Opasraportti

FSci - Degree programme in Biology (2018 - 2019)

Tutkintorakenteet

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

Tutkintorakenteen tila: published

Lukuvuosi: 2018-19

Lukuvuoden alkamispäivämäärä: 01.08.2018

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
Choose from
750615S: Practical training, 10 - 15 op
755626S: Advanced population ecology, 6 op
755630S: Community ecology, 5 op
751642S: Identification of vertebrates in the field, 2 op
751666S: Animal behaviour, 5 op
750653S: Special seminar in biology, 2 - 5 op
750654S: Special lecture in biology, 2 - 5 op
757619S: Advanced course in bioinformatics, 5 op
756648S: Ecological responses to global change and air pollution in the subarctic, 5 - 8 op
754626S: Field methods in freshwater biomonitoring, 5 op
751651S: Advanced identification in animals, 4 - 8 op
751660S: Preparation of an insect collection, 2 - 6 op
756650S: Introduction to molecular ecology, 5 op
752642S: Field course in arctic-alpine ecology and vegetation, 5 op
752692S: Mire ecology, 5 op
752616S: Macro fungi, 3 op
752656S: Taxonomy and ecology of plants, 2 - 4 op
752608S: Advanced identification of plant species I, 6 op
752625S: Advanced identification of plant species II, 5 - 8 op
752672S: Distribution mapping of plants, 2 - 5 op
755624S: Functional animal ecology, 5 op
755608S: Bird ecology and conservation, 2 op

754627S: Special course in aquatic invertebrates, 5 op
754625S: Assessment and monitoring of the ecological status of water bodies, 5 op
755628S: Wildlife management and game animal ecology, 5 op
750626S: Environmental impact assessment (EIA) and ecological inventory of natural resources, 5 op
750616S: Legislation in environmental protection, 5 op
755632S: Restoration ecology, 5 op
750677S: Winter ecology and physiology, 5 op
756604S: Plant ecophysiology in changing environments, 5 op
756649S: Symbiosis, 5 op
750618S: Thursday seminar in biology, 2 op
750629S: Kaamos symposium, 2 - 4 op

Subsidiary Entity for Subject Teacher (vähintään 35 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 30 op)

A251104: Pedagogical Studies in Master's Degree, 25 - 30 op
Pakollinen
410087P: Sociocultural Contexts of Education, 5 op
050124A: Advanced Practice, 5 op
410088P: Philosophical and Ethical Foundations and Objectives of Education, 5 op
050126A: Subject Didactics/Music, 5 op
050125A: Teacher as a Researcher in Teaching Practice, 5 op

Other studies

300003Y: Activities in university and student organizations, 1 - 4 op
300002M: Advanced Information Skills, 1 op
750033Y: Tutorial for new students, 1 op

Bridge studies (enintään 60 op)

Bridge studies concern students who have already done applicable lower or higher university degree. Faculty of Science may require the student to do bridge studies maximum 60 ECTS credits in consequence of the differences in the curriculum and to provide the student ability to do the new degree. Bridge studies are case-specific.

Bridge studies are not included to the mimimum extent of the M.Sc. degree.

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

Tutkintorakenteen tila: published

Lukuvuosi: 2018-19

Lukuvuoden alkamispäivämäärä: 01.08.2018

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)

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

Chose from

757617S: Molecular methods II, 5 op
757613S: Basics in population genetics, 5 op
757618S: DNA analysis in population genetics, 10 op
752688S: Basics of tissue culture, 5 op
750653S: Special seminar in biology, 2 - 5 op
750654S: Special lecture in biology, 2 - 5 op
757615S: Human genetics, 5 op
757619S: Advanced course in bioinformatics, 5 op
757620S: Methods in genomics and genomics evolution, 5 op
757616S: Quantitative genetics and plant and animal breeding, 5 op
756627S: Plant hormones, 5 op
756615S: Physiology of forest trees, 5 op
756604S: Plant ecophysiology in changing environments, 5 op
756626S: Stress physiology of plants, 4 op
756649S: Symbiosis, 5 op
750677S: Winter ecology and physiology, 5 op
750618S: Thursday seminar in biology, 2 op
750629S: Kaamos symposium, 2 - 4 op

Subsidiary Entity for Subject Teacher (vähintään 35 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 30 op)

A251104: Pedagogical Studies in Master's Degree, 25 - 30 op

Pakollinen

410087P: Sociocultural Contexts of Education, 5 op
050124A: Advanced Practice, 5 op
410088P: Philosophical and Ethical Foundations and Objectives of Education, 5 op
050126A: Subject Didactics/Music, 5 op
050125A: Teacher as a Researcher in Teaching Practice, 5 op

Other studies

300003Y: Activities in university and student organizations, 1 - 4 op
300002M: Advanced Information Skills, 1 op
750033Y: Tutorial for new students, 1 op

Bridge studies (enintään 60 op)

Bridge studies concern students who have already done applicable lower or higher university degree. Faculty of Science may require the student to do bridge studies maximum 60 ECTS credits in consequence of the differences in the curriculum and to provide the student ability to do the new degree. Bridge studies are case-specific.

