, familiarization with ethical moral issues and values, the learner as an independent, active actor and influential person, familiarization with the collaboration between home and school)
- special traits of the student's own subject

Mode of delivery:

Supervised teaching practice in the lower and upper secondary school of the Oulu Teacher Training School

Learning activities and teaching methods:

5 credits = 135 lessons (45 minutes each), including 50h (45 min each) of face-to-face teaching and 85h (45 min each) of independent work.

Face-to-face teaching:

- lessons to be given: 9–10, which can also include co-teaching and remedial lessons (75 min each)
- lessons to be monitored: a minimum of 15 (75 min each)
- individual and group supervision 3–3,5 lessons/week (75 min each)
- working as a co-teacher in your own group
- participation in the practice period information meeting and in the lectures forming part of the study module

Target group:

Students in the secondary teacher education programme.

Prerequisites and co-requisites:

Subject didactics

Basic practice

Advanced practice

Recommended optional programme components:

The study module is part of the pedagogical studies in secondary teacher education.

Recommended or required reading:

The Oulu Teacher Training School curricula

To be agreed on at the start of the study module.

Assessment methods and criteria:

Pass

A pass for the study module requires observance of the given programme at a level that corresponds to the grade "good" as well as participation in the info meetings, lectures, supervision sessions and events to be announced separately. The study module calls for good mastery of the subjects to be taught by the student. The assessment criteria focus on commitment, interaction, target orientation and assessment as well as expertise.

Fail

The student's performance in the study module is deficient or it does not show accomplishment in line with the expected learning outcomes of the module.

Grading:

Pass/fail

Person responsible:

Katja Leinonen and Emilia Manninen

Working life cooperation:

Non

410086P: Teaching and Educational Interaction, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Basic Studies**Laji:** Course**Vastuuyksikkö:** Faculty of Education**Arvostelu:** 1 - 5, pass, fail**Opettajat:** Järvelä Sanna**Opintokohteen kielet:** Finnish**Leikkaavuudet:**

ay410086P Teaching and Educational Interaction (OPEN UNI) 5.0 op

ECTS Credits:

5 ECTS

Language of instruction:

Finnish. For ITE students English

Timing:

1st year

Learning outcomes:

- Summarize the historical development of paradigms in learning sciences
- Identify the most significant paradigms of learning sciences and the most influential theorists
- Relate the different cultural circumstances on pedagogical solutions in learning and teaching situations with special focus on intercultural competence
- Discuss the possibilities offered by ICT in teaching and learning situations

Contents:

- historical overview of the development of learning paradigms
- theories of intercultural/ transformative/ experiential and social learning and critical pedagogy
- the impact of cultural factors on learning and teaching
- learning and teaching as individual and social-psychological phenomena
- the role of ICT in learning and teaching

Mode of delivery:

Blended teaching

Learning activities and teaching methods:

Lectures 20h, seminars 10h, and independent study 105h

Target group:

Students in all study programmes of Faculty of Education

Prerequisites and co-requisites:

No

Recommended optional programme components:

The course is part of Basic Studies in Education

Assessment methods and criteria:

Active participation,

Essay

Grading:

Pass/fail

Person responsible:

Sanna Järvelä

Working life cooperation:

Seminar phase of the course work includes observation task on field.

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. 1st or 2nd year.

Learning outcomes:

Student will understand profoundly own major's essential methods, results and theories.

Contents:

Exam books have to be agreed with the responsible teacher in beforehand.

Mode of delivery:

Itsenäinen opiskelu: kirjatentti.

Learning activities and teaching methods:

Book exam (3 h). Exam is held in Examinarium, instructions: <https://www oulu.fi/forstudents/e-exam>

Target group:

TEA, ECO and BS: compulsory.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

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. Timo Muotka):

- 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 literature agreed with the professor

Plant ecology orientation (Doc. Annu Ruotsalainen):

- 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 literature agreed with the professor

MAJOR BIOSCIENCE

Genetics orientation (Assoc. Prof. Heikki Helanterä):

- Lewin Genes (XI) (or equal)

Some part of the book can be replaced with other literature agreed with the responsible teacher, for example human genetics, evolutionary, population or conservation genetics or bioinformatics.

Plant physiologi orientation (Prof. Hely Häggman)

- Taiz, L. et al. 2015. Plant Physiology and Development. Sixth Edition. 761 p. Sinauer Associates, Inc. ISBN-9781605352558

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Book exam in biology public exam day.

Exam in Examinarium: <http://www oulu.fi/english/studying/examinarium>

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä, Prof. Hely Häggman, Doc. Anna Liisa Ruotsalainen or Prof. Timo Muotka.

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: Lumi Viljakainen, Muotka, Timo Tapani

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. 1st - 2nd 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 opposing, 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 Moodle 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 opposing. Detailed instructions on the degree programme's notice board.

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:

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 thesis, Ecogen student will write maturity exam (if not done in the BSc degree) in Examinarium. For Finnish student who has already made maturity exam for the B.Sc. degree the M.Sc. maturity exam will be the abstract that the student will load to the Laturi system with the M.Sc. 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 accepts it.

Target group:

Compulsory to the biology students. During 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:

Prof. Hely Häggman, Prof. Timo Muotka and Assoc. Prof. Heikki Helanerä.

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. 1st or 2nd 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 completing the thesis, Ecogen student will write maturity exam (if not done in the BSc degree). For Finnish student who has already made essay maturity exam for the B.Sc. degree the M.Sc. maturity exam will be the abstract that the student will load to the Laturi system with the M.Sc. thesis (exception: ECOGEN students). 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:

ECO and BS: compulsory 40 cr. TEA: 40 cr. optional.

Prerequisites and co-requisites:

Sufficient amount of basic and subject level studies in order to be able to do independent research work.

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.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä, Prof. Hely Häggman or Prof. Timo Muotka.

Working life cooperation:

Thesis is made in research groups.

Other information:

-

H750950: Subject teacher's optional advanced level studies in bioscience major, 5 - 80 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Advanced Studies

Laji: Study module

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

050124A: Advanced Practice, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Learning outcomes:

Having completed the study module, the student knows how to

- plan independently for work with pupils and students
- apply his/her knowledge about assessment and plan for and implement assessment of study attainments
- apply in practice the knowledge and skills s/he has learnt before
- apply social, multicultural and legal questions related to education in various situations of everyday life
- discuss the significance of teacher responsibility and take independent responsibility of work as a teacher
- explain the meaning of collaboration between school and home.

Contents:

The study module includes the following:

- elaboration of the student's own objectives for the practice
- goal-oriented planning, implementation and assessment of lessons based on curricula so that the self-direction of the pupils is also taken into account
- observation and analysis of teaching
- getting to know the three-tier support in basic education
- utilization of the information and communication technologies in teaching
- familiarization with the collaboration between home and school
- special traits of your own subject.

Mode of delivery:

Supervised teaching practice in the basic education grades 7–9 and in the upper secondary school at the Oulu Teacher Training School.

Face-to-face teaching

Learning activities and teaching methods:

5 credits = 135 lessons (45 minutes each), out of which 50 lessons (45 min each) of face-to-face teaching and 85 lessons (45 min each) of independent work.

Face-to-face teaching:

- lessons to be given 7–9 (75 min each)
- minimum of lessons to be observed 18 (75 min each)
- individual and group supervision 3–3,5 lessons/week (à 75 min)
- working as a co-teacher in the student's own supervision group
- participation in the practice period information meeting and the lectures forming part of the study module

Target group:

Students in the secondary teacher education programme

Prerequisites and co-requisites:

Subject didactics

Basic practice

Education as an Object of Scientific Research

Recommended optional programme components:

The study module is part of the pedagogical studies in secondary teacher education.

Recommended or required reading:

To be agreed on at the start of the study module.

Assessment methods and criteria:

Pass

A pass for the study module requires observance of the given programme at a level corresponding to the grade "good" and participation in the information meetings, lectures, supervision sessions and events to be announced separately. The study module calls for good mastery of the subjects to be taught by the student. The assessment criteria focus on commitment, interaction, goal-orientedness and assessment.

Fail

The student's performance is deficient or does not show any accomplishment in line with the expected learning outcomes of the study module.

Grading:

Pass/fail

Person responsible:

Katja Leinonen and Emilia Manninen

Working life cooperation:

Non

050121A: Basic Practice, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Learning outcomes:

Having completed the study module, the student knows how to

- describe the meaning of a teacher's pedagogical thinking and activity and interaction in educational and teaching situations
- construct an idea of the school's activity, the learners, the teacher's work and school as a work community
- put into use in the lessons the contents of both the core curriculum and ones specific to the subject
- develop his/her capability to encounter different learners in all teaching and learning situations
- identify the teacher's task to guide the learners into active agents who set objectives for their own learning and solve problems.

Contents:

- supervised and independent observation of teaching
- getting to know the school practices and teachers' work and curricula
- familiarisation with the practice plan and assessment criteria
- setting of objectives for yourself
- planning of teaching based on curricula
- implementation and assessment of lessons alone and as a co-teacher
- design of teaching materials and lessons in such a way that the learners are taken into account as active agents
- development of skills of interaction and getting to know the students, encounters with different learners
- getting to know the educational technology used in the school
- special traits of your own subject.

Mode of delivery:

Supervised teaching practice in the lower and upper secondary levels of Oulu Teacher Training School

Face-to-face teaching

Learning activities and teaching methods:

5 credits = 135 lessons (45 minutes each), out of which face-to-face teaching 50 lessons (45 min each) and independent work 85 lessons (45 min each).

Face-to-face teaching:

- participation in the planning, implementation and assessment of 6–8 lessons (75 min each)
- observation of at least 15 lessons (75 min each), which must also include lessons in subjects other than your own
- working as a co-teacher in your own small group
- individual and group supervision 3–3,5 times (75 min each) per week
- participation in the practice information meeting and lectures belonging to the practice period

Target group:

Secondary teacher education students

Prerequisites and co-requisites:

Subject didactics

Education as an Object of Scientific Research

Recommended optional programme components:

The study module is part of the pedagogical studies in secondary teacher education

Recommended or required reading:

To be agreed on at the start of the study module

Assessment methods and criteria:**Pass**

To pass the course the student shall successfully follow the programme assigned to him/her and attend the information meeting, lectures, supervision sessions and any specifically required events. Passing the course requires mastery of the subjects taught by the student. The assessment criteria focus on commitment and interaction.

Fail

The student's performance in the study module is deficient or does not show accomplishment in line with the expected learning outcomes.

Grading:

Pass/fail

Person responsible:

Katja Leinonen and Emilia Manninen

Working life cooperation:

Non

050122A: Broadly Based Subject Didactics, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Learning outcomes:

Having completed the course, the student knows how to

- discuss the meaning of the curriculum in the planning and assessment of teaching.
- apply the general and subject-specific foundations and main working and teaching methods laid down in the curriculum in various learning environments.
- apply what s/he has learnt in his/her teaching and school community.
- discuss research in subject didactics.
- describe the most essential contents of a special course selected by him/herself, and apply it in his/her work as a teacher.

Contents:

- curriculum
- preconceptions
- motivation
- interaction
- lesson plan
- illustration
- educational technology
- assessment
- orientation to research in subject didactics

The contents of the special course are permanent and/or annually changing courses supporting the general objectives of teachers' pedagogical studies, offered by the Teacher Training School, educational sciences, subject didactics, and subject departments. There will be an effort to organise courses in the following areas, among others: ICT, ethics, inquiring orientation in teaching and as part of professional deintity, civic skills and active citizenship, responsibility for the environment, multiculturalism and interculturalism, encountering difference, multiprofessional collaboration, functional mathematics, teaching literature and writing, etc.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 4h

Subject didactics/Oulu Teacher Training School: small group teaching, a maximum of 10h (45 minutes each)
 University subject didactics: small group teaching, 8h
 Implementation of the special course: face-to-face teaching 16h, independent work 97h

Target group:

Students in the secondary teacher education programme

Recommended optional programme components:

The study module is part of the pedagogical studies for secondary teachers.

Recommended or required reading:

To be agreed on at the start of the study module.

Assessment methods and criteria:

For example, active participation in teaching, completion of independent and online assignments, visit, planning of a teaching episode, production of learning materials, diary, blog, video, examination, etc.

Pass

The student's performance shows accomplishment in line with the expected learning outcomes at an acceptable level. S/he deals with the theoretical substance of the study module analytically enough, and applies it in an appropriate manner.

Fail

The student's performance reveals deficiencies in accomplishment relative to the expected learning outcomes, or is unfinished.

Grading:

Pass/fail

Person responsible:

Minna Sääskilähti

Working life cooperation:

Non

410084P: Education as an Object of Scientific Research, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opettajat: Katariina Holma

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay410084P Education as an Object of Scientific Research (OPEN UNI) 5.0 op

ECTS Credits:

5 ECTS credits

Language of instruction:

Finnish

Timing:

1st year

Learning outcomes:

- identify basic concepts and approaches in education
- identify the main research areas of educational research
- describe the main traditions and research approaches in education
- apply educational concepts and research findings in describing and analyzing educational practices

Contents:

- Orientation to basic studies in educational sciences
- Specific features of scientific knowledge
- Specific features of educational research
- Education as a professional practice and research subject

Mode of delivery:

Teaching and independent study

Learning activities and teaching methods:

Basic part: 3 ECTS: Mutual Lectures 14 h, independent Work 67h.

Seminar part: 2 ECTS: seminar groups in training programs 10 h, Independent Work 44 h.

Target group:

Students in Education from different training programs

Prerequisites and co-requisites:

No

Recommended optional programme components:

The course is part of basic studies in education

Recommended or required reading:

- Siljander, P. (2014). Systemaattinen johdatus kasvatustieteeseen: Peruskäsitteet ja pääsuuntauokset. Tampere: Vastapaino. (myös [Ellibs](#)) or literature agreed with the teacher in charge

- Training program-specific study materials

Assessment methods and criteria:

Basic part 3 op

Requirements: Active participation in lectures and independent study of the study material. Written assignment.

Seminar Part 2 ECTS

Requirements: Active participation in seminars. Tasks given by the seminar teacher. The achievement of learning outcomes is assessed on the basis of a written assignment.

To pass the course, the student has to be able to summarize the key themes, concepts and research topics relevant to educational research, and to consider their significance in educational practices or educational research. The student is also expected to relate educational concepts and approaches to each other and apply them in analyzing practical educational situations.

Grading:

Pass/Fail

Person responsible:

Katariina Holma

Working life cooperation:

In seminar groups

410085P: Growth, Development and Learning, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opettajat: Hanni-Mari Muukkonen-van der Meer

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay410085P Growth, Development and Learning (OPEN UNI) 5.0 op

ECTS Credits:

5 ECTS credits

Language of instruction:

Finnish

Timing:

1st year

Learning outcomes:

After completing the course, the students is able to

- Define and analyse learning from the perspectives of educational psychology and research on learning
- Identify the most prominent paradigms and tasks in educational of psychology
- Apply acquired knowledge of psychological trends and theories in classroom discussions considering different learning and teaching environments
- Compare different perspectives of educational psychology focusing on age- and culture-specific aspects in education and upbringing
- Reflect on own practices as a learner and a teacher based on knowledge in educational psychology

Contents:

- Individual growth, development and learning in the context of human development, cultural-historical environment, daily life and work
- The principal tasks of educational psychology as applied, new knowledge generating and critical science
- Research traditions, main concepts and research approaches in educational psychology
- The professional applications in supporting growth

Mode of delivery:

Blended teaching

Learning activities and teaching methods:

Lectures 14h, seminars 10h, and independent study 111 h

Target group:

Students in all study programmes of Faculty of Education

Prerequisites and co-requisites:

No

Recommended optional programme components:

The course is part of Basic Studies in Education

Recommended or required reading:

Ormrod, J. E., Anderman, E. M. & Anderman, L.H. (2019). Educational Psychology: Developing Learners (10th Edition). Pearson.

Crain W. (2010). Theories of Development: concepts and applications. 6th ed. Psychology Press

Assessment methods and criteria:

Active participation, essay

Grading:

Pass/Fail

Person responsible:

Hanni Muukkonen

Working life cooperation:

Seminar phase of the course work includes observation task in educational settings.

410088P: Philosophical and Ethical Foundations and Objectives of Education, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opettajat: Hanna-Maija Huhtala

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay410088P Philosophical and Ethical Foundations and Objectives of Education (OPEN UNI) 5.0 op

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Timing:

1st year

Learning outcomes:

Upon completion of the course, the student will be able to:

- summarize and contrast central concepts and approaches of educational philosophy
- compare international perspectives on ethics
- apply concepts related to philosophy and ethics to discuss educational tasks and relationships in global contexts
- describe their current educational philosophy and explain and illustrate their approach to professional ethics

Contents:

- Western and non-western schools of educational philosophy
- Perspectives on global and professional ethics
- Educational implications of different approaches
- Ethical dilemmas in educational contexts

Mode of delivery:

Blended teaching

Learning activities and teaching methods:

Lectures 20h, seminars 10h, and independent study 105h

Course essay

Target group:

Students in all study programmes of Faculty of Education

Prerequisites and co-requisites:

No

Recommended optional programme components:

The course is part of Basic Studies in Education

Recommended or required reading:

Freire, P. (1998). *Pedagogy of Freedom: Ethics, Democracy, and Civic Courage*. Oxford: Rowman & Littlefield Publishers.

Noddings, N. (2005). *Challenge to care in Schools*. 2 nd ed. New York: Teachers' College Press.

Assessment methods and criteria:

Active participation,

Essay

Grading:

Pass/Fail

Person responsible:

Hanna-Maija Huhtala

Working life cooperation:

Seminar phase of the course work includes observation task on field.

050123A: Research-Based Subject Didactics, 10 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

10 ECTS

Language of instruction:

Finnish

Timing:

4. year autumn, 1. period

Learning outcomes:

The student knows how to

- describe the starting-points of educational research and explain the basics of qualitative and quantitative research.
- make use of didactic research in his/her own subject and compose a thesis in subject didactics.
- choose a relevant research method for his/her study and analyze the research data.
- assess the significance of research in subject didactics for the teaching of his/her own subject and construct the thinking of an inquiring teacher.
- apply the knowledge acquired in the study related to subject didactics in supervised teaching practice.

Contents:

Planning and implementation of and reporting on a study in subject didactics. The study can be about

- a teaching experiment
- a study related to the curriculum
- research into knowledge of subject contents
- research on learning materials
- research of learning environments and use of new technologies in teaching
- research on attitudes
- research on hobby activities connected with the subject
- research on assessment methods

The study can be related to primary, secondary or tertiary education. The study can also be involved with the third sector.

Supervised teaching practice involves

- planning and implementation of lessons and blocks of teaching making use of knowledge acquired in studies on subject didactics.
- observation of lessons from the viewpoint of subject didactics

Mode of delivery:

Face-to-face teaching, supervised teaching practices in grades 7-9 and in the upper secondary grades of the Oulu Teacher Training School, the Faculty

Learning activities and teaching methods:

Lectures 8h, methodological exercises and seminar work, a maximum of 42h, and independent work 195h, including the production of a seminar thesis, preparation to act as opponent to another thesis, and familiarization with the other theses.

In supervised teaching practice, 1 credit equals 27 lessons (45 min each) = 16–17 lessons (75 min each).

- lessons to be given: 2–3 (75 min each)
- lessons to be monitored: 3 (75 min)
- independent work

Target group:

Students in the secondary teacher education programme

Prerequisites and co-requisites:**Recommended optional programme components:**

The study module is part of the pedagogical studies in secondary teacher education

Recommended or required reading:

Curricula in the Oulu Teacher Training School and the literature to be agreed on at the start of the study module

Assessment methods and criteria:

Active participation in teaching, completion of independent assignments, conducting, and acting as an opponent to, a scientific study. Active and committed involvement in supervised teaching practice and related activities.

Pass

The student's performance shows accomplishment in line with the expected learning outcomes at an acceptable level. S/he deals with the theoretical substance of the study module analytically enough, and applies it in an appropriate manner.

In supervised teaching practice, a pass requires observance of the given programme in a manner that corresponds to the grade "good". The study module calls for a good mastery of the subjects to be taught by the student, and application of didactic knowledge in the subjects. The assessment criteria focus on commitment, interaction, target orientation, assessment, and expertise.

Grading:

Pass/fail

Person responsible:

Raimo Kaasila

Working life cooperation:

Non

410087P: Sociocultural Contexts of Education, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opettajat: Vesa Puuronen

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay410087P Sociocultural Contexts of Education (OPEN UNI) 5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Timing:

1st year

Learning outcomes:

Upon completion of the course, the student will be able to:

- use the central concepts of social sciences in educational research and analyze the related basic issues in various contexts of education and growth.
- identify, among other things, the significance of social status and gender in the discussion related to education and schooling (incl. intersectionality).
- apply social, multicultural, juridical and responsibility issues related to education and schooling in everyday life situations.
- describe the historical, socio-political and professional starting points of Finnish education system.

Contents:

- The basics of social sciences in educational research.
- The possibilities and limitations of education and growth determined by the context, i.e., culture, society and environment (incl., e.g., the political, economic and gendered points of view).
- The social, multicultural, juridical and responsibility issues related to education (incl. e.g., from the point of view of gender, sexuality and intersectionality).
- Education systems and their gender as part of the historical development of society (incl. education politics as a part of social politics).
- Gender equality politics as a part of education politics and social politics.

Mode of delivery:

Blended teaching and learning. The course is implemented in Moodle learning environment.

Learning activities and teaching methods:

Lectures 24 h, independent working 111 h.

Learning activities are composed of studying lectures (contact/online/recorded) and their materials, course literature, and carrying out the learning task (e.g., essay), which combines the contents of lectures, course literature and the phenomena of student's own life-world experiences. The learning task is sketched in Moodle workspace of the course, together with the support and guidance by peer students and teacher.

Target group:

Students in all study programmes of Faculty of Education

Prerequisites and co-requisites:

No

Recommended optional programme components:

The course is part of the Basic Studies in Education (25 ECTS)

Recommended or required reading:

Antikainen, A., Rinne, R. & Koski, L. (2000 tai myöhempi painos). Kasvatussosiologia. Jyväskylä: PS-kustannus. (myös e-kirjana)

Saresma, T., Rossi, L-M. & Juvonen, T. (toim.). (2010 tai myöhempi painos). Käsikirja sukupuoleen. Tampere: Vastapaino. (myös e-kirjana)

Assessment methods and criteria:

The adoption of learning outcomes is measured by learning task (e.g., essay), which combines the contents of lectures, course literature and the phenomena of student's own life-world experiences.

Assessment criteria of learning task are:

0 = Work is unfinished, fragmentary, and handled matters are not connected to the theme of the course. References are poorly used.

1 = Work is very superficial in relation to the theme of the course, and handled matters are disconnected from each other. References are weakly used.

2 = Work is superficial in relation to the theme of the course, and handled matters are in some places partly disconnected from each other. References are satisfactorily used.

3 = Work is structured in relation to the theme of the course, handled matters are connected to each other, and there is a visible plot in the work. Using of references is at a good level.

4 = Work is presented and structured in somewhat analytical way in relation to the theme of the course, and handled matters are well connected to each other. Using of references is mainly at a very good level.

5 = Work is presented and structured in a systematic and analytical way in relation to the theme of the course, and handled matters are connected to each other very well. Using of references is at excellent level.

Grading:

0-5

Person responsible:

Vesa Puuronen (Mervi Heikkinen and Veli-Matti Ulvinen)

Working life cooperation:

The adoption of learning outcomes of the course may contain working life cooperation, which relates to the professional contents of each student's own study programme.

050120A: Subject Didactics, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Timing:

3. year, 3. period

Learning outcomes:

Having completed the study module, the student knows how to

- identify the fundamentals of his/her own subject in terms of subject didactics.
- describe different approaches to and methods of teaching, learning environments and teaching aids in his/her own subject..
- identify the meaning of interaction in teaching.
- apply national curricula to plan teaching in his/her own subject.
- develop working methods that take into account the pupils' special needs.
- develop capabilities to assess their own teaching and the students' knowledge.

Contents:

- curricula
- the grounds of the didactics of their own subject
- teaching methods, learning environments, teaching aids
- interaction in teaching
- differentiation and encountering difference
- assessment

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 4 h, small group teaching 34 h, independent work 95h

Target group:

Secondary teacher students

Recommended optional programme components:

The study module is part of the pedagogical studies for secondary teachers.

Recommended or required reading:

To be agreed on at the start of the study module.

Assessment methods and criteria:

Assessment may be based, among other things, on active participation in teaching, completion of independent and online assignments, visits, planning of a teaching episode, production of learning materials, diary, blog, video, examination, etc.

pass

The student's performance shows accomplishment that is in line with the expected learning outcomes on an acceptable level. S/he deals with theoretical substance analytically enough and applies it in an appropriate manner.

fail

The student's performance shows shortcomings in accomplishments based on the expected learning outcomes, or is unfinished.

Grading:

Pass/ fail

Person responsible:

Sari Harmoinen

Working life cooperation:

Non

050125A: Teacher as a Researcher in Teaching Practice, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Learning outcomes:

Having completed the study module, the student knows how to

- apply his/her knowledge of educational philosophy in a constructive way when working with other actors in the field of education in the context of philosophical and ethical issues in education
- apply the knowledge and skills s/he has learnt and carry independent responsibility for his/her work as a teacher
- explain the meaning of multiprofessional collaboration in a teacher's work
- discuss the significance of student welfare services in a teacher's work
- analyze and apply the knowledge and skills acquired in previous studies in independent work with pupils and students
- sum up the meaning of assessment in a teacher's work and apply this knowledge in the planning and implementation of assessment.

Contents:

The study module includes

- deepening one's own objectives in teaching practice
- observation and analysis of teaching and modules of teaching
- independent, goal-oriented planning, implementation and assessment of a broad teaching package based on curricula in such a way that self-regulation of learning is also taken into account
- taking independent responsibility for teaching
- deepening the teacher's job description (the pupil and familiarization with student welfare, encountering different learners and situations, familiarization with ethical moral issues and values, the learner as an independent, active actor and influential person, familiarization with the collaboration between home and school)
- special traits of the student's own subject

Mode of delivery:

Supervised teaching practice in the lower and upper secondary school of the Oulu Teacher Training School

Learning activities and teaching methods:

5 credits = 135 lessons (45 minutes each), including 50h (45 min each) of face-to-face teaching and 85h (45 min each) of independent work.

Face-to-face teaching:

- lessons to be given: 9–10, which can also include co-teaching and remedial lessons (75 min each)
- lessons to be monitored: a minimum of 15 (75 min each)
- individual and group supervision 3–3,5 lessons/week (75 min each)
- working as a co-teacher in your own group
- participation in the practice period information meeting and in the lectures forming part of the study module

Target group:

Students in the secondary teacher education programme.

Prerequisites and co-requisites:

Subject didactics

Basic practice

Advanced practice

Recommended optional programme components:

The study module is part of the pedagogical studies in secondary teacher education.

Recommended or required reading:

The Oulu Teacher Training School curricula

To be agreed on at the start of the study module.

Assessment methods and criteria:

Pass

A pass for the study module requires observance of the given programme at a level that corresponds to the grade "good" as well as participation in the info meetings, lectures, supervision sessions and events to be announced separately. The study module calls for good mastery of the subjects to be taught by the student. The assessment criteria focus on commitment, interaction, target orientation and assessment as well as expertise.

Fail

The student's performance in the study module is deficient or it does not show accomplishment in line with the expected learning outcomes of the module.

Grading:

Pass/fail

Person responsible:

Katja Leinonen and Emilia Manninen

Working life cooperation:

Non

410086P: Teaching and Educational Interaction, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opettajat: Järvelä Sanna

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay410086P Teaching and Educational Interaction (OPEN UNI) 5.0 op

ECTS Credits:

5 ECTS

Language of instruction:

Finnish. For ITE students English

Timing:

1st year

Learning outcomes:

- Summarize the historical development of paradigms in learning sciences
- Identify the most significant paradigms of learning sciences and the most influential theorists
- Relate the different cultural circumstances on pedagogical solutions in learning and teaching situations with special focus on intercultural competence
- Discuss the possibilities offered by ICT in teaching and learning situations

Contents:

- historical overview of the development of learning paradigms
- theories of intercultural/ transformative/ experiential and social learning and critical pedagogy
- the impact of cultural factors on learning and teaching
- learning and teaching as individual and social-psychological phenomena
- the role of ICT in learning and teaching

Mode of delivery:

Blended teaching

Learning activities and teaching methods:

Lectures 20h, seminars 10h, and independent study 105h

Target group:

Students in all study programmes of Faculty of Education

Prerequisites and co-requisites:

No

Recommended optional programme components:

The course is part of Basic Studies in Education

Assessment methods and criteria:

Active participation,

Essay

Grading:

Pass/fail

Person responsible:

Sanna Järvelä

Working life cooperation:

Seminar phase of the course work includes observation task on field.

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. 1st or 2nd year.

Learning outcomes:

Student will understand profoundly own major's essential methods, results and theories.

Contents:

Exam books have to be agreed with the responsible teacher in beforehand.

Mode of delivery:

Itsenäinen opiskelu: kirjatentti.

Learning activities and teaching methods:

Book exam (3 h). Exam is held in Examinarium, instructions: <https://www oulu.fi/forstudents/e-exam>

Target group:

TEA, ECO and BS: compulsory.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

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. Timo Muotka):

- 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 (Doc. Annu Ruotsalainen):

- 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 literature agreed with the professor

MAJOR BIOSCIENCE

Genetics orientation (Assoc. Prof. Heikki Helanterä):

- Lewin Genes (XI) (or equal)

Some part of the book can be replaced with other literature agreed with the responsible teacher, for example human genetics, evolutionary, population or conservation genetics or bioinformatics.

Plant physiologi orientation (Prof. Hely Häggman)

- Taiz, L. et al. 2015. Plant Physiology and Development. Sixth Edition. 761 p. Sinauer Associates, Inc. ISBN-9781605352558

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Book exam in biology public exam day.

Exam in Examinarium: <http://www oulu.fi/english/studying/examinarium>

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä, Prof. Hely Häggman, Doc. Anna Liisa Ruotsalainen or Prof. Timo Muotka.

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: Lumi Viljakainen, Muotka, Timo Tapani

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. 1st - 2nd 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 opposing, 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 Moodle 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 opponing. Detailed instructions on the degree programme's notice board. 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:

-

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 thesis, Ecogen student will write maturity exam (if not done in the BSc degree) in Examinarium. For Finnish student who has already made maturity exam for the B.Sc. degree the M.Sc. maturity exam will be the abstract that the student will load to the Laturi system with the M.Sc. 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 accepts it.

Target group:

Compulsory to the biology students. During 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:

Prof. Hely Häggman, Prof. Timo Muotka and Assoc. Prof. Heikki Helanerä.

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. 1st or 2nd 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 completing the thesis, Ecogen student will write maturity exam (if not done in the BSc degree). For Finnish student who has already made essay maturity exam for the B.Sc. degree the M.Sc. maturity exam will be the abstract that the student will load to the Laturi system with the M.Sc. thesis (exception: ECOGEN students). 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:

ECO and BS: compulsory 40 cr. TEA: 40 cr. optional.

Prerequisites and co-requisites:

Sufficient amount of basic and subject level studies in order to be able to do independent research work.

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.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä, Prof. Hely Häggman or Prof. Timo Muotka.

Working life cooperation:

Thesis is made in research groups.

Other information:

-

H750900: Subject teacher's optional advanced level studies in ecology major, 5 - 80 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Advanced Studies

Laji: Study module

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

050124A: Advanced Practice, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Learning outcomes:

Having completed the study module, the student knows how to

- plan independently for work with pupils and students
- apply his/her knowledge about assessment and plan for and implement assessment of study attainments
- apply in practice the knowledge and skills s/he has learnt before
- apply social, multicultural and legal questions related to education in various situations of everyday life
- discuss the significance of teacher responsibility and take independent responsibility of work as a teacher
- explain the meaning of collaboration between school and home.

Contents:

The study module includes the following:

- elaboration of the student's own objectives for the practice
- goal-oriented planning, implementation and assessment of lessons based on curricula so that the self-direction of the pupils is also taken into account
- observation and analysis of teaching
- getting to know the three-tier support in basic education
- utilization of the information and communication technologies in teaching
- familiarization with the collaboration between home and school
- special traits of your own subject.

Mode of delivery:

Supervised teaching practice in the basic education grades 7–9 and in the upper secondary school at the Oulu Teacher Training School.

Face-to-face teaching

Learning activities and teaching methods:

5 credits = 135 lessons (45 minutes each), out of which 50 lessons (45 min each) of face-to-face teaching and 85 lessons (45 min each) of independent work.

Face-to-face teaching:

- lessons to be given 7–9 (75 min each)
- minimum of lessons to be observed 18 (75 min each)
- individual and group supervision 3–3,5 lessons/week (à 75 min)
- working as a co-teacher in the student's own supervision group
- participation in the practice period information meeting and the lectures forming part of the study module

Target group:

Students in the secondary teacher education programme

Prerequisites and co-requisites:

Subject didactics

Basic practice

Education as an Object of Scientific Research

Recommended optional programme components:

The study module is part of the pedagogical studies in secondary teacher education.

Recommended or required reading:

To be agreed on at the start of the study module.

Assessment methods and criteria:

Pass

A pass for the study module requires observance of the given programme at a level corresponding to the grade "good" and participation in the information meetings, lectures, supervision sessions and events to be announced separately. The study module calls for good mastery of the subjects to be taught by the student. The assessment criteria focus on commitment, interaction, goal-orientedness and assessment.

Fail

The student's performance is deficient or does not show any accomplishment in line with the expected learning outcomes of the study module.

Grading:

Pass/fail

Person responsible:

Katja Leinonen and Emilia Manninen

Working life cooperation:

Non

050121A: Basic Practice, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Learning outcomes:

Having completed the study module, the student knows how to

- describe the meaning of a teacher's pedagogical thinking and activity and interaction in educational and teaching situations
- construct an idea of the school's activity, the learners, the teacher's work and school as a work community
- put into use in the lessons the contents of both the core curriculum and ones specific to the subject
- develop his/her capability to encounter different learners in all teaching and learning situations
- identify the teacher's task to guide the learners into active agents who set objectives for their own learning and solve problems.

Contents:

- supervised and independent observation of teaching
- getting to know the school practices and teachers' work and curricula
- familiarisation with the practice plan and assessment criteria
- setting of objectives for yourself
- planning of teaching based on curricula
- implementation and assessment of lessons alone and as a co-teacher
- design of teaching materials and lessons in such a way that the learners are taken into account as active agents
- development of skills of interaction and getting to know the students, encounters with different learners
- getting to know the educational technology used in the school
- special traits of your own subject.

Mode of delivery:

Supervised teaching practice in the lower and upper secondary levels of Oulu Teacher Training School

Face-to-face teaching

Learning activities and teaching methods:

5 credits = 135 lessons (45 minutes each), out of which face-to-face teaching 50 lessons (45 min each) and independent work 85 lessons (45 min each).

Face-to-face teaching:

- participation in the planning, implementation and assessment of 6–8 lessons (75 min each)

- observation of at least 15 lessons (75 min each), which must also include lessons in subjects other than your own
- working as a co-teacher in your own small group
- individual and group supervision 3–3,5 times (75 min each) per week
- participation in the practice information meeting and lectures belonging to the practice period

Target group:

Secondary teacher education students

Prerequisites and co-requisites:

Subject didactics

Education as an Object of Scientific Research

Recommended optional programme components:

The study module is part of the pedagogical studies in secondary teacher education

Recommended or required reading:

To be agreed on at the start of the study module

Assessment methods and criteria:

Pass

To pass the course the student shall successfully follow the programme assigned to him/her and attend the information meeting, lectures, supervision sessions and any specifically required events. Passing the course requires mastery of the subjects taught by the student. The assessment criteria focus on commitment and interaction.

Fail

The student's performance in the study module is deficient or does not show accomplishment in line with the expected learning outcomes.

Grading:

Pass/fail

Person responsible:

Katja Leinonen and Emilia Manninen

Working life cooperation:

Non

050122A: Broadly Based Subject Didactics, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Learning outcomes:

Having completed the course, the student knows how to

- discuss the meaning of the curriculum in the planning and assessment of teaching.
- apply the general and subject-specific foundations and main working and teaching methods laid down in the curriculum in various learning environments.
- apply what s/he has learnt in his/her teaching and school community.
- discuss research in subject didactics.
- describe the most essential contents of a special course selected by him/herself, and apply it in his/her work as a teacher.

Contents:

- curriculum
- preconceptions
- motivation
- interaction
- lesson plan
- illustration
- educational technology

- assessment
- orientation to research in subject didactics

The contents of the special course are permanent and/or annually changing courses supporting the general objectives of teachers' pedagogical studies, offered by the Teacher Training School, educational sciences, subject didactics, and subject departments. There will be an effort to organise courses in the following areas, among others: ICT, ethics, inquiring orientation in teaching and as part of professional identity, civic skills and active citizenship, responsibility for the environment, multiculturalism and interculturalism, encountering difference, multiprofessional collaboration, functional mathematics, teaching literature and writing, etc.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 4h

Subject didactics/Oulu Teacher Training School: small group teaching, a maximum of 10h (45 minutes each)

University subject didactics: small group teaching, 8h

Implementation of the special course: face-to-face teaching 16h, independent work 97h

Target group:

Students in the secondary teacher education programme

Recommended optional programme components:

The study module is part of the pedagogical studies for secondary teachers.

Recommended or required reading:

To be agreed on at the start of the study module.

Assessment methods and criteria:

For example, active participation in teaching, completion of independent and online assignments, visit, planning of a teaching episode, production of learning materials, diary, blog, video, examination, etc.

Pass

The student's performance shows accomplishment in line with the expected learning outcomes at an acceptable level. S/he deals with the theoretical substance of the study module analytically enough, and applies it in an appropriate manner.

Fail

The student's performance reveals deficiencies in accomplishment relative to the expected learning outcomes, or is unfinished.

Grading:

Pass/fail

Person responsible:

Minna Sääskilähti

Working life cooperation:

Non

410084P: Education as an Object of Scientific Research, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opettajat: Katariina Holma

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay410084P Education as an Object of Scientific Research (OPEN UNI) 5.0 op

ECTS Credits:

5 ECTS credits

Language of instruction:

Finnish

Timing:

1st year

Learning outcomes:

- identify basic concepts and approaches in education
- identify the main research areas of educational research
- describe the main traditions and research approaches in education
- apply educational concepts and research findings in describing and analyzing educational practices

Contents:

- Orientation to basic studies in educational sciences
- Specific features of scientific knowledge
- Specific features of educational research
- Education as a professional practice and research subject

Mode of delivery:

Teaching and independent study

Learning activities and teaching methods:

Basic part: 3 ECTS: Mutual Lectures 14 h, independent Work 67h.

Seminar part: 2 ECTS: seminar groups in training programs 10 h, Independent Work 44 h.

Target group:

Students in Education from different training programs

Prerequisites and co-requisites:

No

Recommended optional programme components:

The course is part of basic studies in education

Recommended or required reading:

- Siljander, P. (2014). Systemaattinen johdatus kasvatustieteeseen: Peruskäsitteet ja pääsuuntauukset. Tampere:

Vastapaino. (myös [Ellibs](#)) or literature agreed with the teacher in charge

- Training program-specific study materials

Assessment methods and criteria:

Basic part 3 op

Requirements: Active participation in lectures and independent study of the study material. Written assignment.

Seminar Part 2 ECTS

Requirements: Active participation in seminars. Tasks given by the seminar teacher. The achievement of learning outcomes is assessed on the basis of a written assignment.

To pass the course, the student has to be able to summarize the key themes, concepts and research topics relevant to educational research, and to consider their significance in educational practices or educational research. The student is also expected to relate educational concepts and approaches to each other and apply them in analyzing practical educational situations.

Grading:

Pass/Fail

Person responsible:

Katariina Holma

Working life cooperation:

In seminar groups

410085P: Growth, Development and Learning, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opettajat: Hanni-Mari Muukkonen-van der Meer

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay410085P Growth, Development and Learning (OPEN UNI) 5.0 op

ECTS Credits:

5 ECTS credits

Language of instruction:

Finnish

Timing:

1st year

Learning outcomes:

After completing the course, the students is able to

- Define and analyse learning from the perspectives of educational psychology and research on learning
- Identify the most prominent paradigms and tasks in educational of psychology
- Apply acquired knowledge of psychological trends and theories in classroom discussions considering different learning and teaching environments
- Compare different perspectives of educational psychology focusing on age- and culture-specific aspects in education and upbringing
- Reflect on own practices as a learner and a teacher based on knowledge in educational psychology

Contents:

- Individual growth, development and learning in the context of human development, cultural-historical environment, daily life and work
- The principal tasks of educational psychology as applied, new knowledge generating and critical science
- Research traditions, main concepts and research approaches in educational psychology
- The professional applications in supporting growth

Mode of delivery:

Blended teaching

Learning activities and teaching methods:

Lectures 14h, seminars 10h, and independent study 111 h

Target group:

Students in all study programmes of Faculty of Education

Prerequisites and co-requisites:

No

Recommended optional programme components:

The course is part of Basic Studies in Education

Recommended or required reading:

Ormrod, J. E., Anderman, E. M. & Anderman, L.H. (2019). Educational Psychology: Developing Learners (10th Edition). Pearson.

Crain W. (2010). Theories of Development: concepts and applications. 6th ed. Psychology Press

Assessment methods and criteria:

Active participation, essay

Grading:

Pass/Fail

Person responsible:

Hanni Muukkonen

Working life cooperation:

Seminar phase of the course work includes observation task in educational settings.

410088P: Philosophical and Ethical Foundations and Objectives of Education, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opettajat: Hanna-Maija Huhtala

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay410088P Philosophical and Ethical Foundations and Objectives of Education (OPEN UNI) 5.0 op

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Timing:

1st year

Learning outcomes:

Upon completion of the course, the student will be able to:

- summarize and contrast central concepts and approaches of educational philosophy
- compare international perspectives on ethics
- apply concepts related to philosophy and ethics to discuss educational tasks and relationships in global contexts
- describe their current educational philosophy and explain and illustrate their approach to professional ethics

Contents:

- Western and non-western schools of educational philosophy
- Perspectives on global and professional ethics
- Educational implications of different approaches
- Ethical dilemmas in educational contexts

Mode of delivery:

Blended teaching

Learning activities and teaching methods:

Lectures 20h, seminars 10h, and independent study 105h

Course essay

Target group:

Students in all study programmes of Faculty of Education

Prerequisites and co-requisites:

No

Recommended optional programme components:

The course is part of Basic Studies in Education

Recommended or required reading:

Freire, P. (1998). *Pedagogy of Freedom: Ethics, Democracy, and Civic Courage*. Oxford: Rowman & Littlefield Publishers.

Noddings, N. (2005). *Challenge to care in Schools*. 2 nd ed. New York: Teachers' College Press.

Assessment methods and criteria:

Active participation,

Essay

Grading:

Pass/Fail

Person responsible:

Hanna-Maija Huhtala

Working life cooperation:

Seminar phase of the course work includes observation task on field.

050123A: Research-Based Subject Didactics, 10 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

10 ECTS

Language of instruction:

Finnish

Timing:

4. year autumn, 1. period

Learning outcomes:

The student knows how to

- describe the starting-points of educational research and explain the basics of qualitative and quantitative research.
- make use of didactic research in his/her own subject and compose a thesis in subject didactics.
- choose a relevant research method for his/her study and analyze the research data.
- assess the significance of research in subject didactics for the teaching of his/her own subject and construct the thinking of an inquiring teacher.
- apply the knowledge acquired in the study related to subject didactics in supervised teaching practice.

Contents:

Planning and implementation of and reporting on a study in subject didactics. The study can be about

- a teaching experiment
- a study related to the curriculum
- research into knowledge of subject contents
- research on learning materials
- research of learning environments and use of new technologies in teaching
- research on attitudes
- research on hobby activities connected with the subject
- research on assessment methods

The study can be related to primary, secondary or tertiary education. The study can also be involved with the third sector.

Supervised teaching practice involves

- planning and implementation of lessons and blocks of teaching making use of knowledge acquired in studies on subject didactics.
- observation of lessons from the viewpoint of subject didactics

Mode of delivery:

Face-to-face teaching, supervised teaching practices in grades 7-9 and in the upper secondary grades of the Oulu Teacher Training School, the Faculty

Learning activities and teaching methods:

Lectures 8h, methodological exercises and seminar work, a maximum of 42h, and independent work 195h, including the production of a seminar thesis, preparation to act as opponent to another thesis, and familiarization with the other theses.

In supervised teaching practice, 1 credit equals 27 lessons (45 min each) = 16–17 lessons (75 min each).

- lessons to be given: 2–3 (75 min each)
- lessons to be monitored: 3 (75 min)
- independent work

Target group:

Students in the secondary teacher education programme

Prerequisites and co-requisites:

Recommended optional programme components:

The study module is part of the pedagogical studies in secondary teacher education

Recommended or required reading:

Curricula in the Oulu Teacher Training School and the literature to be agreed on at the start of the study module

Assessment methods and criteria:

Active participation in teaching, completion of independent assignments, conducting, and acting as an opponent to, a scientific study. Active and committed involvement in supervised teaching practice and related activities.

Pass

The student's performance shows accomplishment in line with the expected learning outcomes at an acceptable level. S/he deals with the theoretical substance of the study module analytically enough, and applies it in an appropriate manner.

In supervised teaching practice, a pass requires observance of the given programme in a manner that corresponds to the grade "good". The study module calls for a good mastery of the subjects to be taught by the student, and application of didactic knowledge in the subjects. The assessment criteria focus on commitment, interaction, target orientation, assessment, and expertise.

Grading:

Pass/fail

Person responsible:

Raimo Kaasila

Working life cooperation:

Non

410087P: Sociocultural Contexts of Education, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opettajat: Vesa Puuronen

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay410087P Sociocultural Contexts of Education (OPEN UNI) 5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Timing:

1st year

Learning outcomes:

Upon completion of the course, the student will be able to:

- use the central concepts of social sciences in educational research and analyze the related basic issues in various contexts of education and growth.
- identify, among other things, the significance of social status and gender in the discussion related to education and schooling (incl. intersectionality).
- apply social, multicultural, juridical and responsibility issues related to education and schooling in everyday life situations.
- describe the historical, socio-political and professional starting points of Finnish education system.

Contents:

- The basics of social sciences in educational research.
- The possibilities and limitations of education and growth determined by the context, i.e., culture, society and environment (incl., e.g., the political, economic and gendered points of view).
- The social, multicultural, juridical and responsibility issues related to education (incl. e.g., from the point of view of gender, sexuality and intersectionality).
- Education systems and their gender as part of the historical development of society (incl. education politics as a part of social politics).
- Gender equality politics as a part of education politics and social politics.

Mode of delivery:

Blended teaching and learning. The course is implemented in Moodle learning environment.

Learning activities and teaching methods:

Lectures 24 h, independent working 111 h.

Learning activities are composed of studying lectures (contact/online/recorded) and their materials, course literature, and carrying out the learning task (e.g., essay), which combines the contents of lectures, course literature and the phenomena of student's own life-world experiences. The learning task is sketched in Moodle workspace of the course, together with the support and guidance by peer students and teacher.

Target group:

Students in all study programmes of Faculty of Education

Prerequisites and co-requisites:

No

Recommended optional programme components:

The course is part of the Basic Studies in Education (25 ECTS)

Recommended or required reading:

Antikainen, A., Rinne, R. & Koski, L. (2000 tai myöhempi painos). Kasvatussosiologia. Jyväskylä: PS-kustannus. (myös e-kirjana)

Saresma, T., Rossi, L-M. & Juvonen, T. (toim.). (2010 tai myöhempi painos). Käsikirja sukupuoleen. Tampere: Vastapaino. (myös e-kirjana)

Assessment methods and criteria:

The adoption of learning outcomes is measured by learning task (e.g., essay), which combines the contents of lectures, course literature and the phenomena of student's own life-world experiences.

Assessment criteria of learning task are:

0 = Work is unfinished, fragmentary, and handled matters are not connected to the theme of the course. References are poorly used.

1 = Work is very superficial in relation to the theme of the course, and handled matters are disconnected from each other. References are weakly used.

2 = Work is superficial in relation to the theme of the course, and handled matters are in some places partly disconnected from each other. References are satisfactorily used.

3 = Work is structured in relation to the theme of the course, handled matters are connected to each other, and there is a visible plot in the work. Using of references is at a good level.

4 = Work is presented and structured in somewhat analytical way in relation to the theme of the course, and handled matters are well connected to each other. Using of references is mainly at a very good level.

5 = Work is presented and structured in a systematic and analytical way in relation to the theme of the course, and handled matters are connected to each other very well. Using of references is at excellent level.

Grading:

0-5

Person responsible:

Vesa Puuronen (Mervi Heikkinen and Veli-Matti Ulvinen)

Working life cooperation:

The adoption of learning outcomes of the course may contain working life cooperation, which relates to the professional contents of each student's own study programme.

050120A: Subject Didactics, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Timing:

3. year, 3. period

Learning outcomes:

Having completed the study module, the student knows how to

- identify the fundamentals of his/her own subject in terms of subject didactics.
- describe different approaches to and methods of teaching, learning environments and teaching aids in his/her own subject..
- identify the meaning of interaction in teaching.
- apply national curricula to plan teaching in his/her own subject.
- develop working methods that take into account the pupils' special needs.
- develop capabilities to assess their own teaching and the students' knowledge.

Contents:

- curricula
- the grounds of the didactics of their own subject
- teaching methods, learning environments, teaching aids
- interaction in teaching
- differentiation and encountering difference
- assessment

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Lectures 4 h, small group teaching 34 h, independent work 95h

Target group:

Secondary teacher students

Recommended optional programme components:

The study module is part of the pedagogical studies for secondary teachers.

Recommended or required reading:

To be agreed on at the start of the study module.

Assessment methods and criteria:

Assessment may be based, among other things, on active participation in teaching, completion of independent and online assignments, visits, planning of a teaching episode, production of learning materials, diary, blog, video, examination, etc.

pass

The student's performance shows accomplishment that is in line with the expected learning outcomes on an acceptable level. S/he deals with theoretical substance analytically enough and applies it in an appropriate manner.

fail

The student's performance shows shortcomings in accomplishments based on the expected learning outcomes, or is unfinished.

Grading:

Pass/ fail

Person responsible:

Sari Harmoinen

Working life cooperation:

Non

050125A: Teacher as a Researcher in Teaching Practice, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS

Language of instruction:

Finnish

Learning outcomes:

Having completed the study module, the student knows how to

- apply his/her knowledge of educational philosophy in a constructive way when working with other actors in the field of education in the context of philosophical and ethical issues in education
- apply the knowledge and skills s/he has learnt and carry independent responsibility for his/her work as a teacher
- explain the meaning of multiprofessional collaboration in a teacher's work
- discuss the significance of student welfare services in a teacher's work
- analyze and apply the knowledge and skills acquired in previous studies in independent work with pupils and students
- sum up the meaning of assessment in a teacher's work and apply this knowledge in the planning and implementation of assessment.

Contents:

The study module includes

- deepening one's own objectives in teaching practice
- observation and analysis of teaching and modules of teaching
- independent, goal-oriented planning, implementation and assessment of a broad teaching package based on curricula in such as way that self-regulation of learning is also taken into account
- taking independent responsibility for teaching
- deepening the teacher's job description (the pupil and familiarization with student welfare, encountering different learners and situations, familiarization with ethical moral issues and values, the learner as an independent, active actor and influential person, familiarization with the collaboration between home and school)
- special traits of the student's own subject

Mode of delivery:

Supervised teaching practice in the lower and upper secondary school of the Oulu Teacher Training School

Learning activities and teaching methods:

5 credits = 135 lessons (45 minutes each), including 50h (45 min each) of face-to-face teaching and 85h (45 min each) of independent work.

Face-to-face teaching:

- lessons to be given: 9–10, which can also include co-teaching and remedial lessons (75 min each)
- lessons to be monitored: a minimum of 15 (75 min each)
- individual and group supervision 3–3,5 lessons/week (75 min each)

- working as a co-teacher in your own group
- participation in the practice period information meeting and in the lectures forming part of the study module

Target group:

Students in the secondary teacher education programme.