Bridge studies are not included to the mimimum extent of the M.Sc. degree.

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

Tutkintorakenteen tila: published

Lukuvuosi: 2018-19

Lukuvuoden alkamispäivämäärä: 01.08.2018

Compulsory 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 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 (vähintään 5 op)

NB. You can choose following courses only if they are not included in Bachelor´s Degree:

- 755642S Funktionaalinen eläinekologia
- 755628S Riistaeläinekologia
- 750677S Talviekologia ja -fysiologia
- 756604S Kasvien ekofysiologia
- 754322A Hydrobiologian perusteet

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

Optional Biology minor (vähintään 15 op)

Biology 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)

300002M: Advanced Information Skills, 1 op
030008P: Information Skills for foreign degree students, 1 op

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

Tutkintorakenteen tila: published

Lukuvuosi: 2018-19

Lukuvuoden alkamispäivämäärä: 01.08.2018

Compulsory 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 major studies in Ecology (vähintään 15 op)

756650S: Introduction to molecular ecology, 5 op
755625S: Methods in ecology I, 5 op
755629S: Methods in ecology II, 5 op

Optional major studies in Ecology (vähintään 10 op)

NB. You can choose following courses only if they are not included in Bachelor´s Degree:

- 755642S Funktionaalinen eläinekologia
- 755628S Riistaeläinekologia
- 750677S Talviekologia ja -fysiologia
- 756604S Kasvien ekofysiologia
- 754322A Hydrobiologian perusteet

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

Choose from

750653S: Special seminar in biology, 2 - 5 op
750654S: Special lecture in biology, 2 - 5 op
750615S: Practical training, 10 - 15 op
750613S: Research training, 2 - 15 op
750661S: Research group seminar, 2 - 4 op
750618S: Thursday seminar in biology, 2 op
750629S: Kaamos symposium, 2 - 4 op
755633S: Identification of animals, 6 op
750649S: Examinations on optional topics in biology, 2 - 10 op
750699S: Optional examinations in environmental protection, 2 - 6 op
755621S: Aquatic ecology field course, 5 op
755622S: Terrestrial animals field course, 5 op
756647S: Conservation of biodiversity, 5 op
755632S: Restoration ecology, 5 op
750677S: Winter ecology and physiology, 5 op
756648S: Ecological responses to global change and air pollution in the subarctic, 5 - 8 op
755624S: Functional animal ecology, 5 op
755628S: Wildlife management and game animal ecology, 5 op
756644S: Plant ecology, 5 - 7 op
756642S: Identification of plant species, 3 - 4 op
756643S: Plant ecology field course, 5 op
756604S: Plant ecophysiology in changing environments, 5 op
756649S: Symbiosis, 5 op

Optional Biology minor (vähintään 15 op)

Biology 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.

Other studies (vähintään 5 op)

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

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

Tutkintorakenteen tila: published

Lukuvuosi: 2018-19

Lukuvuoden alkamispäivämäärä: 01.08.2018

Compulsory major studies (vähintään 70 op)

755626S: Advanced population ecology, 6 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) (2 - 4 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 Plant Ecology

Optional major studies (vähintään 42 op)

NB. You can choose following courses only if they are not included in Bachelor´s Degree:

- 755642S Funktionaalinen eläinekologia
- 755628S Riistaeläinekologia
- 750677S Talviekologia ja -fysiologia
- 756604S Kasvien ekofysiologia
- 754322A Hydrobiologian perusteet

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

Choose from

750653S: Special seminar in biology, 2 - 5 op
750654S: Special lecture in biology, 2 - 5 op
757619S: Advanced course in bioinformatics, 5 op
756648S: Ecological responses to global change and air pollution in the subarctic, 5 - 8 op
754626S: Field methods in freshwater biomonitoring, 5 op
751651S: Advanced identification in animals, 4 - 8 op
751660S: Preparation of an insect collection, 2 - 6 op
756650S: Introduction to molecular ecology, 5 op
752642S: Field course in arctic-alpine ecology and vegetation, 5 op

752692S: Mire ecology, 5 op
752616S: Macro fungi, 3 op
752656S: Taxonomy and ecology of plants, 2 - 4 op
752608S: Advanced identification of plant species I, 6 op
752625S: Advanced identification of plant species II, 5 - 8 op
752672S: Distribution mapping of plants, 2 - 5 op
755624S: Functional animal ecology, 5 op
755608S: Bird ecology and conservation, 2 op
754628S: Stream ecology, 5 op
754627S: Special course in aquatic invertebrates, 5 op
754625S: Assessment and monitoring of the ecological status of water bodies, 5 op
755628S: Wildlife management and game animal ecology, 5 op
750626S: Environmental impact assessment (EIA) and ecological inventory of natural resources, 5 op
750616S: Legislation in environmental protection, 5 op
755632S: Restoration ecology, 5 op
750677S: Winter ecology and physiology, 5 op
756604S: Plant ecophysiology in changing environments, 5 op
756649S: Symbiosis, 5 op

Optional biology minor (vähintään 15 op)

Biology 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.

Optional minor (vähintään 15 op)

Minimum 15 ECTS credits are required for minor at the Faculty of Science degree programme subjects (term: STUDIES) or minimum 25 ECTS credits (term: MINOR).

Other studies

300003Y: Activities in university and student organizations, 1 - 4 op
300002M: Advanced Information Skills, 1 op
790101P: GIS-basics and Cartography, 5 op
750033Y: Tutorial for new students, 1 op

Bridge studies (enintään 60 op)

Bridge studies concern students who have already done applicable lower or higher university degree. Faculty of Science may require the student to do bridge studies maximum 60 ECTS credits in consequence of the differences in the curriculum and to provide the student ability to do the new degree. Bridge studies are case-specific.

Bridge studies are not included to the mimimum extent of the M.Sc. degree.

B.Sc. Degree in Biology (Bioscience).

Tutkintorakenteen tila: published

Lukuvuosi: 2018-19

Lukuvuoden alkamispäivämäärä: 01.08.2018

General studies, Language and Communication Studies (vähintään 7 op)

Compulsory

902002Y: English 1 (Reading for Academic Purposes), 2 op
902004Y: English 2 (Scientific Communication), 2 op
750031Y: Orientation course for new students, 1 op
901035Y: Second Official Language (Swedish), Oral Skills, 1 op
901034Y: Second Official Language (Swedish), Written Skills, 1 op

Optional

300003Y: Activities in university and student organizations, 1 - 4 op
750033Y: Tutorial for new students, 1 op

Biology, major subject (vähintään 66 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
750121P: Cell biology, 5 op
757109P: Concepts of genetics, 5 op
757110P: Experimental course in general genetics, 5 op

Intermedate 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
750373A: Biogeography, 5 op
750372A: Evolution and systematics of organisms, 5 op
755333A: Identification of animals, 6 op
756354A: Identification of plant species, extensive, 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

756343A: Plant ecology field course, 5 op

Optional

757313A: Basics in population genetics, 5 op
757314A: Basics of bioinformatics, 5 op
752388A: Basics of tissue culture, 5 op
755320A: Developmental biology-histology, 5 op
750374A: Evolution, systematics and morphology of organisms exercises, 3 op
750349A: Examinations on optional topics in biology, 2 - 10 op
757312A: Molecular evolution, 5 op
757311A: Molecular methods I, 5 op
756341A: Plant biology practicals, 5 op
756353A: Plant developmental biology, 5 op
756304A: Plant ecophysiology in changing environments, 5 op

750313A: Research training, 2 - 15 op
750318A: Thursday seminar in biology, 2 op
750377A: Winter ecology and physiology, 5 op
750380A: Working knowledge, 1 - 5 op

Other studies (vähintään 16 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

Optional

Pedagogical Studies (30 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
050120A: Subject Didactics, 5 op
410086P: Teaching and Educational Interaction, 5 op

Subsidiary Entity for Subject Teacher (vähintään 30 op)

More information found here: http://www.oulu.fi/maantiede/node/12859

790101P: GIS-basics and Cartography, 5 op
790141P: Introduction to Regional Development and Regional Policy, 5 op
790160P: Introduction to Tourism Geography, 5 op
790104P: Introduction to systematic Human Geography, 5 op
790152P: Introduction to the discipline of Geography, 5 op
790102P: Introduction to the systematic Physical Geography, 5 op

B.Sc. Degree in Biology (ecology).