Prerequisites and co-requisites:

Subject didactics

Basic practice

Advanced practice

Recommended optional programme components:

The study module is part of the pedagogical studies in secondary teacher education.

Recommended or required reading:

The Oulu Teacher Training School curricula

To be agreed on at the start of the study module.

Assessment methods and criteria:

Pass

A pass for the study module requires observance of the given programme at a level that corresponds to the grade "good" as well as participation in the info meetings, lectures, supervision sessions and events to be announced separately. The study module calls for good mastery of the subjects to be taught by the student. The assessment criteria focus on commitment, interaction, target orientation and assessment as well as expertise.

Fail

The student's performance in the study module is deficient or it does not show accomplishment in line with the expected learning outcomes of the module.

Grading:

Pass/fail

Person responsible:

Katja Leinonen and Emilia Manninen

Working life cooperation:

Non

410086P: Teaching and Educational Interaction, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Education

Arvostelu: 1 - 5, pass, fail

Opettajat: Järvelä Sanna

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay410086P Teaching and Educational Interaction (OPEN UNI) 5.0 op

ECTS Credits:

5 ECTS

Language of instruction:

Finnish. For ITE students English

Timing:

1st year

Learning outcomes:

- Summarize the historical development of paradigms in learning sciences
- Identify the most significant paradigms of learning sciences and the most influential theorists
- Relate the different cultural circumstances on pedagogical solutions in learning and teaching situations with special focus on intercultural competence
- Discuss the possibilities offered by ICT in teaching and learning situations

Contents:

- historical overview of the development of learning paradigms

- theories of intercultural/ transformative/ experiential and social learning and critical pedagogy
- the impact of cultural factors on learning and teaching
- learning and teaching as individual and social-psychological phenomena
- the role of ICT in learning and teaching

Mode of delivery:

Blended teaching

Learning activities and teaching methods:

Lectures 20h, seminars 10h, and independent study 105h

Target group:

Students in all study programmes of Faculty of Education

Prerequisites and co-requisites:

No

Recommended optional programme components:

The course is part of Basic Studies in Education

Assessment methods and criteria:

Active participation,

Essay

Grading:

Pass/fail

Person responsible:

Sanna Järvelä

Working life cooperation:

Seminar phase of the course work includes observation task on field.

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:

ECO compulsory.

Prerequisites and co-requisites:

Basics of ecology (750124P).

Recommended optional programme components:

-

Recommended or required reading:

Handouts and book Mittelbach, G. G. Community Ecology (2012). Sinauer, 400 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:

Numerical grading scale 0 – 5, where 0 = 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. 1st or 2nd year.

Learning outcomes:

Student will understand profoundly own major's essential methods, results and theories.

Contents:

Exam books have to be agreed with the responsible teacher in beforehand.

Mode of delivery:

Itsenäinen opiskelu: kirjatentti.

Learning activities and teaching methods:

Book exam (3 h). Exam is held in Examinarium, instructions: <https://www oulu.fi/forstudents/e-exam>

Target group:

TEA, ECO and BS: compulsory.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

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. Timo Muotka):**

- 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 literature agreed with the professor

Plant ecology orientation (Doc. Annu Ruotsalainen):

- 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 literature agreed with the professor

MAJOR BIOSCIENCE

Genetics orientation (Assoc. Prof. Heikki Helanterä):

- Lewin Genes (XI) (or equal)

Some part of the book can be replaced with other literature agreed with the responsible teacher, for example human genetics, evolutionary, population or conservation genetics or bioinformatics.

Plant physiologi orientation (Prof. Hely Häggman)

- Taiz, L. et al. 2015. Plant Physiology and Development. Sixth Edition. 761 p. Sinauer Associates, Inc. ISBN-9781605352558

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Book exam in biology public exam day.

Exam in Examinarium: <http://www oulu.fi/english/studying/examinarium>

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä, Prof. Hely Häggman, Doc. Anna Liisa Ruotsalainen or Prof. Timo Muotka.

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: Lumi Viljakainen, Muotka, Timo Tapani

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. 1st - 2nd 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 opposing, 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 Moodle 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 opponing. Detailed instructions on the degree programme's notice board.

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:

-

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 thesis, Ecogen student will write maturity exam (if not done in the BSc degree) in Examinarium. For Finnish student who has already made maturity exam for the B.Sc. degree the M.Sc. maturity exam will be the abstract that the student will load to the Laturi system with the M.Sc. 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 accepts it.

Target group:

Compulsory to the biology students. During 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:

Prof. Hely Häggman, Prof. Timo Muotka and Assoc. Prof. Heikki Helanerä.

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. 3rd autumn, training B.Sc. 3rd summer - M.Sc. 1st 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:

Assoc. Prof. Heikki Helanterä (BS) and Doc. Seppo Rytönen (ECO)..

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.

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. 1st or 2nd 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 completing the thesis, Ecogen student will write maturity exam (if not done in the BSc degree). For Finnish student who has already made essay maturity exam for the B.Sc. degree the M.Sc. maturity exam will be the abstract that the student will load to the Laturi system with the M.Sc. thesis (exception: ECOGEN students). 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:

ECO and BS: compulsory 40 cr. TEA: 40 cr. optional.

Prerequisites and co-requisites:

Sufficient amount of basic and subject level studies in order to be able to do independent research work.

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.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä, Prof. Hely Häggman or Prof. Timo Muotka.

Working life cooperation:

Thesis is made in research groups.

Other information:

-

751666S: Animal behaviour, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen oppimateriaali:

Viitala, Jussi , , 2005

Krebs, John R. , , 1993

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

English.

Timing:

B.Sc. 3rd spring or M.Sc. 1st 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:

36 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:

-

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:

Learning diary. Exam (voluntary).

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Kari Koivula

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. 1st spring (May).

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, field 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:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Kari Koivula.

Working life cooperation:

No.

Other information:

-

H750700: Optional advanced level studies in ecology major, 35 - 60 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Advanced Studies

Laji: Study module

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

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. 1st or 2nd year.

Learning outcomes:

Student will understand profoundly own major's essential methods, results and theories.

Contents:

Exam books have to be agreed with the responsible teacher in beforehand.

Mode of delivery:

Itsenäinen opiskelu: kirjatentti.

Learning activities and teaching methods:

Book exam (3 h). Exam is held in Examinarium, instructions: <https://www.oulu.fi/forstudents/e-exam>

Target group:

TEA, ECO and BS: compulsory.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

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. Timo Muotka):**

- 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 literature agreed with the professor

Plant ecology orientation (Doc. Annu Ruotsalainen):

- 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 literature agreed with the professor

MAJOR BIOSCIENCE**Genetics orientation (Assoc. Prof. Heikki Helanterä):**

- Lewin Genes (XI) (or equal)

Some part of the book can be replaced with other literature agreed with the responsible teacher, for example human genetics, evolutionary, population or conservation genetics or bioinformatics.

Plant physiologi orientation (Prof. Hely Häggman)

- Taiz, L. et al. 2015. Plant Physiology and Development. Sixth Edition. 761 p. Sinauer Associates, Inc. ISBN-9781605352558

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Book exam in biology public exam day.

Exam in Examinarium: <http://www.oulu.fi/english/studying/examinarium>

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä, Prof. Hely Häggman, Doc. Anna Liisa Ruotsalainen or Prof. Timo Muotka.

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: Lumi Viljakainen, Muotka, Timo Tapani

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. 1st - 2nd 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 opposing, 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 Moodle 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 opposing. Detailed instructions on the degree programme's notice board. 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:

-

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 thesis, Ecogen student will write maturity exam (if not done in the BSc degree) in Examinarium. For Finnish student who has already made maturity exam for the B.Sc. degree the M.Sc. maturity exam will be the abstract that the student will load to the Laturi system with the M.Sc. 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 accepts it.

Target group:

Compulsory to the biology students. During 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:

Prof. Hely Häggman, Prof. Timo Muotka and Assoc. Prof. Heikki Helanerä.

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

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:

M.Sc. 1st autumn.

Learning outcomes:

The student knows how to study gene expression at transcription level by various methods (RT-qPCR, fluorescent reporter proteins) and can fluently use molecular biology tools. The student can evaluate and analyze the results statistically.

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 (757311A).

Recommended optional programme components:

-

Recommended or required reading:

Course handout.

Assessment methods and criteria:

Demonstrations, exercises, reports. Moodle <https://moodle oulu.fi/course/view.php?id=994>

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Anna Maria Pirttilä.

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. 3rd autumn, training B.Sc. 3rd summer - M.Sc. 1st 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:

Assoc. Prof. Heikki Helanterä (BS) and Doc. Seppo Rytönen (ECO)..

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.

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. 1st or 2nd 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 completing the thesis, Ecogen student will write maturity exam (if not done in the BSc degree). For Finnish student who has already made essay maturity exam for the B.Sc. degree the M.Sc. maturity exam will be the abstract that the student will load to the Laturi system with the M.Sc. thesis (exception: ECOGEN students). 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:

ECO and BS: compulsory 40 cr. TEA: 40 cr. optional.

Prerequisites and co-requisites:

Sufficient amount of basic and subject level studies in order to be able to do independent research work.

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.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä, Prof. Hely Häggman or Prof. Timo Muotka.

Working life cooperation:

Thesis is made in research groups.

Other information:

-

757613S: Basics in population genetics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Lumi Viljakainen

Opintokohteen kielet: English

Leikkaavuudet:

753614S Basics in population genetics 8.0 op

ECTS Credits:

5 ECTS cr / 133 hours of work.

Language of instruction:

English.

Timing:

B.Sc. 2nd spring BSc, M.Sc. 1st spring, ECOGENgen 1st spring, compulsory in M.Sc. degree.

Learning outcomes:

Student can explain the fundamental population genetics concepts and models and basics in phylogenetics, and is able to apply these in analysis of data.

Contents:

Fundamentals of population genetics (genetic variation, inbreeding, genetic drift, effective population size, mutation, selection, population structure, gene flow), phylogenetic methods and phylogeography.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

22 h lectures, 16 h exercises, 4 h exercises, take-home exam, independent studying.

Target group:

B.Sc. 2nd spring BSc, M.Sc. 1st spring, ECOGENgen compulsory 1st spring, genetics: compulsory in M.Sc. degree.

Prerequisites and co-requisites:

Concepts of genetics (757109P), Experimental course in general genetics (757110P) and Molecular evolution (757312A) or equivalent knowledge.

Recommended optional programme components:

Compulsory prerequisite for the courses Advanced course in bioinformatics (757619S) and DNA analysis in population genetics (757618S). Recommended prerequisite for course Quantitative genetics (805338A).

Recommended or required reading:

Hamilton, M. B. 2009: Population genetics, Wiley-Blackwell.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Lectures, problem solving, computer exercise, take-home exam, seminar.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Lumi Viljakainen.

Working life cooperation:

No.

Other information:

Note that Basics in population genetics and Introduction to Molecular ecology courses are alternative; students cannot get credits from both.

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: Jouni Aspi

Opintokohteen kielet: Finnish

Leikkaavuudet:

753631S DNA analysis in population genetics, exercises 6.0 op

753616S Specific questions in population genetic and biology 4.0 op

ECTS Credits:

10 cr / 267 hours of work.

Language of instruction:

English.

Timing:

M.Sc. 1st spring.

Learning outcomes:

Deep understanding of population genetic and coalescence theory. Neutral theory and other theories related to genetic polymorphisms. Effect of mutation, linkage disequilibrium and recombination. The relationship between genetic variation, demographic history, mating systems, selection, population structure etc. Identification of natural selection.

Contents:

Basics of coalescence theory, DNA sequence analysis methods, investigation of population structure.

Mode of delivery:

Face-to-face teaching, Moodle.

Learning activities and teaching methods:

20 h lectures, 3 h seminar, 6 h exercises, 36 h computer exercises, 201 h independent work, reports, take home exam.

Target group:

BSg compulsory.

Prerequisites and co-requisites:

Basics of population genetics (757313A), Basics of bioinformatics (757314A) is recommended.

Recommended optional programme components:

-

Recommended or required reading:

Matthew B. Hamilton: Population Genetics.

Assessment methods and criteria:

Lectures, exercises, reports, seminar presentation, independent work.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Prof. Jouni Aspi.

Working life cooperation:

No.

Other information:

-

752688S: Basics of 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 oppimateriaali:

Collin, Hamish A. , , 1998

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 2nd or M.Sc. 1st 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, exam.

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: Neumann K-H, Kumar A, Imani J (2009): Plant Cell and Tissue Culture – A tool in Biotechnology.

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

Assessment methods and criteria:

Essay, exam. Moodle: <https://moodle oulu fi/course/view.php?id=973>

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Prof. Hely Häggman and Doc. Anna Mari Pirttilä..

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:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 1st or 2nd 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:

Seminar, learning diary, essay.

Target group:

-

Prerequisites and co-requisites:

Lectures of Basics of plant biology (756346A) helps the following of the course.

Recommended optional programme components:

-

Recommended or required reading:

Literature announced in seminar.

Assessment methods and criteria:

Learning diary, essay.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Prof. Hely Häggman and Doc. Anna Maria Pirttilä.

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 oppimateriaali:

Taiz, Lincoln , , 2006

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 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 ecophysicologists.

Prerequisites and co-requisites:

Basics of functional plant biology lectures and exercises (752345A, 756341A).

Recommended optional programme components:

-

Recommended or required reading:

Moodle pages. Chapters concerning plant hormones from Taiz, L. et al. 2015. Plant Physiology and Development. 6 e. 761 p. Sinauer Associates, Inc. ISBN- 9781605352558 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:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Prof. Hely Häggman and Doc. Anna Maria Pirttilä.

Working life cooperation:

No.

Other information:

-

H750750: Optional advanced level studies in Genetics and Physiology, 35 - 60 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Advanced Studies

Laji: Study module

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

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. 1st or 2nd year.

Learning outcomes:

Student will understand profoundly own major's essential methods, results and theories.

Contents:

Exam books have to be agreed with the responsible teacher in beforehand.

Mode of delivery:

Itsenäinen opiskelu: kirjatentti.

Learning activities and teaching methods:

Book exam (3 h). Exam is held in Examinarium, instructions: <https://www.oulu.fi/forstudents/e-exam>

Target group:

TEA, ECO and BS: compulsory.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

Recommended or required reading:

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. Timo Muotka):**

- 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 (Doc. Annu Ruotsalainen):

- 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 (Assoc. Prof. Heikki Helanterä):**

- Lewin Genes (XI) (or equal)

Some part of the book can be replaced with other literature agreed with the responsible teacher, for example human genetics, evolutionary, population or conservation genetics or bioinformatics.

Plant physiologi orientation (Prof. Hely Häggman)

- Taiz, L. et al. 2015. Plant Physiology and Development. Sixth Edition. 761 p. Sinauer Associates, Inc. ISBN-9781605352558

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Book exam in biology public exam day.

Exam in Examinarium: <http://www oulu.fi/english/studying/examinarium>

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä, Prof. Hely Häggman, Doc. Anna Liisa Ruotsalainen or 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: Kvist, Laura Irmeli, Lumi Viljakainen

Opintokohteen kielet: English

Leikkaavuudet:

750645S Molecular ecology 2.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

English.

Timing:

B.Sc. 2nd spring or M.Sc. 1st spring, ECOGEN ECO and BS.

Learning outcomes:

This course introduces genetic theories, basics of phylogenetics and usage of molecular biology methods in ecology. The aim is that students know the basic methodology, can apply them into variety of genetic and ecological questions and is familiar with basics of population genetics and phylogenetics in order to be able to analyze and interpret genetic data.

Contents:

Basics of population genetics (variation, effective population size, bottlenecks, population structure, gene flow), relationships between molecular and adaptive variation, phylogenetic methods and phylogeography. Usage of molecular methods for identification of species, sex and individuals, behavioural ecology (mating systems, cooperation, mating success) and conservation.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

22 h lectures, 36 h exercises (laboratory and computer exercises), seminar, final exam.

Target group:

M.Sc. degree: 1st spring ECO optional, ECOGEN eco 1st spring compulsory.

Prerequisites and co-requisites:

Concepts of genetics (757109P) and Experimental course in general genetics (757110P) or equivalent knowledge.

Recommended optional programme components:

ECO: Basics in population ecology (756351A) and Advanced population ecology (755637S).

Recommended or required reading:

Beebe, T and Rowe G. 2004 or 2008. An introduction to molecular ecology. Oxford University Press.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Final exam and seminar.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Laura Kvist.

Working life cooperation:

No.

Other information:

Note that Introduction to Molecular ecology and Introduction to population genetics courses are alternative; students cannot get credits from both.

756651S: Introduction to population ecology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kvist, Laura Irmeli

Opintokohteen kielet: Finnish

Leikkaavuudet:

755636S Population ecology 10.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 3rd autumn.

Learning outcomes:

Basic skills in methods of population biology.

Contents:

Demography and life history strategies with emphasis on dynamics of structured populations in space and time, with an emphasis on conservation biology. Usage of matrix models to calculate basic population parameters and analyze population viability. Metapopulation dynamics and ecological and evolutionary genetics are addressed. In exercises, dynamics of populations are 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:

ilvertown & 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:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Laura Kvist.

Working life cooperation:

No.

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: Lumi Viljakainen, Muotka, Timo Tapani

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. 1st - 2nd 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 opposing, 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 Moodle 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 opponening. Detailed instructions on the degree programme's notice board. 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:

-

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 thesis, Ecogen student will write maturity exam (if not done in the BSc degree) in Examinarium. For Finnish student who has already made maturity exam for the B.Sc. degree the M.Sc. maturity exam will be the abstract that the student will load to the Laturi system with the M.Sc. 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 accepts it.

Target group:

Compulsory to the biology students. During 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:

Prof. Hely Häggman, Prof. Timo Muotka and Assoc. Prof. Heikki Helanerä.

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, Seppo Rytönen

Opintokohteen kielet: English

Leikkaavuudet:

750644S Methods in ecology I 6.0 op

ECTS Credits:

5 cr / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

ECOGEN 1. 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 ECOGEN ECO.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Reading package at course Moodle pages.

Assessment methods and criteria:

Exam.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Kari Koivula and Doc. Seppo Rytönen.

Working life cooperation:

No.

Other information:

-

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: Seppo Rytönen

Opintokohteen kielet: English

Leikkaavuudet:

750647S Methods in ecology II 7.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Lectures Finnish / English, exercises also in English.

Timing:

ECOGEN ECO 1st spring.

Learning outcomes:

The aim of the course is to learn in practice how to apply scientific method in ecological research. The student learns how to select appropriate methods for different ecological problems, and a toolkit for study design and data analysis.

Contents:

Continuation to course Ecological methods I 5 cr (755325A, 755625S). This course focuses on applying the scientific method in ecological research. The course consists mainly of computer exercises in the following subjects: sampling, sample size determination, experimental design and statistical analysis esp. analysis of variance, comparative methods (independent contrasts - analysis), multivariate methods (cluster analysis, ordination) and meta-analysis. Also other current issues can be included.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures 8 h, 40 h exercises, independent work and exam.

Target group:

ECOGEN ECO compulsory.

Prerequisites and co-requisites:

Course Ecological methods I 5 cr (755325A). Recommended: Introduction to Statistics 5 cr (806118P) and A second course in statistics 5 cr (806119P).

Recommended optional programme components:

-

Recommended or required reading:

Reading package at course Moodle pages.

Assessment methods and criteria:

Exam.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Seppo Rytönen and Doc. Kari Koivula.

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. 1st or 2nd 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 completing the thesis, Ecogen student will write maturity exam (if not done in the BSc degree). For Finnish student who has already made essay maturity exam for the B.Sc. degree the M.Sc. maturity exam will be the abstract that the student will load to the Laturi system with the M.Sc. thesis (exception: ECOGEN students). 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:

ECO and BS: compulsory 40 cr. TEA: 40 cr. optional.

Prerequisites and co-requisites:

Sufficient amount of basic and subject level studies in order to be able to do independent research work.

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.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä, Prof. Hely Häggman or Prof. Timo Muotka.

Working life cooperation:

Thesis is made in research groups.

Other information:

-

H750600: EcoGen optional advanced level studies in ecology major, 10 - 80 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Advanced Studies

Laji: Study module

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

030008P: Information Skills for foreign degree students, 1 op

Voimassaolo: 01.08.2012 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Technology

Arvostelu: 1 - 5, pass, fail

Opettajat: Klintrup, Outi-Mirjami

Opintokohteen kielet: English

ECTS Credits:

1 ECTS credits / 27 hours of work

Language of instruction:

English

Timing:

1st year of Master's Degree Programme in Environmental Engineering (BEE) and in Industrial Engineering and Management (international students). The course is held in the autumn semester, during period II and in the spring semester, during period IV.

Learning outcomes:

Upon completion of the course, the students:

- can search scientific information for their thesis,
- know how to evaluate search results and information sources,
- understand the principles of scientific publishing,
- can use a reference management tool.

Contents:

Scientific information retrieval and the search terms, the most important databases and publication channels of the discipline, tools for evaluating the quality of scientific information and reference management.

Mode of delivery:

Blended teaching

Learning activities and teaching methods:

Training sessions 8 h, group work 7 h, self-study 12 h

Target group:

The course is compulsory for the Master's Degree Programme in Environmental Engineering (BEE) and for the Master's Degree Programme in Industrial Engineering and Management (international students). Optional for other degree students working on their diploma/master's thesis.

Recommended or required reading:

Web learning material: "[Finding scientific information](#)"

Assessment methods and criteria:

Passing the course requires successful completion of the course assignments.

Grading:

Pass/fail

Person responsible:

Outi Klintrup

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: Kvist, Laura Irmeli

Opintokohteen kielet: English

Leikkaavuudet:

750664S Molecular methods I 4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

ECOGEN 1st autumn.

Learning outcomes:

Student can isolate DNA, estimate the quality and measure the quantity of DNA, amplify DNA fragments using polymerase chain reaction, design PCR primers and sequence DNA. The student is able to evaluate the results and optimize the methods.

Contents:

Isolation of genomic DNA, amplification of DNA, primer design, DNA sequencing, molecular cloning, analysis of DNA-sequence and writing scientific report.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

48 h laboratory work including demonstrations, 50 h independent work including homework and writing report.

Target group:

ECOGEN compulsory.

Prerequisites and co-requisites:

Concepts of genetics (757110P) or equivalent knowledge.

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:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Lumi Viljakainen.

Working life cooperation:

No.

Other information:

-

757613S: Basics in population genetics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Lumi Viljakainen

Opintokohteen kielet: English

Leikkaavuudet:

753614S Basics in population genetics 8.0 op

ECTS Credits:

5 ECTS cr / 133 hours of work.

Language of instruction:

English.

Timing:

B.Sc. 2nd spring BSg, M.Sc. 1st spring, ECOGENgen 1st spring, compulsory in M.Sc. degree.

Learning outcomes:

Student can explain the fundamental population genetics concepts and models and basics in phylogenetics, and is able to apply these in analysis of data.

Contents:

Fundamentals of population genetics (genetic variation, inbreeding, genetic drift, effective population size, mutation, selection, population structure, gene flow), phylogenetic methods and phylogeography.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

22 h lectures, 16 h exercises, 4 h exercises, take-home exam, independent studying.

Target group:

B.Sc. 2nd spring BSg, M.Sc. 1st spring, ECOGENgen compulsory 1st spring, genetics: compulsory in M.Sc. degree.

Prerequisites and co-requisites:

Concepts of genetics (757109P), Experimental course in general genetics (757110P) and Molecular evolution (757312A) or equivalent knowledge.

Recommended optional programme components:

Compulsory prerequisite for the courses Advanced course in bioinformatics (757619S) and DNA analysis in population genetics (757618S). Recommended prerequisite for course Quantitative genetics (805338A).

Recommended or required reading:

Hamilton, M. B. 2009: Population genetics, Wiley-Blackwell.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Lectures, problem solving, computer exercise, take-home exam, seminar.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Lumi Viljakainen.

Working life cooperation:

No.

Other information:

Note that Basics in population genetics and Introduction to Molecular ecology courses are alternative; students cannot get credits from both.

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: Jouni Aspi

Opintokohteen kielet: Finnish

Leikkaavuudet:

753631S DNA analysis in population genetics, exercises 6.0 op

753616S Specific questions in population genetic and biology 4.0 op

ECTS Credits:

10 cr / 267 hours of work.

Language of instruction:

English.

Timing:

M.Sc. 1st spring.

Learning outcomes:

Deep understanding of population genetic and coalescence theory. Neutral theory and other theories related to genetic polymorphisms. Effect of mutation, linkage disequilibrium and recombination. The relationship between genetic variation, demographic history, mating systems, selection, population structure etc. Identification of natural selection.

Contents:

Basics of coalescence theory, DNA sequence analysis methods, investigation of population structure.

Mode of delivery:

Face-to-face teaching, Moodle.

Learning activities and teaching methods:

20 h lectures, 3 h seminar, 6 h exercises, 36 h computer exercises, 201 h independent work, reports, take home exam.

Target group:

BSc compulsory.

Prerequisites and co-requisites:

Basics of population genetics (757313A), Basics of bioinformatics (757314A) is recommended.

Recommended optional programme components:

-

Recommended or required reading:

Matthew B. Hamilton: Population Genetics.

Assessment methods and criteria:

Lectures, exercises, reports, seminar presentation, independent work.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Prof. Jouni Aspi.

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. 1st or 2nd year.

Learning outcomes:

Student will understand profoundly own major's essential methods, results and theories.

Contents:

Exam books have to be agreed with the responsible teacher in beforehand.

Mode of delivery:

Itsenäinen opiskelu: kirjatentti.

Learning activities and teaching methods:

Book exam (3 h). Exam is held in Examinarium, instructions: <https://www oulu.fi/forstudents/e-exam>

Target group:

TEA, ECO and BS: compulsory.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

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. Timo Muotka):**

- 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 literature agreed with the professor

Plant ecology orientation (Doc. Annu Ruotsalainen):

- 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 literature agreed with the professor

MAJOR BIOSCIENCE

Genetics orientation (Assoc. Prof. Heikki Helanterä):

- Lewin Genes (XI) (or equal)

Some part of the book can be replaced with other literature agreed with the responsible teacher, for example human genetics, evolutionary, population or conservation genetics or bioinformatics.

Plant physiologi orientation (Prof. Hely Häggman)

- Taiz, L. et al. 2015. Plant Physiology and Development. Sixth Edition. 761 p. Sinauer Associates, Inc. ISBN-9781605352558

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Book exam in biology public exam day.