Tutkintorakenteen tila: published

Lukuvuosi: 2018-19

Lukuvuoden alkamispäivämäärä: 01.08.2018

General studies, Language and Communication Studies (vähintään 7 op)

Compulsory

902002Y: English 1 (Reading for Academic Purposes), 2 op
902004Y: English 2 (Scientific Communication), 2 op
750031Y: Orientation course for new students, 1 op
901035Y: Second Official Language (Swedish), Oral Skills, 1 op
901034Y: Second Official Language (Swedish), Written Skills, 1 op

Optional

300003Y: Activities in university and student organizations, 1 - 4 op
750033Y: Tutorial for new students, 1 op

Major Studies in Biology (vähintään 71 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
750121P: Cell biology, 5 op
757109P: Concepts of genetics, 5 op
757110P: Experimental course in general genetics, 5 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
750373A: Biogeography, 5 op
750372A: Evolution and systematics of organisms, 5 op
750336A: Evolutionary ecology, 5 op
755333A: Identification of animals, 6 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: Basics in population ecology, 5 op
750374A: Evolution, systematics and morphology of organisms exercises, 3 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

751366A: Animal behaviour, 5 op
756348A: Ecological responses to global change and air pollution in the subarctic, 5 - 8 op
750349A: Examinations on optional topics in biology, 2 - 10 op
755313A: Field identification of birds, 1 - 5 op
755324A: Functional animal ecology, 5 op
754322A: Introduction to hydrobiology, 5 op
756304A: Plant ecophysiology in changing environments, 5 op
750313A: Research training, 2 - 15 op
755328A: Wildlife management and game animal ecology, 5 op
750377A: Winter ecology and physiology, 5 op
750380A: Working knowledge, 1 - 5 op

Other compulsory minor subject (vähintään 25 op)

Choose 25 ECTS minor subject studies.

Other studies (vähintään 16 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

Optional

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

Tutkintorakenteen tila: published

Lukuvuosi: 2018-19

Lukuvuoden alkamispäivämäärä: 01.08.2018

General studies, Language and Communication Studies (vähintään 8 op)

Compulsory

902002Y: English 1 (Reading for Academic Purposes), 2 op
902004Y: English 2 (Scientific Communication), 2 op
750031Y: Orientation course for new students, 1 op
901035Y: Second Official Language (Swedish), Oral Skills, 1 op
901034Y: Second Official Language (Swedish), Written Skills, 1 op

optional

300003Y: Activities in university and student organizations, 1 - 4 op
750033Y: Tutorial for new students, 1 op

Biology, major studies (vähintään 71 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
750121P: Cell biology, 5 op
757109P: Concepts of genetics, 5 op
757110P: Experimental course in general genetics, 5 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
750373A: Biogeography, 5 op
750372A: Evolution and systematics of organisms, 5 op

755333A: Identification of animals, 6 op
756354A: Identification of plant species, extensive, 5 op
756346A: Plant biology lectures, 5 op
756343A: Plant ecology field course, 5 op

Optional Studies in Biology

755321A: Aquatic ecology field course, 5 op
755322A: Terrestrial animals field course, 5 op

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

756351A: Basics in population ecology, 5 op
750374A: Evolution, systematics and morphology of organisms exercises, 3 op
750336A: Evolutionary ecology, 5 op
755313A: Field identification of birds, 1 - 5 op
752316A: Macro fungi, 3 op
755325A: Methods in ecology I, 5 op
756344A: Plant ecology, 5 op
750313A: Research training, 2 - 15 op
755328A: Wildlife management and game animal ecology, 5 op
750377A: Winter ecology and physiology, 5 op
750380A: Working knowledge, 1 - 5 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 (30 op)

For more information, see: Subject Teacher Education at the Faculty of Education.
Search courses from the course list and add courses needed to your PSP.

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
050120A: Subject Didactics, 5 op
410086P: Teaching and Educational Interaction, 5 op

Other studies (vähintään 16 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

Optional

B.Sc. Degree in Biology (Bioscience).

Tutkintorakenteen tila: published

Lukuvuosi: 2018-19

Lukuvuoden alkamispäivämäärä: 01.08.2018

General studies, Language and Communication Studies (vähintään 7 op)

Compulsory

902002Y: English 1 (Reading for Academic Purposes), 2 op
902004Y: English 2 (Scientific Communication), 2 op
750031Y: Orientation course for new students, 1 op
901035Y: Second Official Language (Swedish), Oral Skills, 1 op
901034Y: Second Official Language (Swedish), Written Skills, 1 op

Optional

Biology, major subject (vähintään 84 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
750121P: Cell biology, 5 op
757109P: Concepts of genetics, 5 op
757110P: Experimental course in general genetics, 5 op

Intermedate 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
750373A: Biogeography, 5 op
755320A: Developmental biology-histology, 5 op
750372A: Evolution and systematics of organisms, 5 op
750336A: Evolutionary ecology, 5 op
755333A: Identification of animals, 6 op
756355A: Identification of plant species, brief, 3 op
Compulsory
756355A-01: Identification of plant species, monocotyledons, brief, 0 op
756355A-02: Identification of plant species, dicotyledons, brief, 0 op
757312A: Molecular evolution, 5 op
756346A: Plant biology lectures, 5 op

756353A: Plant developmental biology, 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

Optional

Other compulsory minor subject (vähintään 25 op)

Biochemistry

740144P: Biochemical Methodologies I, 8 op
740147P: Biomolecules for Bioscientists, 8 op
740149P: Metabolism I, 4 op
740374A: Microbiology, 3 op
740373A: Molecular Biology I, 4 op

Other minor subject

Other studies (vähintään 21 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

Optional

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

Tutkintorakenteen tila: published

Lukuvuosi: 2018-19

Lukuvuoden alkamispäivämäärä: 01.08.2018

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
751688S: Biotechnology and Molecular Biology of Plants, 10 op

Optional Studies in Plant Physiology

756615S: Physiology of forest trees, 5 op
756627S: Plant hormones, 5 op

Optional major studies (vähintään 42 op)

NB. You can choose following courses only if they are not included in Bachelor´s Degree:

- 755642S Funktionaalinen eläinekologia
- 755628S Riistaeläinekologia
- 750677S Talviekologia ja -fysiologia
- 756604S Kasvien ekofysiologia
- 754322A Hydrobiologian perusteet

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

Choose from

750653S: Special seminar in biology, 2 - 5 op
750654S: Special lecture in biology, 2 - 5 op
757615S: Human genetics, 5 op
757619S: Advanced course in bioinformatics, 5 op
757621S: Experimental course in evolutionary genomics, 5 op
757620S: Methods in genomics and genomics evolution, 5 op
757616S: Quantitative genetics and plant and animal breeding, 5 op
756627S: Plant hormones, 5 op
756615S: Physiology of forest trees, 5 op
756604S: Plant ecophysiology in changing environments, 5 op
756626S: Stress physiology of plants, 4 op
756649S: Symbiosis, 5 op
750677S: Winter ecology and physiology, 5 op
756648S: Ecological responses to global change and air pollution in the subarctic, 5 - 8 op
750629S: Kaamos symposium, 2 - 4 op
750618S: Thursday seminar in biology, 2 op

Optional advanced level studies (min. 10 cr) (vähintään 10 op)

Optional biology minor (vähintään 15 op)

Biology 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.

Optional minor (vähintään 15 op)

Minimum 15 ECTS credits are required for minor at the Faculty of Science degree programme subjects (term: STUDIES) or minimum 25 ECTS credits (term: MINOR).

Other studies (vähintään 1 op)

300002M: Advanced Information Skills, 1 op

Bridge studies (enintään 60 op)

Bridge studies concern students who have already done applicable lower or higher university degree. Faculty of Science may require the student to do bridge studies maximum 60 ECTS credits in consequence of the differences in the curriculum and to provide the student ability to do the new degree. Bridge studies are case-specific.

Bridge studies are not included to the mimimum extent of the M.Sc. degree.

Tutkintorakenteisiin kuulumattomat opintokokonaisuudet ja -jaksot

752662S: Botanical collection and digital herbarium, 2 - 6 op
756612S: Soil ecology, 3 - 5 op

Opintojaksojen kuvaukset

Tutkintorakenteisiin kuuluvien opintokohteiden kuvaukset

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 professor in beforehand.
Mode of delivery:
Itsenäinen opiskelu: kirjatentti.
Learning activities and teaching methods:
Book exam (3 h). Exam is held in Examinarium, instructions: http://www.oulu.fi/english/studying/examinarium
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, doc. Kari Koivula February-April 2019):

- 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. Annamari Markkola):

- 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 (doc. Heikki Helanterä):

- Lewin Genes (XI) (or equal)

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

- Nielsen, R. ja Slatkin, M. 2013 An introduction to population genetics. Sinauer, 287 p.