Exam in Examinarium: <http://www oulu.fi/english/studying/examinarium>

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä, Prof. Hely Häggman, Doc. Anna Liisa Ruotsalainen or Prof. Timo Muotka.

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: Lumi Viljakainen, Muotka, Timo Tapani

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. 1st - 2nd 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 opposing, 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 Moodle 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 opponening. Detailed instructions on the degree programme's notice board.

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:

-

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 thesis, Ecogen student will write maturity exam (if not done in the BSc degree) in Examinarium. For Finnish student who has already made maturity exam for the B.Sc. degree the M.Sc. maturity exam will be the abstract that the student will load to the Laturi system with the M.Sc. 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 accepts it.

Target group:

Compulsory to the biology students. During 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:

Prof. Hely Häggman, Prof. Timo Muotka and Assoc. Prof. Heikki Helanerä.

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: Kvist, Laura Irmeli

Opintokohteen kielet: English

Leikkaavuudet:

750664S Molecular methods I 4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

ECOGEN 1st autumn.

Learning outcomes:

Student can isolate DNA, estimate the quality and measure the quantity of DNA, amplify DNA fragments using polymerase chain reaction, design PCR primers and sequence DNA. The student is able to evaluate the results and optimize the methods.

Contents:

Isolation of genomic DNA, amplification of DNA, primer design, DNA sequencing, molecular cloning, analysis of DNA-sequence and writing scientific report.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

48 h laboratory work including demonstrations, 50 h independent work including homework and writing report.

Target group:

ECOGEN compulsory.

Prerequisites and co-requisites:

Concepts of genetics (757110P) or equivalent knowledge.

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:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Lumi Viljakainen.

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. 1st or 2nd 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 completing the thesis, Ecogen student will write maturity exam (if not done in the BSc degree). For Finnish student who has already made essay maturity exam for the B.Sc. degree the M.Sc. maturity exam will be the abstract that the student will load to the Laturi system with the M.Sc. thesis (exception: ECOGEN students). 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:

ECO and BS: compulsory 40 cr. TEA: 40 cr. optional.

Prerequisites and co-requisites:

Sufficient amount of basic and subject level studies in order to be able to do independent research work.

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.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä, Prof. Hely Häggman or Prof. Timo Muotka.

Working life cooperation:

Thesis is made in research groups.

Other information:

-

757613S: Basics in population genetics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Lumi Viljakainen

Opintokohteen kielet: English

Leikkaavuudet:

753614S Basics in population genetics 8.0 op

ECTS Credits:

5 ECTS cr / 133 hours of work.

Language of instruction:

English.

Timing:

B.Sc. 2nd spring BSc, M.Sc. 1st spring, ECOGENgen 1st spring, compulsory in M.Sc. degree.

Learning outcomes:

Student can explain the fundamental population genetics concepts and models and basics in phylogenetics, and is able to apply these in analysis of data.

Contents:

Fundamentals of population genetics (genetic variation, inbreeding, genetic drift, effective population size, mutation, selection, population structure, gene flow), phylogenetic methods and phylogeography.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

22 h lectures, 16 h exercises, 4 h exercises, take-home exam, independent studying.

Target group:

B.Sc. 2nd spring BSc, M.Sc. 1st spring, ECOGENgen compulsory 1st spring, genetics: compulsory in M.Sc. degree.

Prerequisites and co-requisites:

Concepts of genetics (757109P), Experimental course in general genetics (757110P) and Molecular evolution (757312A) or equivalent knowledge.

Recommended optional programme components:

Compulsory prerequisite for the courses Advanced course in bioinformatics (757619S) and DNA analysis in population genetics (757618S). Recommended prerequisite for course Quantitative genetics (805338A).

Recommended or required reading:

Hamilton, M. B. 2009: Population genetics, Wiley-Blackwell.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Lectures, problem solving, computer exercise, take-home exam, seminar.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Lumi Viljakainen.

Working life cooperation:

No.

Other information:

Note that Basics in population genetics and Introduction to Molecular ecology courses are alternative; students cannot get credits from both.

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: Jouni Aspi

Opintokohteen kielet: Finnish

Leikkaavuudet:

753631S DNA analysis in population genetics, exercises 6.0 op

753616S Specific questions in population genetic and biology 4.0 op

ECTS Credits:

10 cr / 267 hours of work.

Language of instruction:

English.

Timing:

M.Sc. 1st spring.

Learning outcomes:

Deep understanding of population genetic and coalescence theory. Neutral theory and other theories related to genetic polymorphisms. Effect of mutation, linkage disequilibrium and recombination. The relationship between genetic variation, demographic history, mating systems, selection, population structure etc. Identification of natural selection.

Contents:

Basics of coalescence theory, DNA sequence analysis methods, investigation of population structure.

Mode of delivery:

Face-to-face teaching, Moodle.

Learning activities and teaching methods:

20 h lectures, 3 h seminar, 6 h exercises, 36 h computer exercises, 201 h independent work, reports, take home exam.

Target group:

BSg compulsory.

Prerequisites and co-requisites:

Basics of population genetics (757313A), Basics of bioinformatics (757314A) is recommended.

Recommended optional programme components:

-

Recommended or required reading:

Matthew B. Hamilton: Population Genetics.

Assessment methods and criteria:

Lectures, exercises, reports, seminar presentation, independent work.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Prof. Jouni Aspi.

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: Kvist, Laura Irmeli

Opintokohteen kielet: English

Leikkaavuudet:

750664S Molecular methods I 4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

ECOGEN 1st autumn.

Learning outcomes:

Student can isolate DNA, estimate the quality and measure the quantity of DNA, amplify DNA fragments using polymerase chain reaction, design PCR primers and sequence DNA. The student is able to evaluate the results and optimize the methods.

Contents:

Isolation of genomic DNA, amplification of DNA, primer design, DNA sequencing, molecular cloning, analysis of DNA-sequence and writing scientific report.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

48 h laboratory work including demonstrations, 50 h independent work including homework and writing report.

Target group:

ECOGEN compulsory.

Prerequisites and co-requisites:

Concepts of genetics (757110P) or equivalent knowledge.

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:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Lumi Viljakainen.

Working life cooperation:

No.

Other information:

-

H750650: EcoGen optional advanced level studies in Genetics major, 5 - 80 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Advanced Studies

Laji: Study module

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

030008P: Information Skills for foreign degree students, 1 op

Voimassaolo: 01.08.2012 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Technology

Arvostelu: 1 - 5, pass, fail

Opettajat: Klintrup, Outi-Mirjami

Opintokohteen kielet: English

ECTS Credits:

1 ECTS credits / 27 hours of work

Language of instruction:

English

Timing:

1st year of Master's Degree Programme in Environmental Engineering (BEE) and in Industrial Engineering and Management (international students). The course is held in the autumn semester, during period II and in the spring semester, during period IV.

Learning outcomes:

Upon completion of the course, the students:

- can search scientific information for their thesis,

- know how to evaluate search results and information sources,
- understand the principles of scientific publishing,
- can use a reference management tool.

Contents:

Scientific information retrieval and the search terms, the most important databases and publication channels of the discipline, tools for evaluating the quality of scientific information and reference management.

Mode of delivery:

Blended teaching

Learning activities and teaching methods:

Training sessions 8 h, group work 7 h, self-study 12 h

Target group:

The course is compulsory for the Master's Degree Programme in Environmental Engineering (BEE) and for the Master's Degree Programme in Industrial Engineering and Management (international students). Optional for other degree students working on their diploma/master's thesis.

Recommended or required reading:

Web learning material: "[Finding scientific information](#)"

Assessment methods and criteria:

Passing the course requires successful completion of the course assignments.

Grading:

Pass/fail

Person responsible:

Outi Klintrup

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

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Proficiency level:

B2-C1

Status:

This course is mandatory for students who choose English as their foreign language in the following B.Sc. degree programmes:

Faculty of Natural Sciences

- Biology
- Mathematical and Physical Sciences.

Faculty of Technology

- Chemistry
- Geosciences.

Note:

Please consult your faculty's 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 skills in English must have been otherwise acquired. If you need to take English, but lack the background, please get in touch with the Languages and Communication contact teacher to discuss individual solutions.

ECTS Credits:

2 ECTS / 53 hours of work

Language of instruction:

English

Timing:

Biology: 1st year spring term (periods 3 and 4)

Mathematical and Physical Sciences: 1st year autumn term (periods 1 and 2)

Chemistry: 1st year autumn term (periods 1 and 2)

Geosciences: 1st year spring term (periods 3 and 4)

Learning outcomes:

By the end of the course, you are expected to demonstrate the ability to:

utilize your knowledge of word formation, text structure, and cohesion markers to understand the vocabulary and content of academic texts,

use effective reading strategies and techniques for studying vocabulary, and

summarize texts both orally or in writing.

Contents:

The course will focus on reading strategies; these include recognising how texts are organised, 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:

The course is implemented using blended methods, which may include web-based teaching and face-to-face teaching. The course utilizes the Moodle learning environment.

Learning activities and teaching methods:

The English 1 course is adapted to accommodate many different fields of study, and thus the materials and implementation methods of the course vary. There will be 26 hours of guided teaching events and 28 hours of independent study, either individually or in a group.

Target group:

Faculty of Natural Sciences: 1st-year students of Biology, Mathematical & Physical Sciences

Faculty of Technology: 1st-year students of Chemistry, Geosciences

Prerequisites and co-requisites:

Post-requisite Students are also required to take [English 2 902004Y](#) following completion of this course.

Recommended optional programme components:

None

Recommended or required reading:

Course materials used will be available from the library or online.

Assessment methods and criteria:

Continuous assessment takes into account active and regular participation in classroom sessions and successful completion of all homework tasks, There are three monthly tests on material covered so far.

The assessment of the course is based on the learning outcomes listed above.

Grading:

The course utilises a grading scale of Pass/Fail.

Person responsible:

Karen Niskanen

Working life cooperation:

The course does not contain working life cooperation.

Other information:

N.B. Students with grades laudatur or eximia in their A1 English school-leaving examination can be exempted from this course and will be granted the credits by your faculty. Contact the faculty for information.

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

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Leikkaavuudet:

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

Proficiency level:

B2 - C1

Status:

This course is mandatory for students who choose English as their foreign language in the following B.Sc. degree programs:

Faculty of Natural Sciences:

Biology

Mathematical & Physical Sciences.

Faculty of Technology:

Chemistry

Geoscience.

Required proficiency level:

Students taking this course must have had English as the A1 or A2 language at school or have equivalent skills.

ECTS Credits:

2 ECTS credits / 53 hours of work.

Language of instruction:

English

Timing:

Biology: 2nd year autumn term (periods 1 and 2)

Mathematic and Physical Sciences 1st year spring term (periods 3 and 4)

Chemistry: 2nd year spring term (periods 3 and 4)

Geosciences: 2nd year spring term (periods 3 and 4)

Learning outcomes:

By the end of the course, you are expected to have demonstrated the ability to:

use appropriate strategies and techniques for communicating effectively in English in an academic context in your own field

prepare and present scientific subjects from your own field of studies to your classmates, using appropriate field-related vocabulary.

Contents:

In the classroom, you will practice the skills of listening, speaking and presenting topics in your own field. The emphasis is on working in pairs and small groups. In addition, you will complete independent homework assignments to support the classroom learning.

Mode of delivery:

The course is implemented using blended methods, which may include distance teaching, classroom instruction and activities in the Moodle learning environment.

Learning activities and teaching methods:

The English 2 course is tailored to the needs of students in different fields of study, and thus the materials and implementation methods of the course vary between groups. The teacher will provide a more detailed schedule and list of homework tasks. There will be 26 hours of guided teaching events and 28 hours of independent work, including both individual and group work.

Target group:

2nd year students of Biology, Chemistry, Geoscience

1st year students of Mathematical and Physical Sciences

Prerequisites and co-requisites:

Prerequisite course: 902002Y English 1, unless exempted

Recommended optional programme components:

-

Recommended or required reading:

Materials will be provided in electronic format or are available from the library.

Assessment methods and criteria:

Continuous assessment is based on regular attendance, active participation in all lessons and the successful completion of all homework tasks. The assessment of the course is based on the learning outcomes of the course.

Grading:

Pass / fail.

Person responsible:

Karen Niskanen

Working life cooperation:

-

Other information:

-

750032Y: Orientation course for new students, 2 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Lumi Viljakainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

750031Y Orientation course for new students 1.0 op

ECTS Credits:

2 ECTS credits / 53 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 (PSP) for the first study year.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Tutorials, presentations, seminar of major subjects, computer exercises, independent studying, total 53 h.

Target group:

BIOL: compulsory.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Study syllabus.

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:

N.N. and Ph. Lic. Minna Vanhatalo.

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: Languages and Communication

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

Proficiency level:

This course is only for Finnish speaking students with CEFR-level A2-B1 in Swedish language. There are no beginner courses in Swedish at the university.

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

Voimassaolo: 01.08.2014 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

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

Proficiency level:

B1/B2/C1

This course is only for Finnish speaking students with CEFR-level A2 in Swedish language. We don't offer Beginners courses in Swedish.

Status:

Required proficiency level:

Contents:

Learning activities and teaching methods:

Recommended optional programme components:

-

Recommended or required reading:

Assessment methods and criteria:

Working life cooperation:

-

750124P: Basics of ecology, 5 op**Opiskelumuoto:** Basic Studies**Laji:** Course**Vastuuyksikkö:** Field of Biology**Arvostelu:** 1 - 5, pass, fail**Opettajat:** Seppo Rytönen**Opintokohteen oppimateriaali:****Krebs, Charles J. , , 2001****Opintokohteen kielet:** Finnish**ECTS Credits:**

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:B.Sc. 1st 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. Moodle excersises.

Learning activities and teaching methods:

The course is based on the course book Manuel C. Molles Jr. & Anna A. Sher 2018. Ecology: concepts and applications (8. ed), lectures describing the major sections of the book, and the Moodle exercises based on the book. After each lecture, a new Moodle-exercise will open (in ca. 2 week-intervals). Assessment is based on the success in the Moodle-exercises. There is no final exam in the course.

Target group:

Compulsory biology students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Manuel C. Molles Jr. & Anna A. Sher 2018. Ecology: concepts and applications (8. p).

The availability of the literature can be checked from [this link](#).**Assessment methods and criteria:**

Passing the course demands passing all the Moodle-exercises in the given time. Assessment is based on the success in the Moodle-exercises.

Read more about [assessment criteria](#) at the University of Oulu webpage.**Grading:**

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Seppo Rytönen.

Working life cooperation:

No.

Other information:

-

750173P: Biogeography, 5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kvist, Laura Irmeli

Opintokohteen kielet: Finnish

Leikkaavuudet:

750373A Biogeography 5.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 1st autumn.

Learning outcomes:

The course introduces students to basic concepts of biogeography, patterns of distribution and historical and present factors affecting the distribution. The student will have an understanding also of how human impact changes distributions and how the Finnish biota has been formed.

Contents:

The course introduces basic models and theories of distribution of organisms in the environment, offering historical, evolutionary, geographical, climatic and ecological explanations. It also introduces research methods used in biogeography and offers understanding on human impact on distributions and a special part of distributions of biota in Finland.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

34 h lectures, independent work (3 cr, a learning diary), exam.

Target group:

BSc: Compulsory for 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 (750372A) and Evolution, systematics and morphology of organisms, practicals (750374A)

Recommended or required reading:

Cox, C.B. & Moore, P.D. 2005: Biogeography. An ecological and evolutionary approach (7 ed.), Blackwell Publishing Ltd, tai Cox, C.B. & Moore, P.D. 2010: Biogeography. An ecological and evolutionary approach (8 ed.), John Wiley & Sons Inc. Eurola, S. 1999: Kasvipeitteemme alueellisuus. Oulanka Reports. Oulu. 116 s.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Exams. Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail. Final grade is average value of the two exams.

Person responsible:

Doc. Laura Kvist.

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: Heikki Helanterä

Opintokohteen kielet: Finnish

Leikkaavuudet:

757122P Concepts of genetics for biochemists 3.0 op

753124P General genetics 4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 1st spring.

Learning outcomes:

To understand and apply basic concepts of genetics, at Mendelian and molecular level.

Contents:

Part 1. Mendelian genetics, including the basics 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:

36 h lectures and seminars, 97 h independent studies, exam.

Target group:

Compulsory to the biology students (5 cr) Biochemistry students: parts 1 and 3 (3 cr) compulsory.

Prerequisites and co-requisites:

Introduction to cell biology and physiology (750122P) or equivalent knowledge.

Recommended optional programme components:

This course is prerequisite to all other genetics courses.

Recommended or required reading:

Home work assignments in Moodle. Klug et al. 2012. Concepts of Genetics (11. 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.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä.

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: Lumi Viljakainen

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, 1st spring.

Learning outcomes:

Knowledge on essential phenomena in genetics as well as know-how to work in a genetics laboratory. Student understands and is able to apply and analyse fundamental genetical experiments.

Contents:

Investigation of Mendelian inheritance; gene mapping and nonadditive effects of genes using cross-breeding; basics of population genetics; investigation of mitosis and meiosis using cytogenetical methods.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

8 h demonstrations, 30 h exercises, 95 h independent work including home work and report.

Target group:

Compulsory for biology students.

Prerequisites and co-requisites:

Concepts of genetics (757109P) 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:

Exam, report, participation to exercises.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Lumi Viljakainen.

Working life cooperation:

No.

Other information:

-

750122P: Introduction to cell biology and physiology, 5 op

Voimassaolo: 01.08.2020 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.S. 1st autumn.

Learning outcomes:

Students will acquire comprehensive understanding of how an organisms function on molecular, cell and physiological level.

Contents:

The course has been divided into four section: animal- and plant cell biology, genetics, and animal physiology.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

40 hours of lecture and hours of independent learning.

Target group:

Compulsory to the biology and biochemistry students.

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Molecular Biology of the Cell (Alberts et al.)

Biology: a global approach (Campbell ym.)

Assessment methods and criteria:

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail. Final grade is average value of the exams.

Person responsible:

Prof. Hely Häggman and Dr. Sanni Kinnunen.

Working life cooperation:

No.

Other information:

-

Compulsory

750122P-01: Introduction to cell biology and physiology, genetics, 0 op

Voimassaolo: 01.08.2020 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha

Opintokohteen kielet: Finnish

750122P-02: Introduction to cell biology and physiology, animal cell biology, 0 op

Voimassaolo: 01.08.2020 -

Opiskelumuoto: Basic Studies

Laji: Partial credit

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha

Opintokohteen kielet: Finnish

750122P-03: Introduction to cell biology and physiology, plant cell biology, 0 op

Voimassaolo: 01.08.2020 -

Opiskelumuoto: Basic Studies

Laji: Partial credit

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha

Opintokohteen kielet: Finnish

750122P-04: Introduction to cell biology and physiology, animal physiology, 0 op

Voimassaolo: 01.08.2020 -

Opiskelumuoto: Basic Studies

Laji: Partial credit

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha

Opintokohteen kielet: Finnish

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. 3rd 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 done on the same exam in Examinarium.

Mode of delivery:

Independent studying: book exam.

Learning activities and teaching methods:

Students make workshops where they discuss content of the books. Book exam (3 h). Exam is held in Examinarium.

Target group:

Compulsory to the biology students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

BSg

- Klug, W. S., Cummings, M. R., Spencer, C.A ja Palladino M.A.: Concepts of Genetics (11. ed.). Pearson & Prentice Hall, 2015
Choose one option:
 - Molecular genetics: chapters 1-3, 6, 8-22, 24 OR
 - Population and Evolutionary Genetics: chapters 1, 3-6, 10-18, 20-23, 25.
- responsible teacher Assoc. Prof. Heikki Helanterä

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. (2 cr)
- Hanski, I. 2007. The Scinking world. (2 cr.)
- 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)
- Primack, R.B. 2012. A primer of conservation biology (4. ed). – 309 p. (2 cr).
- Smith, J.N.M., Keller, L.F., Marr, A.B. & Arcese, P. 2006. Conservation and biology of small populations. – Oxford University Press. 205 p. (2 cr)
- Other books can be agreed on special reasons with doc. Kari Koivula

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 doc. Anna Liisa Ruotsalainen.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Exam in Examinarium.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä, Prof. Hely Häggman, Doc. Anna Liisa Ruotsalainen and Doc. Kari Koivula.

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. Maturity exam will be done in Examinarium.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Detailed instructions on Moodle pages. Essay exam (3 h) in Examinarium.

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. Done in Examinarium.

Read more about [assessment criteria](#) at the University of Oulu webpage.**Grading:**

Pass / Fail.

Person responsible:

Prof. Hely Häggman, Prof. Timo Muotka or Ass. Prof. Heikki Helanterä.

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**Opettajat:** Seppo Rytönen**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. 3rd year. BS and ECO: Introduction to information retrieval autumn, workshop spring. TEA: scientific writing, Introduction to information retrieval and workshop autumn.

Learning outcomes:

B.Sc. seminar: Student will know the technical and ethical principles of scientific writing and publishing. She/he has the capability to make a scientific review (BSc thesis) and present it clearly as a poster or an oral presentation. *B.Sc. thesis:* Student is able to 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 degree programme. 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.

List of the actual B.Sc. thesis topics is on Moodle pages.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

BSc seminar: Info lectures, computer exercises, group and peer support, seminar or poster presentation. BSc thesis: About 15 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 autumn.

Recommended or required reading:

-

Assessment methods and criteria:

B.Sc. seminar: Tutorial group and presentation. *B.Sc. thesis:* Thesis.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Pass / Fail.

Person responsible:

B.Sc. seminar: Doc. Seppo Rytönen coordinator, computer classes, peer groups Prof. Timo Muotka

B.Sc. thesis: Prof. Timo Muotka, Assoc. Prof. Heikki Helanterä and Prof. Hely Häggman.

Working life cooperation:

No.

Other information:

-

755335A: Identification of animals, invertebrates, 4 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Marko Mutanen

Opintokohteen kielet: Finnish

ECTS Credits:

4 ECTS credits / 106 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 1st spring.

Learning outcomes:

The primary goal is to learn indentifying higher taxa of invertebrate animals with help of representative specimen samples. The focus is on taxa that occur in northern Europe. Basics of species' ecology and classification of organisms.

Contents:

During the spring semester (16 h lectures in Finnish, 16 h exercises, exam) the invertebrate taxa (mostly superfamily or family level) occurring in northern Europe are studied using specimen samples.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

16 h lectures in Finnish, 16 h exercises, self-learning, exam.

Target group:

ECOGEN.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

This course is a requisite for attending the Terrestrial animals field course (755322A) and the Aquatic ecology field course (755321A).

Recommended or required reading:

Check course Moodle pages.

Assessment methods and criteria:

Identification exam.

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

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Marko Mutanen.

Working life cooperation:

No.

Other information:

-

755334A: Identification of animals, vertebrates, 4 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Koivula

Opintokohteen kielet: Finnish

Leikkaavuudet:

755333A Identification of animals 6.0 op

ECTS Credits:

4 ECTS credits / 106 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 1st autumn.

Learning outcomes:

Main goal is to learn to identify Finnish animal species (vertebrate) from museum samples.

Contents:

During the autumn semester (9 h lectures in Finnish, 16 h exercises based on museum samples, exam).

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

14 h lectures in Finnish, 14 h exercises, one exercise group with English lectures, self-learning, exam.

Target group:

ECOGEN.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

This course is needed for attending courses Terrestrial animals field course (755322A) and Aquatic ecology field course (755321A).

Recommended or required reading:

Check course Moodle pages.

Assessment methods and criteria:

Species exam.

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

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Kari Koivula.

Working life cooperation:

No.

Other information:

-

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

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Anna Ruotsalainen

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

BSc 1st autumn.

Learning outcomes:

Student is able to identify most common boreal plant species in herbarium specimens.

Contents:

Demonstrations and/or independent stud of ca. 350 vascular plants, mosses and lichens in the boreal vegetation zone. In the identification exam student has to know specimens scientific name and family in latin.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

16 h demonstrations and learning from the herbarium samples. 350 plant species. In the identification exam student has to know specimens scientific name and family in latin.

Target group:

BSc degree: ECO and TEA 5 cr compulsory.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

Course done as 5 cr (756654S) is prerequisite for the Plant ecology field course (756643S) and for the advanced plant species identification courses (752608S and 752625S).

Recommended or required reading:

Booklet Hanhela, P. & Halonen, P. 1995: Plant Identification.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Two species identification subexams (756354A-01 and 756354A-02). 5 cr without the course handout.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Anna Liisa Ruotsalainen.

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: Anna-Maria Pirttilä, Häggman, Hely Margaretha

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. 2nd 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 and plant hormones are discussed.

Mode of delivery:

Face-to-face teaching, book exam.

Learning activities and teaching methods:

Lectures (20 h), Moodle pages and exams.

Target group:

Compulsory to the biology students.

Prerequisites and co-requisites:

Introduction to cell biology and physiology (750122P) or equivalent knowledge helps in following this course.

Recommended optional programme components:

-

Recommended or required reading:

Taiz, L. et al. 2015. Plant Physiology and Development. Sixth Edition. 761 p. Sinauer Associates, Inc. ISBN-9781605352558.

Terävä, E. & Kanervo, E. 2008: Kasvianatomia or equivalent.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Lectures, book, exams. Moodle: <https://moodle oulu fi/course/view.php?id=991>

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Prof. Hely Häggman and Doc. Anna Maria Pirttilä.

Working life cooperation:

No.

Other information:

-

756343A: Plant ecology field course, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Virtanen, Risto Juhani

Opintokohteen kielet: Finnish

Leikkaavuudet:

752304A Field course in ecological botany 5.0 op

ECTS Credits:

5 cr / 133 h of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 1st summer. ECOGEN 1st summer.

Learning outcomes:

Student is able to identify most common boreal plant species in the field, to plan and conduct ecological field experiments and use basic methods in vegetation analyses.

Contents:

Vegetation in the coast of Bothnian Bay in Hailuoto and/or Oulu (3 days). Basics of boreal forest and mire vegetation classification and types at Oulanka Research Station (7 days). Vegetation research and basic methods of stock estimation. Mire vegetation development and ecological biodiversity.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures 10 h, field demonstrations and laboratory exercises, excursions 84 hours in Oulu and/or Hailuoto and Oulanka Research Station. Field exams for plant identification and mire ecology, report.

Target group:

B.Sc. Compulsory to ECO 5 cr and TEA 5 cp, TEA: at least 10 cr compulsory, two field courses, one ecological botany field course (756343A) and other animal field course (either 755321 or 755322A).

Prerequisites and co-requisites:

Identification of plant species (756354A) 5 cr or equivalent knowledge.

Recommended optional programme components:

Course has capacity for 32 or 40 students. Possible elimination of the candidates is done by study success and Plant identification (756354A) grade. This course is a prerequisite for courses Plant ecology (752600S), Mire ecology (752692S) and Field course in Arctic-Alpine ecology and vegetation (752642S).

Recommended or required reading:

Laitinen et al. 2012: Field course in ecological botany; Hanhela, P. & Halonen, P. 1995: Plant identification; Huttunen, A: 1995: Introduction to forest types; Eurola, S., Hicks, S. and Kaakinen, H. 1994: Key to Finnish mire types, pp. 12-117 in: Moore, P. D. (ed.), 1994 European mires, London Academic Press, London, 367 p.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Field exams, report.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Risto Virtanen.

Working life cooperation:

Essential working life skills are learned during the field course.

Other information:

-

806119P: A Second Course in Statistics, 5 op

Voimassaolo: 01.06.2015 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Mathematics

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari Päckilä

Opintokohteen kielet: Finnish

Leikkaavuudet:

806113P	Introduction to Statistics A	5.0 op
806109P	Basic Methods in Statistics I	9.0 op

ECTS Credits:

5 ECTS credits

Language of instruction:

Finnish

Timing:

4th period

Learning outcomes:

Upon completion of the course, student will be able to:

- analyze continuous and categorical response in the most common experimental and observational studies
- critically evaluate scientific articles
- implement and interpret analyses of a statistical software concerning issues of the course.

Contents:

- Skills for performing statistical analyses and inferences on the basis of data obtained in common experimental and observational studies are expanded and deepened
- statistical literacy of scientific articles with quantitative methods

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Total 50 h face-to-face teaching including lectures and exercise (partly computer exercises). Independent work 83 h.

Target group:

Minor students

Prerequisites and co-requisites:

The recommended prerequisite prior to enrolling for the course is the completion of the course: 806118P Introduction to Statistics or 806116P Statistics for Economic Sciences.

Recommended optional programme components:

After the course, student is able to continue other statistics courses.

Recommended or required reading:

Lecture notes

Assessment methods and criteria:

Mid-term exams and/or final exam and possible homework.

Grading:

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

Person responsible:

Jari Pääkkilä

Working life cooperation:

No

780120P: Basic Principles in Chemistry, 5 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Chemistry

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

780117P General and Inorganic Chemistry A 5.0 op

780109P Basic Principles in Chemistry 4.0 op

ECTS Credits:

5 ECTS credits / 134 hours of work

Language of instruction:

Finnish

Timing:

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

Learning outcomes:

Upon completion of the course, the student will be able to display an understanding of basic chemistry phenomenon; equilibrium of acids and bases, chemical equilibrium, redox reactions and stoichiometry.

Contents:

Introduction to chemistry, stoichiometry, redox reactions, chemical equilibrium, the equilibrium of acid and bases, buffer solutions, titration, thermodynamics.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

40 hours of lectures and 94 hours of self-study

Target group:

Biology, Geology, Process Engineering, Environmental Engineering compulsory.

Geography, optional.

Prerequisites and co-requisites:

The compulsory course in upper secondary school chemistry (1st course)

Recommended optional programme components:

The course is not included in the 25 ECTS credits entity of chemistry!

Recommended or required reading:

Tro, N.J., Principles of Chemistry. A Molecular Approach, Pearson, 3. edition, 2016

Assessment methods and criteria:

Final examination.

Grading:

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

Person responsible:

Minna Tiainen

Working life cooperation:

No

030005P: Information Skills, 1 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Technology

Arvostelu: 1 - 5, pass, fail

Opettajat: Ursula Heinikoski

Opintokohteen kielet: Finnish

Leikkaavuudet:

030004P Introduction to Information Retrieval 0.0 op

ECTS Credits:

1 ECTS credit / 27 hours of work

Language of instruction:

Finnish

Timing:

Architecture 3. spring semester, period III;
 biochemistry 3. autumn semester;
 biology 3. autumn semester, period I;
 chemistry 3. autumn semester, period I;
 civil engineering 2. spring semester, period IV;
 computer science and engineering 2. spring semester, period IV;
 electronics and communications engineering 3. spring semester;
 geosciences 2. spring semester, period IV;
 geography 3. semester, periods I and III;
 industrial engineering and management 3. year;
 information processing sciences 1. or 3. year;
 mathematics and physics 1. spring semester, period III;
 mechanical engineering 3. year;
 mining engineering and mineral processing 3. year;
 process and environmental engineering 2. year, period II;
 Master's degree students in industrial engineering and management 1st year.

Learning outcomes:

Upon completion of the course, the students:

- can search scientific information,
- can use the most important databases of their discipline,
- know how to evaluate search results and information sources,
- can use the reference management tool.

Contents:

Scientific information retrieval process, the most important databases and publication channels of the discipline, evaluation of the reliability of information sources and reference management tool.

Mode of delivery:

Blended teaching: classroom training, web-based learning material and exercises, a group assignment.

Learning activities and teaching methods:

Training sessions 8 h, group working 7 h, self-study 12 h

Target group:

Compulsory for all bachelor degree students of Faculty of information technology and electrical engineering, Faculty of Technology and Faculty of science. Compulsory also for those Master's degree students in Industrial Engineering and Management who have no earlier studies in the information skills. Optional for the students of biochemistry.

Recommended optional programme components:

In biochemistry the course is completed as a part of 740376A Bachelor's Thesis.

Recommended or required reading:

Web learning material [Tieteellisen tiedonhankinnan opas](#)

Assessment methods and criteria:

Passing the course requires participation in the training sessions and successful completion of the course assignments.

Grading:

pass/fail

Person responsible:

Ursula Heinikoski

806118P: Introduction to Statistics, 5 op

Voimassaolo: 01.06.2015 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Mathematics

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari Pääkkilä

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay806118P Introduction to Statistics (OPEN UNI) 5.0 op

806113P Introduction to Statistics A 5.0 op

ECTS Credits:

5 ECTS credits

Language of instruction:

Finnish

Timing:

3rd period

Learning outcomes:

After completing the course, student will be able to:

- consider issues influencing to data collection
- describe data by appropriate methods (tables, statistics and graphical presentations)
- evaluate the effect size of the sample to the margin of error for instance in Gallup polls and in different market researches
- interpret output of a statistical software.

Contents:

- collecting data, e.g. sampling
- variables and measuring
- descriptive statistical methods and their selection
- margin of error of estimator for population mean and proportion
- statistical literacy
- basic analysis of data using statistical software

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Total 50 h face-to-face teaching including lectures and exercise (partly computer exercises). Independent work 83 h.

Target group:

Minor students

Recommended optional programme components:

After the course, student is able to continue to A Second Course in Statistics.

Recommended or required reading:

Lecture notes

Assessment methods and criteria:

Mid-term exams and/or final exam and possible homework.

Grading:

Fail, 1-5

Person responsible:

Hanna Heikkinen and Jari Pääkkilä

Working life cooperation:

No

750032Y: Orientation course for new students, 2 op**Voimassaolo:** 01.08.2017 -**Opiskelumuoto:** General Studies**Laji:** Course**Vastuuyksikkö:** Field of Biology**Arvostelu:** 1 - 5, pass, fail**Opettajat:** Lumi Viljakainen**Opintokohteen kielet:** Finnish**Leikkaavuudet:**

750031Y Orientation course for new students 1.0 op

ECTS Credits:

2 ECTS credits / 53 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 (PSP) for the first study year.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Tutorials, presentations, seminar of major subjects, computer exercises, independent studying, total 53 h.

Target group:

BIOL: compulsory.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Study syllabus.

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:

N.N. and Ph. Lic. Minna Vanhatalo.

Working life cooperation:

No.

Other information:

-

902002Y: English 1 (Reading for Academic Purposes), 2 op**Voimassaolo:** 01.08.1995 -**Opiskelumuoto:** Language and Communication Studies**Laji:** Course**Vastuuyksikkö:** Languages and Communication**Arvostelu:** 1 - 5, pass, fail**Opintokohteen kielet:** English

Proficiency level:

B2-C1

Status:

This course is mandatory for students who choose English as their foreign language in the following B.Sc. degree programmes:

Faculty of Natural Sciences

- Biology
- Mathematical and Physical Sciences.

Faculty of Technology

- Chemistry
- Geosciences.

Note:

Please consult your faculty's 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 skills in English must have been otherwise acquired. If you need to take English, but lack the background, please get in touch with the Languages and Communication contact teacher to discuss individual solutions.

ECTS Credits:

2 ECTS / 53 hours of work

Language of instruction:

English

Timing:

Biology: 1st year spring term (periods 3 and 4)

Mathematical and Physical Sciences: 1st year autumn term (periods 1 and 2)

Chemistry: 1st year autumn term (periods 1 and 2)

Geosciences: 1st year spring term (periods 3 and 4)

Learning outcomes:

By the end of the course, you are expected to demonstrate the ability to:

utilize your knowledge of word formation, text structure, and cohesion markers to understand the vocabulary and content of academic texts,

use effective reading strategies and techniques for studying vocabulary, and

summarize texts both orally or in writing.

Contents:

The course will focus on reading strategies; these include recognising how texts are organised, 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:

The course is implemented using blended methods, which may include web-based teaching and face-to-face teaching. The course utilizes the Moodle learning environment.

Learning activities and teaching methods:

The English 1 course is adapted to accommodate many different fields of study, and thus the materials and implementation methods of the course vary. There will be 26 hours of guided teaching events and 28 hours of independent study, either individually or in a group.

Target group:

Faculty of Natural Sciences: 1st-year students of Biology, Mathematical & Physical Sciences

Faculty of Technology: 1st-year students of Chemistry, Geosciences

Prerequisites and co-requisites:

Post-requisite Students are also required to take [English 2 902004Y](#) following completion of this course.

Recommended optional programme components:

None

Recommended or required reading:

Course materials used will be available from the library or online.

Assessment methods and criteria:

Continuous assessment takes into account active and regular participation in classroom sessions and successful completion of all homework tasks, There are three monthly tests on material covered so far. The assessment of the course is based on the learning outcomes listed above.

Grading:

The course utilises a grading scale of Pass/Fail.

Person responsible:

Karen Niskanen

Working life cooperation:

The course does not contain working life cooperation.

Other information:

N.B. Students with grades laudatur or eximia in their A1 English school-leaving examination can be exempted from this course and will be granted the credits by your faculty. Contact the faculty for information.

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

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Leikkaavuudet:

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

Proficiency level:

B2 - C1

Status:

This course is mandatory for students who choose English as their foreign language in the following B.Sc. degree programs:

Faculty of Natural Sciences:

Biology

Mathematical & Physical Sciences.

Faculty of Technology:

Chemistry

Geoscience.

Required proficiency level:

Students taking this course must have had English as the A1 or A2 language at school or have equivalent skills.

ECTS Credits:

2 ECTS credits / 53 hours of work.

Language of instruction:

English

Timing:

Biology: 2nd year autumn term (periods 1 and 2)

Mathematic and Physical Sciences 1st year spring term (periods 3 and 4)

Chemistry: 2nd year spring term (periods 3 and 4)

Geosciences: 2nd year spring term (periods 3 and 4)

Learning outcomes:

By the end of the course, you are expected to have demonstrated the ability to: use appropriate strategies and techniques for communicating effectively in English in an academic context in your own field

prepare and present scientific subjects from your own field of studies to your classmates, using appropriate field-related vocabulary.

Contents:

In the classroom, you will practice the skills of listening, speaking and presenting topics in your own field. The emphasis is on working in pairs and small groups. In addition, you will complete independent homework assignments to support the classroom learning.

Mode of delivery:

The course is implemented using blended methods, which may include distance teaching, classroom instruction and activities in the Moodle learning environment.

Learning activities and teaching methods:

The English 2 course is tailored to the needs of students in different fields of study, and thus the materials and implementation methods of the course vary between groups. The teacher will provide a more detailed schedule and list of homework tasks. There will be 26 hours of guided teaching events and 28 hours of independent work, including both individual and group work.

Target group:

2nd year students of Biology, Chemistry, Geoscience
1st year students of Mathematical and Physical Sciences

Prerequisites and co-requisites:

Prerequisite course: 902002Y English 1, unless exempted

Recommended optional programme components:

-

Recommended or required reading:

Materials will be provided in electronic format or are available from the library.

Assessment methods and criteria:

Continuous assessment is based on regular attendance, active participation in all lessons and the successful completion of all homework tasks. The assessment of the course is based on the learning outcomes of the course.

Grading:

Pass / fail.

Person responsible:

Karen Niskanen

Working life cooperation:

-

Other information:

-

750032Y: Orientation course for new students, 2 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Lumi Viljakainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

750031Y Orientation course for new students 1.0 op

ECTS Credits:

2 ECTS credits / 53 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 (PSP) for the first study year.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Tutorials, presentations, seminar of major subjects, computer exercises, independent studying, total 53 h.

Target group:

BIOL: compulsory.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Study syllabus.

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:

N.N. and Ph. Lic. Minna Vanhatalo.

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: Languages and Communication

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

Proficiency level:

This course is only for Finnish speaking students with CEFR-level A2-B1 in Swedish language. There are no beginner courses in Swedish at the university.

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

Voimassaolo: 01.08.2014 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

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

Proficiency level:

B1/B2/C1

This course is only for Finnish speaking students with CEFR-level A2 in Swedish language. We don't offer Beginners courses in Swedish.

Status:**Required proficiency level:****Contents:****Learning activities and teaching methods:****Recommended optional programme components:**

-

Recommended or required reading:**Assessment methods and criteria:****Working life cooperation:**

-

750124P: Basics of ecology, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Seppo Rytönen

Opintokohteen oppimateriaali:

Krebs, Charles J. , , 2001

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 1st 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. Moodle excersises.

Learning activities and teaching methods:

The course is based on the course book Manuel C. Molles Jr. & Anna A. Sher 2018. Ecology: concepts and applications (8. ed), lectures describing the major sections of the book, and the Moodle exercises based on the book. After each lecture, a new Moodle-exercise will open (in ca. 2 week-intervals). Assessment is based on the success in the Moodle-exercises. There is no final exam in the course.

Target group:

Compulsory biology students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Manuel C. Molles Jr. & Anna A. Sher 2018. Ecology: concepts and applications (8. p).

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Passing the course demands passing all the Moodle-exercises in the given time. Assessment is based on the success in the Moodle-exercises.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Seppo Rytönen.

Working life cooperation:

No.

Other information:

-

750173P: Biogeography, 5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kvist, Laura Irmeli

Opintokohteen kielet: Finnish

Leikkaavuudet:

750373A Biogeography 5.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 1st autumn.

Learning outcomes:

The course introduces students to basic concepts of biogeography, patterns of distribution and historical and present factors affecting the distribution. The student will have an understanding also of how human impact changes distributions and how the Finnish biota has been formed.

Contents:

The course introduces basic models and theories of distribution of organisms in the environment, offering historical, evolutionary, geographical, climatic and ecological explanations. It also introduces research methods used in biogeography and offers understanding on human impact on distributions and a special part of distributions of biota in Finland.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

34 h lectures, independent work (3 cr, a learning diary), exam.

Target group:

BSc: Compulsory for 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 (750372A) and Evolution, systematics and morphology of organisms, practicals (750374A)

Recommended or required reading:

Cox, C.B. & Moore, P.D. 2005: Biogeography. An ecological and evolutionary approach (7 ed.), Blackwell Publishing Ltd, tai Cox, C.B. & Moore, P.D. 2010: Biogeography. An ecological and evolutionary approach (8 ed.), John Wiley & Sons Inc. Euroala, S. 1999: Kasvipeitteemme alueellisuus. Oulanka Reports. Oulu. 116 s.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Exams. Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail. Final grade is average value of the two exams.

Person responsible:

Doc. Laura Kvist.

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: Heikki Helanterä

Opintokohteen kielet: Finnish

Leikkaavuudet:

757122P Concepts of genetics for biochemists 3.0 op

753124P General genetics 4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 1st spring.

Learning outcomes:

To understand and apply basic concepts of genetics, at Mendelian and molecular level.

Contents:

Part 1. Mendelian genetics, including the basics 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:

36 h lectures and seminars, 97 h independent studies, exam.

Target group:

Compulsory to the biology students (5 cr) Biochemistry students: parts 1 and 3 (3 cr) compulsory.

Prerequisites and co-requisites:

Introduction to cell biology and physiology (750122P) or equivalent knowledge.

Recommended optional programme components:

This course is prerequisite to all other genetics courses.

Recommended or required reading:

Home work assignments in Moodle. Klug et al. 2012. Concepts of Genetics (11. 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.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä.

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: Lumi Viljakainen

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, 1st spring.

Learning outcomes:

Knowledge on essential phenomena in genetics as well as know-how to work in a genetics laboratory. Student understands and is able to apply and analyse fundamental genetical experiments.

Contents:

Investigation of Mendelian inheritance; gene mapping and nonadditive effects of genes using cross-breeding; basics of population genetics; investigation of mitosis and meiosis using cytogenetical methods.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

8 h demonstrations, 30 h exercises, 95 h independent work including home work and report.

Target group:

Compulsory for biology students.

Prerequisites and co-requisites:

Concepts of genetics (757109P) 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:

Exam, report, participation to exercises.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Lumi Viljakainen.

Working life cooperation:

No.

Other information:

-

750122P: Introduction to cell biology and physiology, 5 op

Voimassaolo: 01.08.2020 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.S. 1st autumn.

Learning outcomes:

Students will acquire comprehensive understanding of how an organisms function on molecular, cell and physiological level.

Contents:

The course has been divided into four section: animal- and plant cell biology, genetics, and animal physiology.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

40 hours of lecture and hours of independent learning.

Target group:

Compulsory to the biology and biochemistry students.

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Molecular Biology of the Cell (Alberts et al.)

Biology: a global approach (Campbell ym.)

Assessment methods and criteria:

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail. Final grade is average value of the exams.

Person responsible:

Prof. Hely Häggman and Dr. Sanni Kinnunen.

Working life cooperation:

No.

Other information:

-

Compulsory

750122P-01: Introduction to cell biology and physiology, genetics, 0 op

Voimassaolo: 01.08.2020 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Häggman, Hely Margaretha
Opintokohteen kielet: Finnish

750122P-02: Introduction to cell biology and physiology, animal cell biology, 0 op

Voimassaolo: 01.08.2020 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Häggman, Hely Margaretha
Opintokohteen kielet: Finnish

750122P-03: Introduction to cell biology and physiology, plant cell biology, 0 op

Voimassaolo: 01.08.2020 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Häggman, Hely Margaretha
Opintokohteen kielet: Finnish

750122P-04: Introduction to cell biology and physiology, animal physiology, 0 op

Voimassaolo: 01.08.2020 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Häggman, Hely Margaretha
Opintokohteen kielet: Finnish

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. 3rd 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 done on the same exam in Examinarium.

Mode of delivery:

Independent studying: book exam.

Learning activities and teaching methods:

Students make workshops where they discuss content of the books. Book exam (3 h). Exam is held in Examinarium.

Target group:

Compulsory to the biology students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

BSg

- Klug, W. S., Cummings, M. R., Spencer, C.A ja Palladino M.A.: Concepts of Genetics (11. ed.). Pearson & Prentice Hall, 2015
Choose one option:
 - Molecular genetics: chapters 1-3, 6, 8-22, 24 OR
 - Population and Evolutionary Genetics: chapters 1, 3-6, 10-18, 20-23, 25.
- responsible teacher Assoc. Prof. Heikki Helanterä

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. (2 cr)
- Hanski, I. 2007. The Scinking world. (2 cr.)
- 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)
- Primack, R.B. 2012. A primer of conservation biology (4. ed). – 309 p. (2 cr).
- Smith, J.N.M., Keller, L.F., Marr, A.B. & Arcese, P. 2006. Conservation and biology of small populations. – Oxford University Press. 205 p. (2 cr)
- Other books can be agreed on special reasons with doc. Kari Koivula

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 doc. Anna Liisa Ruotsalainen.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Exam in Examinarium.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä, Prof. Hely Häggman, Doc. Anna Liisa Ruotsalainen and Doc. Kari Koivula.

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. Maturity exam will be done in Examinarium.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Detailed instructions on Moodle pages. Essay exam (3 h) in Examinarium.

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. Done in Examinarium.

Read more about [assessment criteria](#) at the University of Oulu webpage.**Grading:**

Pass / Fail.

Person responsible:

Prof. Hely Häggman, Prof. Timo Muotka or Ass. Prof. Heikki Helanterä.

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**Opettajat:** Seppo Rytönen**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. 3rd year. BS and ECO: Introduction to information retrieval autumn, workshop spring. TEA: scientific writing, Introduction to information retrieval and workshop autumn.

Learning outcomes:

B.Sc. seminar: Student will know the technical and ethical principles of scientific writing and publishing. She/he has the capability to make a scientific review (BSc thesis) and present it clearly as a poster or an oral presentation. *B.Sc. thesis:* Student is able to 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 degree programme. 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.

List of the actual B.Sc. thesis topics is on Moodle pages.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

BSc seminar: Info lectures, computer exercises, group and peer support, seminar or poster presentation. BSc thesis: About 15 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 autumn.

Recommended or required reading:

-

Assessment methods and criteria:

B.Sc. seminar: Tutorial group and presentation. *B.Sc. thesis:* Thesis. Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Pass / Fail.

Person responsible:

B.Sc. seminar: Doc. Seppo Rytönen coordinator, computer classes, peer groups Prof. Timo Muotka
B.Sc. thesis: Prof. Timo Muotka, Assoc. Prof. Heikki Helanterä and Prof. Hely Häggman.

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: Virtanen, Risto Juhani, Marko Mutanen

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:

The students will learn a broad overview of the diversity of life-forms, the evolutionary history of life and the principles of biological classification.

Contents:

The course provides an insight into the biological evolution and evolutionary processes reflected by the systematic classification of the organisms. Also basics of phylogenetic inference, concepts of systematics and classification are introduced.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

30 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. 2nd 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.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Marko Mutanen and Doc. Risto Virtanen.

Working life cooperation:

No.

Other information:

-

755335A: Identification of animals, invertebrates, 4 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Marko Mutanen

Opintokohteen kielet: Finnish

ECTS Credits:

4 ECTS credits / 106 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 1st spring.

Learning outcomes:

The primary goal is to learn indentifying higher taxa of invertebrate animals with help of representative specimen samples. The focus is on taxa that occur in northern Europe. Basics of species' ecology and classification of organisms.

Contents:

During the spring semester (16 h lectures in Finnish, 16 h exercises, exam) the invertebrate taxa (mostly superfamily or family level) occurring in northern Europe are studied using specimen samples.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

16 h lectures in Finnish, 16 h exercises, self-learning, exam.

Target group:

ECOGEN.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

This course is a requisite for attending the Terrestrial animals field course (755322A) and the Aquatic ecology field course (755321A).

Recommended or required reading:

Check course Moodle pages.

Assessment methods and criteria:

Identification exam.

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

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Marko Mutanen.

Working life cooperation:

No.

Other information:

-

755334A: Identification of animals, vertebrates, 4 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Koivula

Opintokohteen kielet: Finnish

Leikkaavuudet:

755333A Identification of animals 6.0 op

ECTS Credits:

4 ECTS credits / 106 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 1st autumn.

Learning outcomes:

Main goal is to learn to identify Finnish animal species (vertebrate) from museum samples.

Contents:

During the autumn semester (9 h lectures in Finnish, 16 h exercises based on museum samples, exam).

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

14 h lectures in Finnish, 14 h exercises, one exercise group with English lectures, self-learning, exam.

Target group:

ECOGEN.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

This course is needed for attending courses Terrestrial animals field course (755322A) and Aquatic ecology field course (755321A).

Recommended or required reading:

Check course Moodle pages.

Assessment methods and criteria:

Species exam.

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

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Kari Koivula.

Working life cooperation:

No.

Other information:

-

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

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Anna Ruotsalainen

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

BSc 1st autumn.

Learning outcomes:

Student is able to identify most common boreal plant species in herbarium specimens.

Contents:

Demonstrations and/or independent stud of ca. 350 vascular plants, mosses and lichens in the boreal vegetation zone. In the identification exam student has to know specimens scientific name and family in latin.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

16 h demonstrations and learning from the herbarium samples. 350 plant species. In the identification exam student has to know specimens scientific name and family in latin.

Target group:

BSc degree: ECO and TEA 5 cr compulsory.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

Course done as 5 cr (756654S) is prerequisite for the Plant ecology field course (756643S) and for the advanced plant species identification courses (752608S and 752625S).

Recommended or required reading:

Booklet Hanhela, P. & Halonen, P. 1995: Plant Identification.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Two species identification subexams (756354A-01 and 756354A-02). 5 cr without the course handout.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Anna Liisa Ruotsalainen.

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: Anna-Maria Pirttilä, Häggman, Hely Margaretha

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. 2nd 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 and plant hormones are discussed.

Mode of delivery:

Face-to-face teaching, book exam.

Learning activities and teaching methods:

Lectures (20 h), Moodle pages and exams.

Target group:

Compulsory to the biology students.

Prerequisites and co-requisites:

Introduction to cell biology and physiology (750122P) or equivalent knowledge helps in following this course.

Recommended optional programme components:

-

Recommended or required reading:

Taiz, L. et al. 2015. Plant Physiology and Development. Sixth Edition. 761 p. Sinauer Associates, Inc. ISBN-9781605352558.

Terävä, E. & Kanervo, E. 2008: Kasvianatomia or equivalent.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Lectures, book, exams. Moodle: <https://moodle oulu.fi/course/view.php?id=991>

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Prof. Hely Häggman and Doc. Anna Maria Pirttilä.

Working life cooperation:

No.

Other information:

-

756343A: Plant ecology field course, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Virtanen, Risto Juhani

Opintokohteen kielet: Finnish

Leikkaavuudet:

752304A Field course in ecological botany 5.0 op

ECTS Credits:

5 cr / 133 h of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 1st summer. ECOGEN 1st summer.