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

Animal physiology orientation (Henrika Honkanen):

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

Plant physiologi orientation (prof. Hely Häggman)

- Beeckman 2009. Root Development. Annual Plant Reviews 37. - Wiley-Blackwell. ISBN 978-1-4051-6150-3
- Coruzzi Gutierrez 2009. Plant Systems Biology. Annual Plant Reviews 35. - Wiley-Blackwell. ISBN 978-1-4051-6283-8.
- Dickison, W.C. 2000. Integrative plant anatomy. 533 s. ISBN 0-12-215170-4
- Fahn, A. 1990. Plant anatomy. 4. rev. ed. 588 s. ISBN 0-08-037490
- Gan 2007. Senescence processes in plants. - Wiley-Blackwell. ISBN 978-0-8138-1963-1
- Hayat, Mori, Pichtel & Ahmad 2010. Nitric oxide in plant physiology. - Wiley-Blackwell. ISBN 978-3-527-32519-1
- Hvoslef-Eide, A.K. & Preil, W. 2005. Liquid culture systems for in vitro plant propagation. Springer ISBN 1-4020-3199-8
- Jenks & Wood 2009. Genes for Plant Abiotic Stress. - Wiley-Blackwell. ISBN 978-1-4051-3984-7
- Kinight, Perroud, Cove 2009. The Moss Physcomitrella- Annual Plant Reviews, volume 36 - Wiley-Blackwell. ISBN 978-1-4051-8189-1.
- Lambers, H., Chapin III, F.S., Pons, T.L. 2008. Plant physiological ecology. Springer. 610 p. ISBN 978-0-387-78340-6

- Osbourn, A.E. & Lanzotti, V. 2009. Plant-derived natural products: synthesis, function, and application. 587 s. Springer. (Printed or electronical book version in the library)
- Parker 2008. Molecular aspects of plant disease resistance. Annual Plant Reviews , volume 34. - Wiley-Blackwell. ISBN 978-1-4051-7532-6
- Reed, B.M. 2008. Plant Cryopreservation: A Practical Guide. Springer ISBN 978-0-387-72275-7
- Smith & Read 2008. Mycorrhizal symbiosis. 3. painos. Academic Press. 800 p.
- Taiz, L. et al. 2015. Plant Physiology and Development. Sixth Edition.761 p. Sinauer Associates, Inc. ISBN-9781605352558
- Wink 2010. Biochemistry of plant secondary metabolism. Annual Plant Reviews, volume 40. - Wiley-Blackwell. ISBN 978-1-4051-83970. Electronical book. Link can be found for example from OULA library cataloque. Dawsonera can be accessed with koivu/paju password. http://www.dawsonera.com/depp/reader/protected/external/AbstractView/S9781444320510
- Yeo & Flowers 2007. Plant Solute Transport. - Wiley-Blackwell. ISBN 978-1-4051-3995-3
- Yoshioka & Shinozaki 2009. Signal Crosstalk in Plant Stress Responses - Wiley-Blackwell. ISBN 978-0-8138-1963-1

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

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:
1-5 / Fail.

Person responsible:
M.Sc. Henrika Honkanen, Prof. Hely Häggman, Doc. Annamari Markkola, Prof. Timo Muotka or Doc. Heikki Helanterä.

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: 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 opponenting, eight research seminar and eight result seminar attendances. Research plan seminar and results seminar presentations cannot be given at same day. Topics and dates have to be agreed with the professor in beforehand. See degree programme notice board for the schedule and instructions.

Target group:

Compulsory to the biology students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Seminar presentations, attendance and opponenting. Detailed instructions on the 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 Master of Science Thesis, the student will give summary in Finnish, Swedish or English to show his/her familiarity with the topic of the thesis. If the international degree student has not done a maturity exam in her /his B.Sc. degree the student has to make a 4 pages long essay about the thesis subject in Examinarium.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Instructions at the Faculty of Science internet homepage. One teacher examine the maturity exam and Pro gradu working group accepts it.
Target group:
Compulsory to the biology students. After completing the thesis.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Summary form at the Faculty of Science internet homepage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Hely Häggman, Prof. Jari Oksanen, Prof. Markku Orell or Prof. Outi Savolainen.
Working life cooperation:
No.

Other information:
-

750658S: Pro gradu thesis in biology, 40 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Diploma thesis

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

ECTS Credits:
40 ECTS credits / 1067 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st or 2 nd year.
Learning outcomes:
Student knows the research methods in specific field of biology. She is conversant with her field of thesis and is able to scientific thinking, estimating the results, analysing, drawing conclusions and scientific communicating.
Contents:
Literary work which in general includes experimental research work. Student gets profoundly acquainted on certain special field in biology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Independent research work on a scientific subject in agreement with the responsible professor and under the supervision of the Department. The supervisors may be professors of the department, docents and other teachers and researchers who have the docent's status. The student may
have several supervisors, the other supervisor may be from other department, university (also abroad) or from research institute. The subject must be agreed on with the professor in advance. The research work can contain fieldwork, laboratory work, theoretical work or work on collections in museum. The work always includes a literature survey. After having completed the thesis, the student writes the Maturity Exam. The programme director will order the final examiners by the proposal of the professor. Pro gradu working group accepts and grades the thesis on the basis of the final examiners' opinions.
Target group:
ECO and BS: compulsory 40 cr. TEA: 40 cr. optional. So called didactic pro gradu thesis cannot be 40 cr.
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:
1-5 / Fail.
Person responsible:
M.Sc. Henrika Honkanen, Prof. Hely Häggman, prof. Jari Oksanen, Prof. Timo Muotka or Prof. Outi Savolainen.
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.

Choose from

750615S: Practical training, 10 - 15 op

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

ECTS Credits:

10-15 ECTS credits / 380-570 hours of traineeship work.

Language of instruction:

Finnish / English.

Timing:

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

Learning outcomes:

The aim of the course is for students to gain work experience in their own field of biology. Student applies the theoretical knowledge gained during the studies in practice.

Contents:

Minimum training period is two months full day work 10 cr. Students can obtain 15 credits for three months versatile training depending on the length and intensity of it. Student can do the training period in Finland or during her/his exchange period or train otherwise abroad.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

The trainee has to keep a journal of the work and its background factors. This journal and a summary of 6-8 pages have to be handed in to the responsible contact person after the training period. The summary should contain information on the training place, the ongoing research, the trainee’s own work and its results. The journal is returned to the student after the summary has been approved. The student has also to be given a reference of the work. Offered training placements are announced in the internet page of Extension School. Entering for the practical training is made in 3rd autumn. Normally, the student has to find him/herself a placement in public or private sectors or abroad.

Target group:

Compulsory to BS and ECO in the M.Sc. degree.

Prerequisites and co-requisites:

About 80 credit amount of biology courses.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

Journal and final report.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Pass / Fail.

Person responsible:

Contact person Minna Vanhatalo. The supervisors of the practical training are Prof. Timo Muotka (ECOz), Prof. Jari Oksanen (ECOb), Prof. Hely Häggman (BSb), M.Sc. Henrika Honkanen (BSz) and Prof. Outi Savolainen (BSg).

Working life cooperation:

Yes. Participating to biology project gives working life skills.

Other information:

The student has to contact the professor and discuss about the suitability of the internship place in beforehand.

755626S: Advanced population ecology, 6 op

Voimassaolo: 01.08.2015 - 31.07.2019

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Veli-Matti Pakanen

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

ECTS Credits:

6 ECTS credits / 160 hours of work.

Language of instruction:

Finnish.

Timing:

M.Sc. 1st autumn.

Learning outcomes:

Student learns central methodologies how to derive population vital parameters from various kind of long-term data to apply the information to population viability analysis. The focus is to link modeling methods to real data.

Contents:

Introduction to the mechanisms and factors, which affect the structure, size and dynamics of a population. Topics include e.g. intraspecific relationships of species, predator-prey and parasite-host interactions, competition and the structure of environment and changes in it. Information of the relations between age distribution, birth rate, mortality rate and migration of the population are needed in viability analyses of a population. The aim of the course is to initiate into the methods by which the data of individuals is leaden to the parameters describing the condition and dynamics of the population.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

30 h lectures, 30 h computer exercises, independent work, exam.

Target group:

ECO: compulsory.

Prerequisites and co-requisites:

Basics in population ecology (756351A).

Recommended optional programme components:

-

Recommended or required reading:

Supplementary reading Morris, W.F & Doak, D.F. Quantitative conservation biology. Theory and practice of population viability analysis. Akçakaya, H.R., Burgman, M.A. & Ginzburg, L.R. Applied population ecology. Principles and computer exercises using RAMAS ® EcoLab. Lande, R., Engen,S. & Sæther, B-E. Stochastic population dynamics in ecology and conservation.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

N.N.

Working life cooperation:

No.

Other information:

-

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:

1-5 / Fail.

Person responsible:

Prof. Timo Muotka.

Working life cooperation:

No.

Other information:

-

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

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

ECTS Credits:

2 ECTS credits / 53 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 1 st spring (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:

1-5 / Fail.

Person responsible:

Doc. Kari Koivula.

Working life cooperation:

No.

Other information:

-

751666S: Animal behaviour, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Kaitala Arja
Opintokohteen oppimateriaali:
Viitala, Jussi , , 2005
Krebs, John R. , , 1993
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

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

Learning outcomes:

To understand basic principles of animal behaviour in an evolutionary ecology contest.

Contents:

The basics of behavioural ecology of animals. Lecture topics: Animal foraging, predator-pray interactions, mating systems, and social behaviour. Seminars are based on the latest research results.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

30 h lectures, seminars, final exam.