Learning outcomes:

Student is able to identify most common boreal plant species in the field, to plan and conduct ecological field experiments and use basic methods in vegetation analyses.

Contents:

Vegetation in the coast of Bothnian Bay in Hailuoto and/or Oulu (3 days). Basics of boreal forest and mire vegetation classification and types at Oulanka Research Station (7 days). Vegetation research and basic methods of stock estimation. Mire vegetation development and ecological biodiversity.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures 10 h, field demonstrations and laboratory exercises, excursions 84 hours in Oulu and/or Hailuoto and Oulanka Research Station. Field exams for plant identification and mire ecology, report.

Target group:

B.Sc. Compulsory to ECO 5 cr and TEA 5 cp, TEA: at least 10 cr compulsory, two field courses, one ecological botany field course (756343A) and other animal field course (either 755321 or 755322A).

Prerequisites and co-requisites:

Identification of plant species (756354A) 5 cr or equivalent knowledge.

Recommended optional programme components:

Course has capacity for 32 or 40 students. Possible elimination of the candidates is done by study success and Plant identification (756354A) grade. This course is a prerequisite for courses Plant ecology (752600S), Mire ecology (752692S) and Field course in Arctic-Alpine ecology and vegetation (752642S).

Recommended or required reading:

Laitinen et al. 2012: Field course in ecological botany; Hanhela, P. & Halonen, P. 1995: Plant identification; Huttunen, A: 1995: Introduction to forest types; Euroola, S., Hicks, S. and Kaakinen, H. 1994: Key to Finnish mire types, pp. 12-117 in: Moore, P. D. (ed.), 1994 European mires, London Academic Press, London, 367 p.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Field exams, report.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Risto Virtanen.

Working life cooperation:

Essential working life skills are learned during the field course.

Other information:

-

756343A: Plant ecology field course, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Virtanen, Risto Juhani

Opintokohteen kielet: Finnish

Leikkaavuudet:

752304A Field course in ecological botany 5.0 op

ECTS Credits:

5 cr / 133 h of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 1st summer. ECOGEN 1st summer.

Learning outcomes:

Student is able to identify most common boreal plant species in the field, to plan and conduct ecological field experiments and use basic methods in vegetation analyses.

Contents:

Vegetation in the coast of Bothnian Bay in Hailuoto and/or Oulu (3 days). Basics of boreal forest and mire vegetation classification and types at Oulanka Research Station (7 days). Vegetation research and basic methods of stock estimation. Mire vegetation development and ecological biodiversity.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures 10 h, field demonstrations and laboratory exercises, excursions 84 hours in Oulu and/or Hailuoto and Oulanka Research Station. Field exams for plant identification and mire ecology, report.

Target group:

B.Sc. Compulsory to ECO 5 cr and TEA 5 cp, TEA: at least 10 cr compulsory, two field courses, one ecological botany field course (756343A) and other animal field course (either 755321 or 755322A).

Prerequisites and co-requisites:

Identification of plant species (756354A) 5 cr or equivalent knowledge.

Recommended optional programme components:

Course has capacity for 32 or 40 students. Possible elimination of the candidates is done by study success and Plant identification (756354A) grade. This course is a prerequisite for courses Plant ecology (752600S), Mire ecology (752692S) and Field course in Arctic-Alpine ecology and vegetation (752642S).

Recommended or required reading:

Laitinen et al. 2012: Field course in ecological botany; Hanhela, P. & Halonen, P. 1995: Plant identification; Huttunen, A: 1995: Introduction to forest types; Eurola, S., Hicks, S. and Kaakinen, H. 1994: Key to Finnish mire types, pp. 12-117 in: Moore, P. D. (ed.), 1994 European mires, London Academic Press, London, 367 p.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Field exams, report.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Risto Virtanen.

Working life cooperation:

Essential working life skills are learned during the field course.

Other information:

-

806119P: A Second Course in Statistics, 5 op

Voimassaolo: 01.06.2015 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Mathematics

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari Päckilä

Opintokohteen kielet: Finnish

Leikkaavuudet:

806113P Introduction to Statistics A 5.0 op

806109P Basic Methods in Statistics I 9.0 op

ECTS Credits:

5 ECTS credits

Language of instruction:

Finnish

Timing:

4th period

Learning outcomes:

Upon completion of the course, student will be able to:

- analyze continuous and categorical response in the most common experimental and observational studies
- critically evaluate scientific articles
- implement and interpret analyses of a statistical software concerning issues of the course.

Contents:

- Skills for performing statistical analyses and inferences on the basis of data obtained in common experimental and observational studies are expanded and deepened
- statistical literacy of scientific articles with quantitative methods

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Total 50 h face-to-face teaching including lectures and exercise (partly computer exercises). Independent work 83 h.

Target group:

Minor students

Prerequisites and co-requisites:

The recommended prerequisite prior to enrolling for the course is the completion of the course: 806118P Introduction to Statistics or 806116P Statistics for Economic Sciences.

Recommended optional programme components:

After the course, student is able to continue other statistics courses.

Recommended or required reading:

Lecture notes

Assessment methods and criteria:

Mid-term exams and/or final exam and possible homework.

Grading:

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

Person responsible:

Jari Pääkkilä

Working life cooperation:

No

780120P: Basic Principles in Chemistry, 5 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Chemistry

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

780117P General and Inorganic Chemistry A 5.0 op

780109P Basic Principles in Chemistry 4.0 op

ECTS Credits:

5 ECTS credits / 134 hours of work

Language of instruction:

Finnish

Timing:

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

Learning outcomes:

Upon completion of the course, the student will be able to display an understanding of basic chemistry phenomenon; equilibrium of acids and bases, chemical equilibrium, redox reactions and stoichiometry.

Contents:

Introduction to chemistry, stoichiometry, redox reactions, chemical equilibrium, the equilibrium of acid and bases, buffer solutions, titration, thermodynamics.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

40 hours of lectures and 94 hours of self-study

Target group:

Biology, Geology, Process Engineering, Environmental Engineering compulsory.
Geography, optional.

Prerequisites and co-requisites:

The compulsory course in upper secondary school chemistry (1st course)

Recommended optional programme components:

The course is not included in the 25 ECTS credits entity of chemistry!

Recommended or required reading:

Tro, N.J., Principles of Chemistry. A Molecular Approach, Pearson, 3. edition, 2016

Assessment methods and criteria:

Final examination.

Grading:

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

Person responsible:

Minna Tiainen

Working life cooperation:

No

030005P: Information Skills, 1 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Technology

Arvostelu: 1 - 5, pass, fail

Opettajat: Ursula Heinikoski

Opintokohteen kielet: Finnish

Leikkaavuudet:

030004P Introduction to Information Retrieval 0.0 op

ECTS Credits:

1 ECTS credit / 27 hours of work

Language of instruction:

Finnish

Timing:

Architecture 3. spring semester, period III;
biochemistry 3. autumn semester;
biology 3. autumn semester, period I;
chemistry 3. autumn semester, period I;
civil engineering 2. spring semester, period IV;
computer science and engineering 2. spring semester, period IV;
electronics and communications engineering 3. spring semester;
geosciences 2. spring semester, period IV;
geography 3. semester, periods I and III;
industrial engineering and management 3. year;
information processing sciences 1. or 3. year;
mathematics and physics 1. spring semester, period III;
mechanical engineering 3. year;
mining engineering and mineral processing 3. year;
process and environmental engineering 2. year, period II;
Master's degree students in industrial engineering and management 1st year.

Learning outcomes:

Upon completion of the course, the students:

- can search scientific information,
- can use the most important databases of their discipline,

- know how to evaluate search results and information sources,
- can use the reference management tool.

Contents:

Scientific information retrieval process, the most important databases and publication channels of the discipline, evaluation of the reliability of information sources and reference management tool.

Mode of delivery:

Blended teaching: classroom training, web-based learning material and exercises, a group assignment.

Learning activities and teaching methods:

Training sessions 8 h, group working 7 h, self-study 12 h

Target group:

Compulsory for all bachelor degree students of Faculty of information technology and electrical engineering, Faculty of Technology and Faculty of science. Compulsory also for those Master's degree students in Industrial Engineering and Management who have no earlier studies in the information skills. Optional for the students of biochemistry.

Recommended optional programme components:

In biochemistry the course is completed as a part of 740376A Bachelor's Thesis.

Recommended or required reading:

Web learning material [Tieteellisen tiedonhankinnan opas](#)

Assessment methods and criteria:

Passing the course requires participation in the training sessions and successful completion of the course assignments.

Grading:

pass/fail

Person responsible:

Ursula Heinikoski

806118P: Introduction to Statistics, 5 op

Voimassaolo: 01.06.2015 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Mathematics

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari Pääkkilä

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay806118P Introduction to Statistics (OPEN UNI) 5.0 op

806113P Introduction to Statistics A 5.0 op

ECTS Credits:

5 ECTS credits

Language of instruction:

Finnish

Timing:

3rd period

Learning outcomes:

After completing the course, student will be able to:

- consider issues influencing to data collection
- describe data by appropriate methods (tables, statistics and graphical presentations)
- evaluate the effect size of the sample to the margin of error for instance in Gallup polls and in different market researches
- interpret output of a statistical software.

Contents:

- collecting data, e.g. sampling
- variables and measuring
- descriptive statistical methods and their selection
- margin of error of estimator for population mean and proportion
- statistical literacy
- basic analysis of data using statistical software

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Total 50 h face-to-face teaching including lectures and exercise (partly computer exercises). Independent work 83 h.

Target group:

Minor students

Recommended optional programme components:

After the course, student is able to continue to A Second Course in Statistics.

Recommended or required reading:

Lecture notes

Assessment methods and criteria:

Mid-term exams and/or final exam and possible homework.

Grading:

Fail, 1-5

Person responsible:

Hanna Heikkinen and Jari Päckilä

Working life cooperation:

No

750032Y: Orientation course for new students, 2 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Lumi Viljakainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

750031Y Orientation course for new students 1.0 op

ECTS Credits:

2 ECTS credits / 53 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 (PSP) for the first study year.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Tutorials, presentations, seminar of major subjects, computer exercises, independent studying, total 53 h.

Target group:

BIOL: compulsory.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Study syllabus.

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:

N.N. and Ph. Lic. Minna Vanhatalo.

Working life cooperation:

No.

Other information:

-

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

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Proficiency level:

B2-C1

Status:

This course is mandatory for students who choose English as their foreign language in the following B.Sc. degree programmes:

Faculty of Natural Sciences

- Biology
- Mathematical and Physical Sciences.

Faculty of Technology

- Chemistry
- Geosciences.

Note:

Please consult your faculty's 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 skills in English must have been otherwise acquired. If you need to take English, but lack the background, please get in touch with the Languages and Communication contact teacher to discuss individual solutions.

ECTS Credits:

2 ECTS / 53 hours of work

Language of instruction:

English

Timing:

Biology: 1st year spring term (periods 3 and 4)

Mathematical and Physical Sciences: 1st year autumn term (periods 1 and 2)

Chemistry: 1st year autumn term (periods 1 and 2)

Geosciences: 1st year spring term (periods 3 and 4)

Learning outcomes:

By the end of the course, you are expected to demonstrate the ability to:

utilize your knowledge of word formation, text structure, and cohesion markers to understand the vocabulary and content of academic texts,

use effective reading strategies and techniques for studying vocabulary, and

summarize texts both orally or in writing.

Contents:

The course will focus on reading strategies; these include recognising how texts are organised, 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:

The course is implemented using blended methods, which may include web-based teaching and face-to-face teaching. The course utilizes the Moodle learning environment.

Learning activities and teaching methods:

The English 1 course is adapted to accommodate many different fields of study, and thus the materials and implementation methods of the course vary. There will be 26 hours of guided teaching events and 28 hours of independent study, either individually or in a group.

Target group:

Faculty of Natural Sciences: 1st-year students of Biology, Mathematical & Physical Sciences

Faculty of Technology: 1st-year students of Chemistry, Geosciences

Prerequisites and co-requisites:

Post-requisite Students are also required to take [English 2 902004Y](#) following completion of this course.

Recommended optional programme components:

None

Recommended or required reading:

Course materials used will be available from the library or online.

Assessment methods and criteria:

Continuous assessment takes into account active and regular participation in classroom sessions and successful completion of all homework tasks, There are three monthly tests on material covered so far. The assessment of the course is based on the learning outcomes listed above.

Grading:

The course utilises a grading scale of Pass/Fail.

Person responsible:

Karen Niskanen

Working life cooperation:

The course does not contain working life cooperation.

Other information:

N.B. Students with grades laudatur or eximia in their A1 English school-leaving examination can be exempted from this course and will be granted the credits by your faculty. Contact the faculty for information.

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

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Leikkaavuudet:

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

Proficiency level:

B2 - C1

Status:

This course is mandatory for students who choose English as their foreign language in the following B.Sc. degree programs:

Faculty of Natural Sciences:

Biology

Mathematical & Physical Sciences.

Faculty of Technology:

Chemistry

Geoscience.

Required proficiency level:

Students taking this course must have had English as the A1 or A2 language at school or have equivalent skills.

ECTS Credits:

2 ECTS credits / 53 hours of work.

Language of instruction:

English

Timing:

Biology: 2nd year autumn term (periods 1 and 2)

Mathematic and Physical Sciences 1st year spring term (periods 3 and 4)

Chemistry: 2nd year spring term (periods 3 and 4)

Geosciences: 2nd year spring term (periods 3 and 4)

Learning outcomes:

By the end of the course, you are expected to have demonstrated the ability to:

use appropriate strategies and techniques for communicating effectively in English in an academic context in your own field

prepare and present scientific subjects from your own field of studies to your classmates, using appropriate field-related vocabulary.

Contents:

In the classroom, you will practice the skills of listening, speaking and presenting topics in your own field. The emphasis is on working in pairs and small groups. In addition, you will complete independent homework assignments to support the classroom learning.

Mode of delivery:

The course is implemented using blended methods, which may include distance teaching, classroom instruction and activities in the Moodle learning environment.

Learning activities and teaching methods:

The English 2 course is tailored to the needs of students in different fields of study, and thus the materials and implementation methods of the course vary between groups. The teacher will provide a more detailed schedule and list of homework tasks. There will be 26 hours of guided teaching events and 28 hours of independent work, including both individual and group work.

Target group:

2nd year students of Biology, Chemistry, Geoscience

1st year students of Mathematical and Physical Sciences

Prerequisites and co-requisites:

Prerequisite course: 902002Y English 1, unless exempted

Recommended optional programme components:

-

Recommended or required reading:

Materials will be provided in electronic format or are available from the library.

Assessment methods and criteria:

Continuous assessment is based on regular attendance, active participation in all lessons and the successful completion of all homework tasks. The assessment of the course is based on the learning outcomes of the course.

Grading:

Pass / fail.

Person responsible:

Karen Niskanen

Working life cooperation:

-

Other information:

-

750032Y: Orientation course for new students, 2 op**Voimassaolo:** 01.08.2017 -**Opiskelumuoto:** General Studies**Laji:** Course**Vastuuyksikkö:** Field of Biology**Arvostelu:** 1 - 5, pass, fail**Opettajat:** Lumi Viljakainen**Opintokohteen kielet:** Finnish**Leikkaavuudet:**

750031Y Orientation course for new students 1.0 op

ECTS Credits:

2 ECTS credits / 53 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 (PSP) for the first study year.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Tutorials, presentations, seminar of major subjects, computer exercises, independent studying, total 53 h.

Target group:

BIOL: compulsory.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Study syllabus.

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:

N.N. and Ph. Lic. Minna Vanhatalo.

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:** Languages and Communication**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

Proficiency level:

This course is only for Finnish speaking students with CEFR-level A2-B1 in Swedish language. There are no beginner courses in Swedish at the university.

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

Voimassaolo: 01.08.2014 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

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

Proficiency level:

B1/B2/C1

This course is only for Finnish speaking students with CEFR-level A2 in Swedish language. We don't offer Beginners courses in Swedish.

Status:**Required proficiency level:****Contents:****Learning activities and teaching methods:****Recommended optional programme components:**

-

Recommended or required reading:**Assessment methods and criteria:****Working life cooperation:**

-

750124P: Basics of ecology, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Seppo Rytkönen

Opintokohteen oppimateriaali:

Krebs, Charles J. , , 2001

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 1st 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. Moodle excersises.

Learning activities and teaching methods:

The course is based on the course book Manuel C. Molles Jr. & Anna A. Sher 2018. Ecology: concepts and applications (8. ed), lectures describing the major sections of the book, and the Moodle exercises based on the book. After each lecture, a new Moodle-exercise will open (in ca. 2 week-intervals). Assessment is based on the success in the Moodle-exercises. There is no final exam in the course.

Target group:

Compulsory biology students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Manuel C. Molles Jr. & Anna A. Sher 2018. Ecology: concepts and applications (8. p).

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Passing the course demands passing all the Moodle-exercises in the given time. Assessment is based on the success in the Moodle-exercises.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Seppo Rytönen.

Working life cooperation:

No.

Other information:

-

750173P: Biogeography, 5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kvist, Laura Irmeli

Opintokohteen kielet: Finnish

Leikkaavuudet:

750373A Biogeography 5.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 1st autumn.

Learning outcomes:

The course introduces students to basic concepts of biogeography, patterns of distribution and historical and present factors affecting the distribution. The student will have an understanding also of how human impact changes distributions and how the Finnish biota has been formed.

Contents:

The course introduces basic models and theories of distribution of organisms in the environment, offering historical, evolutionary, geographical, climatic and ecological explanations. It also introduces research methods used in biogeography and offers understanding on human impact on distributions and a special part of distributions of biota in Finland.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

34 h lectures, independent work (3 cr, a learning diary), exam.

Target group:

BSc: Compulsory for 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 (750372A) and Evolution, systematics and morphology of organisms, practicals (750374A)

Recommended or required reading:

Cox, C.B. & Moore, P.D. 2005: Biogeography. An ecological and evolutionary approach (7 ed.), Blackwell Publishing Ltd, tai Cox, C.B. & Moore, P.D. 2010: Biogeography. An ecological and evolutionary approach (8 ed.), John Wiley & Sons Inc. Euroola, S. 1999: Kasvipeitteemme alueellisuus. Oulanka Reports. Oulu. 116 s.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Exams. Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail. Final grade is average value of the two exams.

Person responsible:

Doc. Laura Kvist.

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: Heikki Helanterä

Opintokohteen kielet: Finnish

Leikkaavuudet:

757122P Concepts of genetics for biochemists 3.0 op

753124P General genetics 4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 1st spring.

Learning outcomes:

To understand and apply basic concepts of genetics, at Mendelian and molecular level.

Contents:

Part 1. Mendelian genetics, including the basics 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:

36 h lectures and seminars, 97 h independent studies, exam.

Target group:

Compulsory to the biology students (5 cr) Biochemistry students: parts 1 and 3 (3 cr) compulsory.

Prerequisites and co-requisites:

Introduction to cell biology and physiology (750122P) or equivalent knowledge.

Recommended optional programme components:

This course is prerequisite to all other genetics courses.

Recommended or required reading:

Home work assignments in Moodle. Klug et al. 2012. Concepts of Genetics (11. 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.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä.

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: Lumi Viljakainen

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, 1st spring.

Learning outcomes:

Knowledge on essential phenomena in genetics as well as know-how to work in a genetics laboratory. Student understands and is able to apply and analyse fundamental genetical experiments.

Contents:

Investigation of Mendelian inheritance; gene mapping and nonadditive effects of genes using cross-breeding; basics of population genetics; investigation of mitosis and meiosis using cytogenetical methods.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

8 h demonstrations, 30 h exercises, 95 h independent work including home work and report.

Target group:

Compulsory for biology students.

Prerequisites and co-requisites:

Concepts of genetics (757109P) 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:

Exam, report, participation to exercises.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Lumi Viljakainen.

Working life cooperation:

No.

Other information:

-

750122P: Introduction to cell biology and physiology, 5 op

Voimassaolo: 01.08.2020 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.S. 1st autumn.

Learning outcomes:

Students will acquire comprehensive understanding of how an organisms function on molecular, cell and physiological level.

Contents:

The course has been divided into four section: animal- and plant cell biology, genetics, and animal physiology.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

40 hours of lecture and hours of independent learning.

Target group:

Compulsory to the biology and biochemistry students.

Prerequisites and co-requisites:

-
Recommended optional programme components:

-
Recommended or required reading:

Molecular Biology of the Cell (Alberts et al.)

Biology: a global approach (Campbell ym.)

Assessment methods and criteria:

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail. Final grade is average value of the exams.

Person responsible:

Prof. Hely Häggman and Dr. Sanni Kinnunen.

Working life cooperation:

No.

Other information:

-

Compulsory

750122P-01: Introduction to cell biology and physiology, genetics, 0 op

Voimassaolo: 01.08.2020 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha

Opintokohteen kielet: Finnish

750122P-02: Introduction to cell biology and physiology, animal cell biology, 0 op

Voimassaolo: 01.08.2020 -

Opiskelumuoto: Basic Studies

Laji: Partial credit

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha

Opintokohteen kielet: Finnish

750122P-03: Introduction to cell biology and physiology, plant cell biology, 0 op

Voimassaolo: 01.08.2020 -

Opiskelumuoto: Basic Studies

Laji: Partial credit

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha

Opintokohteen kielet: Finnish

750122P-04: Introduction to cell biology and physiology, animal physiology, 0 op

Voimassaolo: 01.08.2020 -

Opiskelumuoto: Basic Studies

Laji: Partial credit

Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Häggman, Hely Margaretha
Opintokohteen kielet: Finnish

755323A: Animal physiology, 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. 3rd autumn.

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:

24 h lectures, 25 h exercises and independent studying, mid-semester exams.

Learning activities and teaching methods:

Face-to-face teaching.

Target group:

BS compulsory, TEA and ECO optional.

Prerequisites and co-requisites:

Cell biology (750121P) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

Reece, J.B. Urry, L.A. Cain, M.L., Wasserman, S.A. Minorsky, P.V. & Jackson R.B. 2013: Campbell Biology (10e). Pearson, Global Edition, 1488 p, handouts.

Assessment methods and criteria:

Lecture exam 1-5 / Fail.

Exercises as accepted / Fail by learning diary / blog.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Sanni Kinnunen.

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. 3rd 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 done on the same exam in Examinarium.

Mode of delivery:

Independent studying: book exam.

Learning activities and teaching methods:

Students make workshops where they discuss content of the books. Book exam (3 h). Exam is held in Examinarium.

Target group:

Compulsory to the biology students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

BSg

- Klug, W. S., Cummings, M. R., Spencer, C.A ja Palladino M.A.: Concepts of Genetics (11. ed.). Pearson & Prentice Hall, 2015
- Choose one option:
 - Molecular genetics: chapters 1-3, 6, 8-22, 24 OR
 - Population and Evolutionary Genetics: chapters 1, 3-6, 10-18, 20-23, 25.
- responsible teacher Assoc. Prof. Heikki Helanterä

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. (2 cr)
- Hanski, I. 2007. The Scringing world. (2 cr.)
- 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)
- Primack, R.B. 2012. A primer of conservation biology (4. ed.). – 309 p. (2 cr).
- Smith, J.N.M., Keller, L.F., Marr, A.B. & Arcese, P. 2006. Conservation and biology of small populations. – Oxford University Press. 205 p. (2 cr)
- Other books can be agreed on special reasons with doc. Kari Koivula

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 doc. Anna Liisa Ruotsalainen.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Exam in Examinarium.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä, Prof. Hely Häggman, Doc. Anna Liisa Ruotsalainen and Doc. Kari Koivula.

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. Maturity exam will be done in Examinarium.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Detailed instructions on Moodle pages. Essay exam (3 h) in Examinarium.

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. Done in Examinarium.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Pass / Fail.

Person responsible:

Prof. Hely Häggman, Prof. Timo Muotka or Ass. Prof. Heikki Helanterä.

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

Opettajat: Seppo Rytönen

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. 3rd year. BS and ECO: Introduction to information retrieval autumn, workshop spring. TEA: scientific writing, Introduction to information retrieval and workshop autumn.

Learning outcomes:

B.Sc. seminar: Student will know the technical and ethical principles of scientific writing and publishing. She/he has the capability to make a scientific review (BSc thesis) and present it clearly as a poster or an oral presentation. *B.Sc. thesis:* Student is able to 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 degree programme. 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.

List of the actual B.Sc. thesis topics is on Moodle pages.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

BSc seminar: Info lectures, computer exercises, group and peer support, seminar or poster presentation. BSc thesis: About 15 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 autumn.

Recommended or required reading:

-

Assessment methods and criteria:

B.Sc. seminar: Tutorial group and presentation. *B.Sc. thesis:* Thesis.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Pass / Fail.

Person responsible:

B.Sc. seminar: Doc. Seppo Rytönen coordinator, computer classes, peer groups Prof. Timo Muotka

B.Sc. thesis: Prof. Timo Muotka, Assoc. Prof. Heikki Helanterä and Prof. Hely Häggman.

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: Virtanen, Risto Juhani, Marko Mutanen

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:

The students will learn a broad overview of the diversity of life-forms, the evolutionary history of life and the principles of biological classification.

Contents:

The course provides an insight into the biological evolution and evolutionary processes reflected by the systematic classification of the organisms. Also basics of phylogenetic inference, concepts of systematics and classification are introduced.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

30 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. 2nd 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.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Marko Mutanen and Doc. Risto Virtanen.

Working life cooperation:

No.

Other information:

-

750336A: Evolutionary ecology, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Topi Lehtonen

Opintokohteen oppimateriaali:

Björklund, Mats, , 2009

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / (English).

Timing:

B.Sc. degree 2nd 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 to the main topics of evolutionary ecology, for example basic concepts of natural selection and evolution, selection level, speciation, evolution of life histories, also 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. Lectures and seminars compulsory, exam.

Target group:

BS and ECO compulsory, TEAeco optional.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Lectures and seminars.

Assessment methods and criteria:

Seminar and exam.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Prof. Arja Kaitala and Dr. Topi Lehtonen.

Working life cooperation:

No.

Other information:

Gaudeamus, Stearns, S. and Hoekstra, R. F. 2005: Evolution, An Introduction. Oxford University Press, New York, 575 p

755335A: Identification of animals, invertebrates, 4 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Marko Mutanen

Opintokohteen kielet: Finnish

ECTS Credits:

4 ECTS credits / 106 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 1st spring.

Learning outcomes:

The primary goal is to learn indentifying higher taxa of invertebrate animals with help of representative specimen samples. The focus is on taxa that occur in northern Europe. Basics of species' ecology and classification of organisms.

Contents:

During the spring semester (16 h lectures in Finnish, 16 h exercises, exam) the invertebrate taxa (mostly superfamily or family level) occurring in northern Europe are studied using specimen samples.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

16 h lectures in Finnish, 16 h exercises, self-learning, exam.

Target group:

ECOGEN.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

This course is a requisite for attending the Terrestrial animals field course (755322A) and the Aquatic ecology field course (755321A).

Recommended or required reading:

Check course Moodle pages.

Assessment methods and criteria:

Identification exam.

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

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Marko Mutanen.

Working life cooperation:

No.

Other information:

-

755334A: Identification of animals, vertebrates, 4 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Koivula

Opintokohteen kielet: Finnish

Leikkaavuudet:

755333A Identification of animals 6.0 op

ECTS Credits:

4 ECTS credits / 106 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 1st autumn.

Learning outcomes:

Main goal is to learn to identify Finnish animal species (vertebrate) from museum samples.

Contents:

During the autumn semester (9 h lectures in Finnish, 16 h exercises based on museum samples, exam).

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

14 h lectures in Finnish, 14 h exercises, one exercise group with English lectures, self-learning, exam.

Target group:

ECOGEN.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

This course is needed for attending courses Terrestrial animals field course (755322A) and Aquatic ecology field course (755321A).

Recommended or required reading:

Check course Moodle pages.

Assessment methods and criteria:

Species exam.

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

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Kari Koivula.

Working life cooperation:

No.

Other information:

-

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

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Anna Ruotsalainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

756342A Identification of plant species 3.0 op

ECTS Credits:

3 ECTS credits / 80 hours of work.

Language of instruction:

Finnish / English.

Timing:

BSc 1st autumn.

Learning outcomes:

Student is able to identify most common boreal plant species in herbarium specimens.

Contents:

Demonstrations and/or independent stud of ca. 350 vascular plants, mosses and lichens in the boreal vegetation zone. In the identification exam student has to know specimens scientific name and family in latin.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

16 h demonstrations and learning from the herbarium samples. 350 plant species. In the identification exam student has to know specimens scientific name and family in latin.

Target group:

BSc degree, BS: compulsory 3 cr.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Booklet Hanhela, P. & Halonen, P. 1995: Plant Identification.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Two species identification subexams (756355A-01 and 756355A-02) 3 cr with the help of handout.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Anna Liisa Ruotsalainen.

Working life cooperation:

No.

Other information:

-

757312A: Molecular evolution, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Lumi Viljakainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

753327A Molecular evolution 4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English. Lectures are in Finnish, but non-speakers can take an exam based on literature.

Timing:

B.Sc. 2nd autumn.

Learning outcomes:

Methods to study the evolutionary history of organisms and the evolutionary forces that have affected the outcome. The student knows the main concepts in the field and can read scientific articles in molecular evolution.

Contents:

Methods to estimate nucleotide substitution rates, reconstruction of phylogenetic trees with distance based methods and parsimony. Evolution of genome structure and size.

Mode of delivery:

Face-to-face teaching, Moodle.

Learning activities and teaching methods:

18 h lectures, 12 h exercises/seminar, 103 h independent studies including home essays.

Target group:

Compulsory for biology students.

Prerequisites and co-requisites:

Concepts of genetics (757109P) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

Graur, D, Molecular and Genome evolution 2016. Sinauer, Massachusetts, Graur, D. ja 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:

Homework, Exam/essay, exercises.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Lumi Viljakainen.

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: Anna-Maria Pirttilä, Häggman, Hely Margaretha

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. 2nd 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 and plant hormones are discussed.

Mode of delivery:

Face-to-face teaching, book exam.

Learning activities and teaching methods:

Lectures (20 h), Moodle pages and exams.

Target group:

Compulsory to the biology students.

Prerequisites and co-requisites:

Introduction to cell biology and physiology (750122P) or equivalent knowledge helps in following this course.

Recommended optional programme components:

-

Recommended or required reading:

Taiz, L. et al. 2015. Plant Physiology and Development. Sixth Edition. 761 p. Sinauer Associates, Inc. ISBN-9781605352558.

Terävä, E. & Kanervo, E. 2008: Kasvianatomia or equivalent.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Lectures, book, exams. Moodle: <https://moodle oulu fi/course/view.php?id=991>

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Prof. Hely Häggman and Doc. Anna Maria Pirttilä.

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: Lumi Viljakainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

750340A Basics of bioinformatics 3.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

English.

Timing:

B.Sc. studies, 3rd autumn.

Learning outcomes:

After the course the student can explain and is able to use the basic methods to analyse nucleotide and protein sequences. Student learns how to use various databases, can explain the principles of the analytic methods, is able to take up a critical attitude towards the used methods and gets a good background for applying new methods that are developed continuously.

Contents:

Searching DNA and protein sequences and information connected to the sequences from various databases, genome structure and sequence-based gene prediction and annotation, sequence alignment, introduction to next-generation sequencing techniques.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

12 h lectures, 6 h seminar, 20 h exercises, independent work.

Target group:

BT: compulsory, recommended for all biologists. Suitable also for biochemists.

Prerequisites and co-requisites:

Concepts of genetics (757109P) or equivalent knowledge, also Molecular evolution (757312A) is recommended.

Recommended optional programme components:

-

Recommended or required reading:

Pevsner, J. 2015: Bioinformatics and functional genomics, Wiley-Blackwell.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Take-home exam, exercises, seminar presentation, independent work and student activity.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Lumi Viljakainen.

Working life cooperation:

No.

Other information:

-

757311A: Molecular methods I, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Lumi Viljakainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

750364A Molecular methods I 4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

BS: B.Sc. 2nd autumn, ECOGEN 1st autumn.

Learning outcomes:

Student can isolate DNA, estimate the quality and measure the quantity of DNA, amplify DNA fragments using polymerase chain reaction, design PCR primers, clone and sequence DNA. The student is able to evaluate the results and optimize the methods.

Contents:

Isolation of genomic DNA, amplification of DNA by PCR, primer design, DNA sequencing molecular cloning, analysis of DNA-sequence and writing scientific report.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

48 h laboratory work including demonstrations, 50 h independent work including homework and writing report.

Target group:

Compulsory to BSc and ECOGEN, suitable for ECO students who are interested in population and evolutionary ecology.

Prerequisites and co-requisites:

Concepts of genetics (757110P) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

Report.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Lumi Viljakainen.

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:

The student can differentiate the basic structures of higher plants at microscopic and macroscopic level and understands the relationship between structure and function.

Contents:

The student can interpret the meaning of structure behind function at microscopic and macroscopic level. 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.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

45 h laboratory exercises. Exercises are done in pairs and reports are made as team work.

Target group:

BS: compulsory, TEAbs optional.

Prerequisites and co-requisites:

Introductio to cell biology and physiology (750122P) and Basics in functional plant biology, lectures (756346A).

Recommended optional programme components:

Recommended or required reading:

Terävä, E. & Kanervo, E. 2008: Kasvianatomia or equivalent knowledge, Taiz, L. et al. : Plant Physiology and Development (6. painos) Sinauer Associates, Sunderland Massachusetts U.S.A; Hohtola ym.: Harjoitustyömoniste.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Laboratory exercises, reports. Moodle: <https://moodle oulu fi/course/view.php?id=974>

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = 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:

BS compulsory. ECO and TEA optional.

Prerequisites and co-requisites:

Basics of plant biology (756346A) lectures is recommended as prerequisite.

Recommended optional programme components:

-

Recommended or required reading:

Lectures and supplementary material. Moodle pages. Taiz et al. 2015. Plant Physiology and Development (sixth edition) and 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:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Prof. Hely Häggman.

Working life cooperation:

No.

Other information:

-

806119P: A Second Course in Statistics, 5 op

Voimassaolo: 01.06.2015 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Mathematics

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari Päckilä

Opintokohteen kielet: Finnish

Leikkaavuudet:

806113P	Introduction to Statistics A	5.0 op
806109P	Basic Methods in Statistics I	9.0 op

ECTS Credits:

5 ECTS credits

Language of instruction:

Finnish

Timing:

4th period

Learning outcomes:

Upon completion of the course, student will be able to:

- analyze continuous and categorical response in the most common experimental and observational studies
- critically evaluate scientific articles
- implement and interpret analyses of a statistical software concerning issues of the course.

Contents:

- Skills for performing statistical analyses and inferences on the basis of data obtained in common experimental and observational studies are expanded and deepened
- statistical literacy of scientific articles with quantitative methods

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Total 50 h face-to-face teaching including lectures and exercise (partly computer exercises). Independent work 83 h.

Target group:

Minor students

Prerequisites and co-requisites:

The recommended prerequisite prior to enrolling for the course is the completion of the course: 806118P Introduction to Statistics or 806116P Statistics for Economic Sciences.

Recommended optional programme components:

After the course, student is able to continue other statistics courses.

Recommended or required reading:

Lecture notes

Assessment methods and criteria:

Mid-term exams and/or final exam and possible homework.

Grading:

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

Person responsible:

Jari Päckilä

Working life cooperation:

No

780120P: Basic Principles in Chemistry, 5 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Chemistry

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

780117P General and Inorganic Chemistry A 5.0 op

780109P Basic Principles in Chemistry 4.0 op

ECTS Credits:

5 ECTS credits / 134 hours of work

Language of instruction:

Finnish

Timing:

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

Learning outcomes:

Upon completion of the course, the student will be able to display an understanding of basic chemistry phenomenon; equilibrium of acids and bases, chemical equilibrium, redox reactions and stoichiometry.

Contents:

Introduction to chemistry, stoichiometry, redox reactions, chemical equilibrium, the equilibrium of acid and bases, buffer solutions, titration, thermodynamics.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

40 hours of lectures and 94 hours of self-study

Target group:

Biology, Geology, Process Engineering, Environmental Engineering compulsory.

Geography, optional.

Prerequisites and co-requisites:

The compulsory course in upper secondary school chemistry (1st course)

Recommended optional programme components:

The course is not included in the 25 ECTS credits entity of chemistry!

Recommended or required reading:

Tro, N.J., Principles of Chemistry. A Molecular Approach, Pearson, 3. edition, 2016

Assessment methods and criteria:

Final examination.

Grading:

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

Person responsible:

Minna Tiainen

Working life cooperation:

No

030005P: Information Skills, 1 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Technology

Arvostelu: 1 - 5, pass, fail

Opettajat: Ursula Heinikoski

Opintokohteen kielet: Finnish

Leikkaavuudet:

ECTS Credits:

1 ECTS credit / 27 hours of work

Language of instruction:

Finnish

Timing:

Architecture 3. spring semester, period III;
 biochemistry 3. autumn semester;
 biology 3. autumn semester, period I;
 chemistry 3. autumn semester, period I;
 civil engineering 2. spring semester, period IV;
 computer science and engineering 2. spring semester, period IV;
 electronics and communications engineering 3. spring semester;
 geosciences 2. spring semester, period IV;
 geography 3. semester, periods I and III;
 industrial engineering and management 3. year;
 information processing sciences 1. or 3. year;
 mathematics and physics 1. spring semester, period III;
 mechanical engineering 3. year;
 mining engineering and mineral processing 3. year;
 process and environmental engineering 2. year, period II;
 Master's degree students in industrial engineering and management 1st year.

Learning outcomes:

Upon completion of the course, the students:

- can search scientific information,
- can use the most important databases of their discipline,
- know how to evaluate search results and information sources,
- can use the reference management tool.

Contents:

Scientific information retrieval process, the most important databases and publication channels of the discipline, evaluation of the reliability of information sources and reference management tool.

Mode of delivery:

Blended teaching: classroom training, web-based learning material and exercises, a group assignment.

Learning activities and teaching methods:

Training sessions 8 h, group working 7 h, self-study 12 h

Target group:

Compulsory for all bachelor degree students of Faculty of information technology and electrical engineering, Faculty of Technology and Faculty of science. Compulsory also for those Master's degree students in Industrial Engineering and Management who have no earlier studies in the information skills. Optional for the students of biochemistry.

Recommended optional programme components:

In biochemistry the course is completed as a part of 740376A Bachelor's Thesis.

Recommended or required reading:

Web learning material [Tieteellisen tiedonhankinnan opas](#)

Assessment methods and criteria:

Passing the course requires participation in the training sessions and successful completion of the course assignments.

Grading:

pass/fail

Person responsible:

Ursula Heinikoski

780116P: Introduction to Organic Chemistry, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Chemistry

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay780116P	Introduction to Organic Chemistry (OPEN UNI)	5.0 op
780103P2	Organic Chemistry I	6.0 op
780108P	Basic Course in Organic Chemistry	6.0 op
780112P	Introduction to Organic Chemistry	4.0 op
780103P	Introduction to Organic Chemistry	6.0 op

ECTS Credits:

5 ECTS credits / 134 hours of work

Language of instruction:

Finnish. Book-examination in English as well.

Timing:

1st spring

Learning outcomes:

After this course, the student:

- can recognize and name basic organic compounds and explain their properties.
- can explain organic chemistry basic concepts.
- can deduce basic reaction types and solve their mechanisms.

Contents:

Classification of organic compounds and their properties. Basic reactions of organic compounds: addition, elimination and substitution along with the reaction mechanisms. Basics of stereochemistry.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

38 hours of lectures plus 12 hours of exercises, 84 hours of independent self-study.

Target group:

Biochemistry, Chemistry, Biology, Process Engineering, Environmental Engineering and in the study entity of 25 credits, compulsory.

Physical Sciences, Geology, Geography, Mathematical Sciences, optional.

Prerequisites and co-requisites:

Upper secondary school chemistry

Recommended optional programme components:

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

Recommended or required reading:

Hart, H.: Organic Chemistry: A Short Course, 10. ed. or newer, Houghton Mifflin, Boston, 1999; Hart, H. ja Hart, D.: Study Guide & Solutions Book, Organic Chemistry: A Short Course, 10. ed. or newer, Houghton Mifflin, Boston, 1999 and material in Moodle.

Assessment methods and criteria:

Two intermediate examinations or one final examination.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

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

Person responsible:

Johanna Kärkkäinen

Working life cooperation:

No

806118P: Introduction to Statistics, 5 op

Voimassaolo: 01.06.2015 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Mathematics

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari Päckilä

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay806118P	Introduction to Statistics (OPEN UNI)	5.0 op
806113P	Introduction to Statistics A	5.0 op

ECTS Credits:

5 ECTS credits

Language of instruction:

Finnish

Timing:

3rd period

Learning outcomes:

After completing the course, student will be able to:

- consider issues influencing to data collection
- describe data by appropriate methods (tables, statistics and graphical presentations)
- evaluate the effect size of the sample to the margin of error for instance in Gallup polls and in different market researches
- interpret output of a statistical software.

Contents:

- collecting data, e.g. sampling
- variables and measuring
- descriptive statistical methods and their selection
- margin of error of estimator for population mean and proportion
- statistical literacy
- basic analysis of data using statistical software

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Total 50 h face-to-face teaching including lectures and exercise (partly computer exercises). Independent work 83 h.

Target group:

Minor students

Recommended optional programme components:

After the course, student is able to continue to A Second Course in Statistics.

Recommended or required reading:

Lecture notes

Assessment methods and criteria:

Mid-term exams and/or final exam and possible homework.

Grading:

Fail, 1-5

Person responsible:

Hanna Heikkinen and Jari Päckilä

Working life cooperation:

No

750032Y: Orientation course for new students, 2 op**Voimassaolo:** 01.08.2017 -**Opiskelumuoto:** General Studies**Laji:** Course**Vastuuyksikkö:** Field of Biology**Arvostelu:** 1 - 5, pass, fail**Opettajat:** Lumi Viljakainen**Opintokohteen kielet:** Finnish**Leikkaavuudet:**

750031Y Orientation course for new students 1.0 op

ECTS Credits:

2 ECTS credits / 53 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 (PSP) for the first study year.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Tutorials, presentations, seminar of major subjects, computer exercises, independent studying, total 53 h.

Target group:

BIOL: compulsory.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Study syllabus.

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:

N.N. and Ph. Lic. Minna Vanhatalo.

Working life cooperation:

No.

Other information:

-

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

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Proficiency level:

B2-C1

Status:

This course is mandatory for students who choose English as their foreign language in the following B.Sc. degree programmes:

Faculty of Natural Sciences

- Biology
- Mathematical and Physical Sciences.

Faculty of Technology

- Chemistry
- Geosciences.

Note:

Please consult your faculty's 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 skills in English must have been otherwise acquired. If you need to take English, but lack the background, please get in touch with the Languages and Communication contact teacher to discuss individual solutions.

ECTS Credits:

2 ECTS / 53 hours of work

Language of instruction:

English

Timing:

Biology: 1st year spring term (periods 3 and 4)

Mathematical and Physical Sciences: 1st year autumn term (periods 1 and 2)

Chemistry: 1st year autumn term (periods 1 and 2)

Geosciences: 1st year spring term (periods 3 and 4)

Learning outcomes:

By the end of the course, you are expected to demonstrate the ability to:

utilize your knowledge of word formation, text structure, and cohesion markers to understand the vocabulary and content of academic texts,

use effective reading strategies and techniques for studying vocabulary, and

summarize texts both orally or in writing.

Contents:

The course will focus on reading strategies; these include recognising how texts are organised, 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:

The course is implemented using blended methods, which may include web-based teaching and face-to-face teaching. The course utilizes the Moodle learning environment.

Learning activities and teaching methods:

The English 1 course is adapted to accommodate many different fields of study, and thus the materials and implementation methods of the course vary. There will be 26 hours of guided teaching events and 28 hours of independent study, either individually or in a group.

Target group:

Faculty of Natural Sciences: 1st-year students of Biology, Mathematical & Physical Sciences

Faculty of Technology: 1st-year students of Chemistry, Geosciences

Prerequisites and co-requisites:

Post-requisite Students are also required to take [English 2 902004Y](#) following completion of this course.

Recommended optional programme components:

None

Recommended or required reading:

Course materials used will be available from the library or online.

Assessment methods and criteria:

Continuous assessment takes into account active and regular participation in classroom sessions and successful completion of all homework tasks, There are three monthly tests on material covered so far. The assessment of the course is based on the learning outcomes listed above.

Grading:

The course utilises a grading scale of Pass/Fail.

Person responsible:

Karen Niskanen

Working life cooperation:

The course does not contain working life cooperation.

Other information:

N.B. Students with grades laudatur or eximia in their A1 English school-leaving examination can be exempted from this course and will be granted the credits by your faculty. Contact the faculty for information.

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

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Leikkaavuudet:

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

Proficiency level:

B2 - C1

Status:

This course is mandatory for students who choose English as their foreign language in the following B.Sc. degree programs:

Faculty of Natural Sciences:

Biology

Mathematical & Physical Sciences.

Faculty of Technology:

Chemistry

Geoscience.

Required proficiency level:

Students taking this course must have had English as the A1 or A2 language at school or have equivalent skills.

ECTS Credits:

2 ECTS credits / 53 hours of work.

Language of instruction:

English

Timing:

Biology: 2nd year autumn term (periods 1 and 2)

Mathematic and Physical Sciences 1st year spring term (periods 3 and 4)

Chemistry: 2nd year spring term (periods 3 and 4)

Geosciences: 2nd year spring term (periods 3 and 4)

Learning outcomes:

By the end of the course, you are expected to have demonstrated the ability to:

use appropriate strategies and techniques for communicating effectively in English in an academic context in your own field

prepare and present scientific subjects from your own field of studies to your classmates, using appropriate field-related vocabulary.

Contents:

In the classroom, you will practice the skills of listening, speaking and presenting topics in your own field. The emphasis is on working in pairs and small groups. In addition, you will complete independent homework assignments to support the classroom learning.

Mode of delivery:

The course is implemented using blended methods, which may include distance teaching, classroom instruction and activities in the Moodle learning environment.

Learning activities and teaching methods:

The English 2 course is tailored to the needs of students in different fields of study, and thus the materials and implementation methods of the course vary between groups. The teacher will provide a more detailed schedule and list of homework tasks. There will be 26 hours of guided teaching events and 28 hours of independent work, including both individual and group work.

Target group:

2nd year students of Biology, Chemistry, Geoscience
1st year students of Mathematical and Physical Sciences

Prerequisites and co-requisites:

Prerequisite course: 902002Y English 1, unless exempted

Recommended optional programme components:

-

Recommended or required reading:

Materials will be provided in electronic format or are available from the library.

Assessment methods and criteria:

Continuous assessment is based on regular attendance, active participation in all lessons and the successful completion of all homework tasks. The assessment of the course is based on the learning outcomes of the course.

Grading:

Pass / fail.

Person responsible:

Karen Niskanen

Working life cooperation:

-

Other information:

-

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

Voimassaolo: 01.08.2014 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

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

Proficiency level:

This course is only for Finnish speaking students with CEFR-level A2-B1 in Swedish language. There are no beginner courses in Swedish at the university.

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

Voimassaolo: 01.08.2014 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

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

Proficiency level:

B1/B2/C1

This course is only for Finnish speaking students with CEFR-level A2 in Swedish language. We don't offer Beginners courses in Swedish.

Status:

Required proficiency level:

Contents:

Learning activities and teaching methods:

Recommended optional programme components:

-

Recommended or required reading:

Assessment methods and criteria:

Working life cooperation:

-

750124P: Basics of ecology, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Seppo Rytönen

Opintokohteen oppimateriaali:

Krebs, Charles J. , , 2001

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 1st 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. Moodle excersises.

Learning activities and teaching methods:

The course is based on the course book Manuel C. Molles Jr. & Anna A. Sher 2018. Ecology: concepts and applications (8. ed), lectures describing the major sections of the book, and the Moodle exercises based on the book. After each lecture, a new Moodle-exercise will open (in ca. 2 week-intervals). Assessment is based on the success in the Moodle-exercises. There is no final exam in the course.

Target group:

Compulsory biology students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Manuel C. Molles Jr. & Anna A. Sher 2018. Ecology: concepts and applications (8. p).

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Passing the course demands passing all the Moodle-exercises in the given time. Assessment is based on the success in the Moodle-exercises.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Seppo Rytkönen.

Working life cooperation:

No.

Other information:

-

750173P: Biogeography, 5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kvist, Laura Irmeli

Opintokohteen kielet: Finnish

Leikkaavuudet:

750373A Biogeography 5.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 1st autumn.

Learning outcomes:

The course introduces students to basic concepts of biogeography, patterns of distribution and historical and present factors affecting the distribution. The student will have an understanding also of how human impact changes distributions and how the Finnish biota has been formed.

Contents:

The course introduces basic models and theories of distribution of organisms in the environment, offering historical, evolutionary, geographical, climatic and ecological explanations. It also introduces research methods used in biogeography and offers understanding on human impact on distributions and a special part of distributions of biota in Finland.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

34 h lectures, independent work (3 cr, a learning diary), exam.

Target group:

BSc: Compulsory for 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 (750372A) and Evolution, systematics and morphology of organisms, practicals (750374A)

Recommended or required reading:

Cox, C.B. & Moore, P.D. 2005: Biogeography. An ecological and evolutionary approach (7 ed.), Blackwell Publishing Ltd, tai Cox, C.B. & Moore, P.D. 2010: Biogeography. An ecological and evolutionary approach (8 ed.), John Wiley & Sons Inc. Euroala, S. 1999: Kasvipteemme alueellisuus. Oulanka Reports. Oulu. 116 s.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Exams. Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail. Final grade is average value of the two exams.

Person responsible:

Doc. Laura Kvist.

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: Heikki Helanterä

Opintokohteen kielet: Finnish

Leikkaavuudet:

757122P	Concepts of genetics for biochemists	3.0 op
753124P	General genetics	4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 1st spring.

Learning outcomes:

To understand and apply basic concepts of genetics, at Mendelian and molecular level.

Contents:

Part 1. Mendelian genetics, including the basics 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:

36 h lectures and seminars, 97 h independent studies, exam.

Target group:

Compulsory to the biology students (5 cr) Biochemistry students: parts 1 and 3 (3 cr) compulsory.

Prerequisites and co-requisites:

Introduction to cell biology and physiology (750122P) or equivalent knowledge.

Recommended optional programme components:

This course is prerequisite to all other genetics courses.

Recommended or required reading:

Home work assignments in Moodle. Klug et al. 2012. Concepts of Genetics (11. 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.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä.

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: Lumi Viljakainen

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, 1st spring.

Learning outcomes:

Knowledge on essential phenomena in genetics as well as know-how to work in a genetics laboratory. Student understands and is able to apply and analyse fundamental genetical experiments.

Contents:

Investigation of Mendelian inheritance; gene mapping and nonadditive effects of genes using cross-breeding; basics of population genetics; investigation of mitosis and meiosis using cytogenetical methods.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

8 h demonstrations, 30 h exercises, 95 h independent work including home work and report.

Target group:

Compulsory for biology students.

Prerequisites and co-requisites:

Concepts of genetics (757109P) 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:

Exam, report, participation to exercises.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Lumi Viljakainen.

Working life cooperation:

No.

Other information:

750122P: Introduction to cell biology and physiology, 5 op

Voimassaolo: 01.08.2020 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.S. 1st autumn.

Learning outcomes:

Students will acquire comprehensive understanding of how an organisms function on molecular, cell and physiological level.

Contents:

The course has been divided into four section: animal- and plant cell biology, genetics, and animal physiology.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

40 hours of lecture and hours of independent learning.

Target group:

Compulsory to the biology and biochemistry students.

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Molecular Biology of the Cell (Alberts et al.)

Biology: a global approach (Campbell ym.)

Assessment methods and criteria:

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail. Final grade is average value of the exams.

Person responsible:

Prof. Hely Häggman and Dr. Sanni Kinnunen.

Working life cooperation:

No.

Other information:

-

Compulsory

750122P-01: Introduction to cell biology and physiology, genetics, 0 op

Voimassaolo: 01.08.2020 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha

Opintokohteen kielet: Finnish

750122P-02: Introduction to cell biology and physiology, animal cell biology, 0 op

Voimassaolo: 01.08.2020 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Häggman, Hely Margaretha
Opintokohteen kielet: Finnish

750122P-03: Introduction to cell biology and physiology, plant cell biology, 0 op

Voimassaolo: 01.08.2020 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Häggman, Hely Margaretha
Opintokohteen kielet: Finnish

750122P-04: Introduction to cell biology and physiology, animal physiology, 0 op

Voimassaolo: 01.08.2020 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Häggman, Hely Margaretha
Opintokohteen kielet: Finnish

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. 3rd 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 done on the same exam in Examinarium.

Mode of delivery:

Independent studying: book exam.

Learning activities and teaching methods:

Students make workshops where they discuss content of the books. Book exam (3 h). Exam is held in Examinarium.

Target group:

Compulsory to the biology students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

BSg

- Klug, W. S., Cummings, M. R., Spencer, C.A ja Palladino M.A.: Concepts of Genetics (11. ed.). Pearson & Prentice Hall, 2015
Choose one option:
 - Molecular genetics: chapters 1-3, 6, 8-22, 24 OR
 - Population and Evolutionary Genetics: chapters 1, 3-6, 10-18, 20-23, 25.
- responsible teacher Assoc. Prof. Heikki Helanterä

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. (2 cr)
- Hanski, I. 2007. The Scinking world. (2 cr.)
- 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 tie. – Art House, 327 p. (2 cr)
- Primack, R.B. 2012. A primer of conservation biology (4. ed). – 309 p. (2 cr).
- Smith, J.N.M., Keller, L.F., Marr, A.B. & Arcese, P. 2006. Conservation and biology of small populations. – Oxford University Press. 205 p. (2 cr)
- Other books can be agreed on special reasons with doc. Kari Koivula

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 doc. Anna Liisa Ruotsalainen.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Exam in Examinarium.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Assoc. Prof. Heikki Helanterä, Prof. Hely Häggman, Doc. Anna Liisa Ruotsalainen and Doc. Kari Koivula.

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. Maturity exam will be done in Examinarium.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Detailed instructions on Moodle pages. Essay exam (3 h) in Examinarium.

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. Done in Examinarium.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Pass / Fail.

Person responsible:

Prof. Hely Häggman, Prof. Timo Muotka or Ass. Prof. Heikki Helanterä.

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

Opettajat: Seppo Rytönen

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. 3rd year. BS and ECO: Introduction to information retrieval autumn, workshop spring. TEA: scientific writing, Introduction to information retrieval and workshop autumn.

Learning outcomes:

B.Sc. seminar: Student will know the technical and ethical principles of scientific writing and publishing. She/he has the capability to make a scientific review (BSc thesis) and present it clearly as a poster or an oral presentation. *B.Sc. thesis:* Student is able to 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 degree programme. 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.

List of the actual B.Sc. thesis topics is on Moodle pages.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

BSc seminar: Info lectures, computer exercises, group and peer support, seminar or poster presentation. BSc thesis: About 15 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 autumn.

Recommended or required reading:

-

Assessment methods and criteria:

B.Sc. seminar: Tutorial group and presentation. *B.Sc. thesis:* Thesis. Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Pass / Fail.

Person responsible:

B.Sc. seminar: Doc. Seppo Rytönen coordinator, computer classes, peer groups Prof. Timo Muotka
B.Sc. thesis: Prof. Timo Muotka, Assoc. Prof. Heikki Helanterä and Prof. Hely Häggman.

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: Virtanen, Risto Juhani, Marko Mutanen

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:

The students will learn a broad overview of the diversity of life-forms, the evolutionary history of life and the principles of biological classification.

Contents:

The course provides an insight into the biological evolution and evolutionary processes reflected by the systematic classification of the organisms. Also basics of phylogenetic inference, concepts of systematics and classification are introduced.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

30 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. 2nd 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.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Marko Mutanen and Doc. Risto Virtanen.

Working life cooperation:

No.

Other information:

-

750336A: Evolutionary ecology, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Topi Lehtonen

Opintokohteen oppimateriaali:

Björklund, Mats, , 2009

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / (English).

Timing:

B.Sc. degree 2nd 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 to the main topics of evolutionary ecology, for example basic concepts of natural selection and evolution, selection level, speciation, evolution of life histories, also 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. Lectures and seminars compulsory, exam.

Target group:

BS and ECO compulsory, TEAeco optional.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Lectures and seminars.

Assessment methods and criteria:

Seminar and exam.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Prof. Arja Kaitala and Dr. Topi Lehtonen.

Working life cooperation:

No.

Other information:

Gaudeamus, Stearns, S. and Hoekstra, R. F. 2005: Evolution, An Introduction. Oxford University Press, New York, 575 p

755335A: Identification of animals, invertebrates, 4 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Marko Mutanen

Opintokohteen kielet: Finnish

ECTS Credits:

4 ECTS credits / 106 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 1st spring.

Learning outcomes:

The primary goal is to learn indentifying higher taxa of invertebrate animals with help of representative specimen samples. The focus is on taxa that occur in northern Europe. Basics of species' ecology and classification of organisms.

Contents:

During the spring semester (16 h lectures in Finnish, 16 h exercises, exam) the invertebrate taxa (mostly superfamily or family level) occurring in northern Europe are studied using specimen samples.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

16 h lectures in Finnish, 16 h exercises, self-learning, exam.

Target group:

ECOGEN.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

This course is a requisite for attending the Terrestrial animals field course (755322A) and the Aquatic ecology field course (755321A).

Recommended or required reading:

Check course Moodle pages.

Assessment methods and criteria:

Identification exam.

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

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Marko Mutanen.

Working life cooperation:

No.

Other information:

-

755334A: Identification of animals, vertebrates, 4 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Koivula

Opintokohteen kielet: Finnish

Leikkaavuudet:

755333A Identification of animals 6.0 op

ECTS Credits:

4 ECTS credits / 106 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 1st autumn.

Learning outcomes:

Main goal is to learn to identify Finnish animal species (vertebrate) from museum samples.

Contents:

During the autumn semester (9 h lectures in Finnish, 16 h exercises based on museum samples, exam).

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

14 h lectures in Finnish, 14 h exercises, one exercise group with English lectures, self-learning, exam.

Target group:

ECOGEN.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

This course is needed for attending courses Terrestrial animals field course (755322A) and Aquatic ecology field course (755321A).

Recommended or required reading:

Check course Moodle pages.

Assessment methods and criteria:

Species exam.

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

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Kari Koivula.

Working life cooperation:

No.

Other information:

-

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

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Anna Ruotsalainen

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

BSc 1st autumn.

Learning outcomes:

Student is able to identify most common boreal plant species in herbarium specimens.

Contents:

Demonstrations and/or independent stud of ca. 350 vascular plants, mosses and lichens in the boreal vegetation zone. In the identification exam student has to know specimens scientific name and family in latin.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

16 h demonstrations and learning from the herbarium samples. 350 plant species. In the identification exam student has to know specimens scientific name and family in latin.

Target group:

BSc degree: ECO and TEA 5 cr compulsory.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

Course done as 5 cr (756654S) is prerequisite for the Plant ecology field course (756643S) and for the advanced plant species identification courses (752608S and 752625S).

Recommended or required reading:

Booklet Hanhela, P. & Halonen, P. 1995: Plant Identification.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Two species identification subexams (756354A-01 and 756354A-02). 5 cr without the course handout.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Anna Liisa Ruotsalainen.

Working life cooperation:

No.

Other information:

-

757312A: Molecular evolution, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Lumi Viljakainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

753327A Molecular evolution 4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English. Lectures are in Finnish, but non-speakers can take an exam based on literature.

Timing:

B.Sc. 2nd autumn.

Learning outcomes:

Methods to study the evolutionary history of organisms and the evolutionary forces that have affected the outcome. The student knows the main concepts in the field and can read scientific articles in molecular evolution.

Contents:

Methods to estimate nucleotide substitution rates, reconstruction of phylogenetic trees with distance based methods and parsimony. Evolution of genome structure and size.

Mode of delivery:

Face-to-face teaching, Moodle.

Learning activities and teaching methods:

18 h lectures, 12 h exercises/seminar, 103 h independent studies including home essays.

Target group:

Compulsory for biology students.

Prerequisites and co-requisites:

Concepts of genetics (757109P) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

Graur, D, Molecular and Genome evolution 2016. Sinauer, Massachusetts, Graur, D. ja 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:

Homework, Exam/essay, exercises.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Lumi Viljakainen.

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: Anna-Maria Pirttilä, Häggman, Hely Margaretha

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. 2nd 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 and plant hormones are discussed.

Mode of delivery:

Face-to-face teaching, book exam.

Learning activities and teaching methods:

Lectures (20 h), Moodle pages and exams.

Target group:

Compulsory to the biology students.

Prerequisites and co-requisites:

Introduction to cell biology and physiology (750122P) or equivalent knowledge helps in following this course.

Recommended optional programme components:

-

Recommended or required reading:

Taiz, L. et al. 2015. Plant Physiology and Development. Sixth Edition. 761 p. Sinauer Associates, Inc. ISBN-9781605352558.

Terävä, E. & Kanervo, E. 2008: Kasvianatomia or equivalent.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Lectures, book, exams. Moodle: <https://moodle oulu.fi/course/view.php?id=991>

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Prof. Hely Häggman and Doc. Anna Maria Pirttilä.

Working life cooperation:

No.

Other information:

-

755321A: Aquatic ecology field course, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

751307A Field course in aquatic animals 4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 1st summer. ECOGEN 1st summer.

Learning outcomes:

To learn basic methods in biological freshwater sampling and to identify the most common freshwater taxa.

Contents:

Basics of freshwater ecology. Demonstrations of the most frequently-used biological sampling methods. Identification of the most common freshwater fishes, invertebrates and zooplankton.

Mode of delivery:

Face-to-face teaching and independent studying.

Learning activities and teaching methods:

Summer: 50 h of field work and demonstrations at the Oulanka research station, 83 h of independent studying including a reading package.

Target group:

Compulsory (5 cr) to ECO. TEAeco: either Aquatic ecology field course 5 cr (755321A) or Terrestrial animals field course 5 cr (755322A) is compulsory for biology major, the other field course can be included to the ecology minor. TEABs, alternatively compulsory to TEABs either Aquatic ecology field course 5 cr or Terrestrial animals field course 5 cr. TEA: at least 10 cr compulsory, two field courses, one animal and other Plant ecology field course (756343A).

Prerequisites and co-requisites:

Identification of animals, vertebrates 4 cr (755334A) and Identification of animals, invertebrates 4 cr (755335A) or equivalent knowledge. (if necessary, selection to the course 755321A can be based on success in courses 755334A and 755335A).

Recommended optional programme components:

This course is a prerequisite for the following: Winter ecology (750377A), Special course in aquatic invertebrates (754627S), Assessment and monitoring of the ecological status of water bodies (754625S), Field methods in freshwater biomonitoring (754626S).

Recommended or required reading:

Reading package, handouts and lectures given before / during the course.

Assessment methods and criteria:

On the final course day species identification exam on the species met during the course, practical exam on the sampling methods and

theoretical exam based on the literature and demonstration material.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Prof. Timo Muotka.

Working life cooperation:

No.

Other information:

-

756351A: Introduction to 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

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 / English.

Timing:

B.Sc. 3rd autumn.

Learning outcomes:

Basic skills in methods of population biology.

Contents:

Demography and life history strategies with emphasis on dynamics of structured populations in space and time, with an emphasis on conservation biology. Usage of matrix models to calculate basic population parameters and analyze population viability. Metapopulation dynamics and ecological and evolutionary genetics and interactions between populations and their environment are addressed. In exercises, dynamics of populations are analysed with matrix models 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

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Laura Kvist

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, Seppo Rytönen

Opintokohteen kielet: Finnish

Leikkaavuudet:

750347A Ecological methods I 6.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 3rd autumn, ECOGEN 1st autumn.

Learning outcomes:

Students are familiar to scientific method and can recognize scientific information from pseudo-scientific and other descriptions and explanations of surrounding world. Students have learned to assess the uncertainty of information and can also evaluate the quality of information with respect to its theoretical and applied value. Students also learn the build a valid theoretical or empirical strategy to solve scientific problems.

Contents:

The aim of the course is to introduce the students in scientific modes of argumentation and research methods in modern ecology. Both the empirical and theoretical methods and their relationship in theory formation are discussed. Hypothesis testing; observational method, experimental method and comparative method are the empirical methods introduced. Autumn period ends in a seminar where scientific publications are analysed.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures, seminar, exercises and exam.

Target group:

Compulsory to ECO.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:
See course wiki pages.

Assessment methods and criteria:
Exam.
Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:
Numeerinen arviointiasteikko 0 – 5, missä 0 = hylätty.

Person responsible:
Doc. Kari Koivula and Doc. Seppo Rytönen.

Working life cooperation:
No.

Other information:
-

755329A: Methods in ecology II, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Seppo Rytönen

Opintokohteen kielet: Finnish

Leikkaavuudet:

750647S Methods in ecology II 7.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Lectures Finnish / English, exercises also in English.

Timing:

Finnish B.Sc. 3rd spring, ECOGEN ECO 1st spring.

Learning outcomes:

The aim of the course is to learn in practice how to apply scientific method in ecological research. The student learns how to select appropriate methods for different ecological problems, and a toolkit for study design and data analysis.

Contents:

Continuation to course Ecological methods I 5cr (755325A, 755625S). This course focuses on applying the scientific method in ecological research. The course consists mainly of computer exercises in the following subjects: sampling, sample size determination, experimental design and statistical analysis esp. analysis of variance, comparative methods (independent contrasts - analysis), multivariate methods (cluster analysis, ordination) and meta-analysis. Also other current issues can be included.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures 8 h, 40 h exercises, independent work and exam.

Target group:

ECO: compulsory and ECOGEN ECO compulsory.

Prerequisites and co-requisites:

Course Ecological methods I 5 cr (755325A). Recommended: Introduction to Statistics 5 cr (806118P) and A second course in statistics 5 cr (806119P).

Recommended optional programme components:

-

Recommended or required reading:
Reading package at course Moodle pages.

Assessment methods and criteria:
Exam.
Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:
Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Seppo Rytönen and Doc. Kari Koivula.

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

Opintokohteen kielet: Finnish

Leikkaavuudet:

752300A Plant ecology 7.0 op

ECTS Credits:

5 cr / 133 hours of work.

Language of instruction:

Lectures Finnish, Exercises Finnish / English.

Timing:

B.Sc. 2nd autumn. ECOGEN 1st autumn.

Learning outcomes:

Student will get basic knowledge how plants adapt to different environmental factors.

Contents:

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

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

(1) Book exam. (2) 22 h demonstrations and exercises in field and laboratory (basic methods in plant ecology and laboratory work) and 4 h final seminars. International students will compensate lectures by reading book Ridge, I. 2002: Plants, Oxford Univ. Press.

Target group:

Compulsory to ECO.

Prerequisites and co-requisites:

Basics of ecology (750124P) and Plant ecology field course (756343A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

Ridge, I. 2002: Plants, Oxford Univ. Press..

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Lecture Book exam (final grade), laboratory diary and seminar presentation (both accepted/rejected).

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Annamari Markkola.

Working life cooperation:

No.

Other information:

-

756343A: Plant ecology field course, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Virtanen, Risto Juhani

Opintokohteen kielet: Finnish

Leikkaavuudet:

752304A Field course in ecological botany 5.0 op

ECTS Credits:

5 cr / 133 h of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 1st summer. ECOGEN 1st summer.

Learning outcomes:

Student is able to identify most common boreal plant species in the field, to plan and conduct ecological field experiments and use basic methods in vegetation analyses.

Contents:

Vegetation in the coast of Bothnian Bay in Hailuoto and/or Oulu (3 days). Basics of boreal forest and mire vegetation classification and types at Oulanka Research Station (7 days). Vegetation research and basic methods of stock estimation. Mire vegetation development and ecological biodiversity.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures 10 h, field demonstrations and laboratory exercises, excursions 84 hours in Oulu and/or Hailuoto and Oulanka Research Station. Field exams for plant identification and mire ecology, report.

Target group:

B.Sc. Compulsory to ECO 5 cr and TEA 5 cp, TEA: at least 10 cr compulsory, two field courses, one ecological botany field course (756343A) and other animal field course (either 755321 or 755322A).

Prerequisites and co-requisites:

Identification of plant species (756354A) 5 cr or equivalent knowledge.

Recommended optional programme components:

Course has capacity for 32 or 40 students. Possible elimination of the candidates is done by study success and Plant identification (756354A) grade. This course is a prerequisite for courses Plant ecology (752600S), Mire ecology (752692S) and Field course in Arctic-Alpine ecology and vegetation (752642S).

Recommended or required reading:

Laitinen et al. 2012: Field course in ecological botany; Hanhela, P. & Halonen, P. 1995: Plant identification; Huttunen, A: 1995: Introduction to forest types; Euroola, S., Hicks, S. and Kaakinen, H. 1994: Key to Finnish mire types, pp. 12-117 in: Moore, P. D. (ed.), 1994 European mires, London Academic Press, London, 367 p.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Field exams, report.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Risto Virtanen.

Working life cooperation:

Essential working life skills are learned during the field course.

Other information:

-

755322A: Terrestrial animals field course, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Seppo Rytönen

Opintokohteen kielet: Finnish

Leikkaavuudet:

751306A Field course in terrestrial animals 4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. - 1st summer. ECOGEN 1st summer.

Learning outcomes:

The aim of the course is to learn the basics of field identification and ecology of terrestrial animals in northern Finland. The student will understand that proper skills in species identification and knowledge of species' ecology are the basis of ecological research.

Contents:

The fauna in different kinds of terrestrial habitats is studied using several ecological sampling and research methods. The course is held at the Oulanka Research Station, Kuusamo, and deals with identification and ecology of invertebrates, mammals (especially small mammals), gallinaceous birds and birds of prey. The exercises take place partly in the field and partly in the laboratory. Data gained during the course is analyzed. The results are reported (in PowerPoint) and presented in the final seminar in Kuusamo.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Part 1. (Oulu): 2 h demonstration, independent studying. Part 2. (Oulanka): 49 h demonstrations and practicals, one species and theory exam, seminar.

Target group:

Compulsory (5 cr) to ECO. TEAeco: either Aquatic ecology field course 5 cr (755321A) or Terrestrial animals field course 5 cr (755322A) is compulsory for biology major, the other field course can be included to the ecology minor. TEAbs, alternatively compulsory to TEAbs either Aquatic ecology field course 5 cr or Terrestrial animals field course 5 cr. TEA: at least 10 cr compulsory, two field courses, one animal and other Plant ecology field course (756343A).

Prerequisites and co-requisites:

Identification of animals, vertebrates 4 cr (755334A) and Identification of animals, invertebrates 4 cr (755335A) or equivalent knowledge.

Recommended optional programme components:

This course is a prerequisite to course Winter ecology (750377A).

Recommended or required reading:

Compulsory at Oulanka: 1) Rytönen, S. ym. 2003: 751306 Maaeläimistön tuntemus ja ekologia. - Biologian laitoksen monisteita 3/2003. Oulun yliopisto, Oulu. 2) Pentinsaari, M. ym. 2015: Eläinten lajintuntemus, selkärangattomat. Oulun yliopisto, Oulu. Insect book recommended: Chinery, M. 1988 Pohjois-Euroopan hyönteisheimojen määritysopas, Tammi, Helsinki, 2. painos.

The availability of the literature can be checked from [this link](#).

Assessment methods and criteria:

Theory exam, species identification exam, seminar presentation.

Read more about [assessment criteria](#) at the University of Oulu webpage.

Grading:

Numerical grading scale 0 – 5, where 0 = fail.

Person responsible:

Doc. Seppo Rytönen.

Working life cooperation:

No.

Other information:

Binoculars, bird identification book, suitable outfit. Preparation knife, preparation scissors and sharp cusp tweezers.

806119P: A Second Course in Statistics, 5 op

Voimassaolo: 01.06.2015 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Mathematics

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari Pääkkilä

Opintokohteen kielet: Finnish

Leikkaavuudet:

806113P	Introduction to Statistics A	5.0 op
806109P	Basic Methods in Statistics I	9.0 op

ECTS Credits:

5 ECTS credits

Language of instruction:

Finnish

Timing:

4th period

Learning outcomes:

Upon completion of the course, student will be able to:

- analyze continuous and categorical response in the most common experimental and observational studies
- critically evaluate scientific articles
- implement and interpret analyses of a statistical software concerning issues of the course.

Contents:

- Skills for performing statistical analyses and inferences on the basis of data obtained in common experimental and observational studies are expanded and deepened
- statistical literacy of scientific articles with quantitative methods

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Total 50 h face-to-face teaching including lectures and exercise (partly computer exercises). Independent work 83 h.

Target group:

Minor students

Prerequisites and co-requisites:

The recommended prerequisite prior to enrolling for the course is the completion of the course: 806118P Introduction to Statistics or 806116P Statistics for Economic Sciences.

Recommended optional programme components:

After the course, student is able to continue other statistics courses.

Recommended or required reading:

Lecture notes

Assessment methods and criteria:

Mid-term exams and/or final exam and possible homework.

Grading:

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

Person responsible:

Jari Pääkkilä

Working life cooperation:

No

780120P: Basic Principles in Chemistry, 5 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Chemistry

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

780117P General and Inorganic Chemistry A 5.0 op

780109P Basic Principles in Chemistry 4.0 op

ECTS Credits:

5 ECTS credits / 134 hours of work

Language of instruction:

Finnish

Timing:

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

Learning outcomes:

Upon completion of the course, the student will be able to display an understanding of basic chemistry phenomenon; equilibrium of acids and bases, chemical equilibrium, redox reactions and stoichiometry.

Contents:

Introduction to chemistry, stoichiometry, redox reactions, chemical equilibrium, the equilibrium of acid and bases, buffer solutions, titration, thermodynamics.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

40 hours of lectures and 94 hours of self-study

Target group:

Biology, Geology, Process Engineering, Environmental Engineering compulsory.

Geography, optional.

Prerequisites and co-requisites:

The compulsory course in upper secondary school chemistry (1st course)

Recommended optional programme components:

The course is not included in the 25 ECTS credits entity of chemistry!

Recommended or required reading:

Tro, N.J., Principles of Chemistry. A Molecular Approach, Pearson, 3. edition, 2016

Assessment methods and criteria:

Final examination.

Grading:

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

Person responsible:

Minna Tiainen

Working life cooperation:

No

030005P: Information Skills, 1 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Technology

Arvostelu: 1 - 5, pass, fail

Opettajat: Ursula Heinikoski

Opintokohteen kielet: Finnish

Leikkaavuudet:

030004P Introduction to Information Retrieval 0.0 op

ECTS Credits:

1 ECTS credit / 27 hours of work

Language of instruction:

Finnish

Timing:

Architecture 3. spring semester, period III;

biochemistry 3. autumn semester;

biology 3. autumn semester, period I;

chemistry 3. autumn semester, period I;

civil engineering 2. spring semester, period IV;

computer science and engineering 2. spring semester, period IV;
 electronics and communications engineering 3. spring semester;
 geosciences 2. spring semester, period IV;
 geography 3. semester, periods I and III;
 industrial engineering and management 3. year;
 information processing sciences 1. or 3. year;
 mathematics and physics 1. spring semester, period III;
 mechanical engineering 3. year;
 mining engineering and mineral processing 3. year;
 process and environmental engineering 2. year, period II;
 Master's degree students in industrial engineering and management 1st year.

Learning outcomes:

Upon completion of the course, the students:

- can search scientific information,
- can use the most important databases of their discipline,
- know how to evaluate search results and information sources,
- can use the reference management tool.

Contents:

Scientific information retrieval process, the most important databases and publication channels of the discipline, evaluation of the reliability of information sources and reference management tool.

Mode of delivery:

Blended teaching: classroom training, web-based learning material and exercises, a group assignment.

Learning activities and teaching methods:

Training sessions 8 h, group working 7 h, self-study 12 h

Target group:

Compulsory for all bachelor degree students of Faculty of information technology and electrical engineering, Faculty of Technology and Faculty of science. Compulsory also for those Master's degree students in Industrial Engineering and Management who have no earlier studies in the information skills. Optional for the students of biochemistry.

Recommended optional programme components:

In biochemistry the course is completed as a part of 740376A Bachelor's Thesis.

Recommended or required reading:

Web learning material [Tieteellisen tiedonhankinnan opas](#)

Assessment methods and criteria:

Passing the course requires participation in the training sessions and successful completion of the course assignments.

Grading:

pass/fail

Person responsible:

Ursula Heinikoski

806118P: Introduction to Statistics, 5 op

Voimassaolo: 01.06.2015 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Mathematics

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari Pääkkilä

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay806118P Introduction to Statistics (OPEN UNI) 5.0 op

806113P Introduction to Statistics A 5.0 op

ECTS Credits:

5 ECTS credits

Language of instruction:

Finnish

Timing:

3rd period

Learning outcomes:

After completing the course, student will be able to:

- consider issues influencing to data collection
- describe data by appropriate methods (tables, statistics and graphical presentations)
- evaluate the effect size of the sample to the margin of error for instance in Gallup polls and in different market researches
- interpret output of a statistical software.

Contents:

- collecting data, e.g. sampling
- variables and measuring
- descriptive statistical methods and their selection
- margin of error of estimator for population mean and proportion
- statistical literacy
- basic analysis of data using statistical software

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

Total 50 h face-to-face teaching including lectures and exercise (partly computer exercises). Independent work 83 h.

Target group:

Minor students

Recommended optional programme components:

After the course, student is able to continue to A Second Course in Statistics.

Recommended or required reading:

Lecture notes

Assessment methods and criteria:

Mid-term exams and/or final exam and possible homework.

Grading:

Fail, 1-5

Person responsible:

Hanna Heikkinen and Jari Pääkkilä

Working life cooperation:

No

750032Y: Orientation course for new students, 2 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Lumi Viljakainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

750031Y Orientation course for new students 1.0 op

ECTS Credits:

2 ECTS credits / 53 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 (PSP) for the first study year.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Tutorials, presentations, seminar of major subjects, computer exercises, independent studying, total 53 h.

Target group:

BIOL: compulsory.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Study syllabus.

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:

N.N. and Ph. Lic. Minna Vanhatalo.

Working life cooperation:

No.

Other information:

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