Target group:

B.Sc. degree optional to ECO, M.Sc. degree compulsory to ECOz.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Davis, NB, Krebs, JR, & West, SA N.B. (2012) An Introduction to Behavioural Ecology, 4th ed, Wiley-Blackwell.
The availability of the literature can be checked from this link

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Prof. Arja Kaitala.

Working life cooperation:

No.

Other information:

-

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

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

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

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

2-5 ECTS credits / 53-133 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. or Ph.D. degree. Arranged if resources allow.

Learning outcomes:

Students will be acquainted to current issues in biology.

Contents:

Seminars on current issues in biology.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Course specific.

Target group:

Biology students.

Prerequisites and co-requisites:

Varying.

Recommended optional programme components:

-

Recommended or required reading:

Varying.

Assessment methods and criteria:

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

Grading:

1-5 / Fail or Pass / Fail.

Person responsible:

Prof. Timo Muotka, Prof. Jari Oksanen, Prof. Outi Savolainen and Prof. Hely Häggman.

Working life cooperation:

No.

Other information:

-

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

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

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

ECTS Credits:

2-5 ECTS credits / 53-133 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. or Ph.D. degree. Arranged if resourses allow

Learning outcomes:

Students will be acquainted to current issues in biology.

Contents:

Seminars on current issues in biology.

Mode of delivery:

Varying.

Learning activities and teaching methods:

Varying.

Target group:

Biology students.

Prerequisites and co-requisites:

Varying.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

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

Grading:

1-5 / Fail or Pass / Fail.

Person responsible:

Prof. Timo Muotka, Prof. Jari Oksanen, Prof. Outi Savolainen and Prof. Hely Häggman.

Working life cooperation:

No.

Other information:

-

757619S: Advanced course in bioinformatics, 5 op

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

753629S	Advanced course in bioinformatics	4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

English.

Timing:

M.Sc. 2nd spring.

Learning outcomes:

The main objective of this course is to provide students with understanding and experience of the main techniques required to manipulate, analyse and interpret next generation sequence data. Students will understand different technologies; be capable of manipulating data files and assess data quality; assemble and map reads; identify genes and variants; complete some basic analyses of genome data.

Contents:

During the course, students will manipulate an example data set to provide a comprehensive experience of contemporary bioinformatics techniques required to identify genes and polymorphisms, as well as familiarity with the command terminal and basic LINUX commands. This course builds on Basics of bioinformatics (757314A) and complements the theory learnt in Introduction to population genetics (757313A), Introduction to molecular ecology (756650S) and Experimental course in evolutionary genomics (757621S). Lectures provide the core understanding of the main steps and principals behind data analyses, but the core content will be practical experience of handling and analysing large data sets.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Contact hours: 12 hrs lectures, 40 hrs computer exercises, 56 hr independent study. Continuous assessment (coursework) and a final exam.

Target group:

Bioscience and Ecology M.Sc.

Prerequisites and co-requisites:

Basics of bioinformatics (757314A) or equivalent knowledge, Introduction to population genetics (757313A), Molecular evolution (757312A).

Recommended optional programme components:

-

Recommended or required reading:

Good guide for much of this is the De Wit P. et al 2012: The simple fool's guide to population genomics via RNA-Seq: an introduction to high-throughput sequencing data analysis. Molecular Ecology Resourses. Molecular Ecology Resources. Volume 12, Issue 6, pages 1058–1067, November 2012 and other course material.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Continuous assessment, learning diary and project report.

Grading:

1-5 / Fail.

Person responsible:

Dr. Phillip Watts.

Working life cooperation:

No.

Other information:

-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

ECTS Credits:

5 (- 8) cr / 133 (- 240) hours of work.

Language of instruction:

Finnish / English.

Timing:

B. Sc. / M. Sc. / Ph.D., (excursion arranged if resources alow).

Learning outcomes:

Student can identify the ecological and environmental effects of climate change and air pollution in the subarctic area. In addition, the student may learn basic research methods related to topic, and how to use the facilities provided by the subarctic research stations in the research.

Contents:

Lectures deal the ecological responses of global change and air pollution. The content is focused on the environmental effects and their ecological significance in the northern areas. During excursion the student

familiarizes with the special features of northern areas and explores the action and research carried out in the northern research stations.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

1) 24 h lectures with exam, and 15 h independent studies (assay and seminar work) (5 cr); **(2)** 4 days summer excursion and closing seminar (3 cr); participation in excursion necessitates accepted credits in the first part (lectures, independent studies).

Target group:

Ecology students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

-ACIA (2005) Arctic Climate Impact Assessment, Cambridge University Press, 1042 p. -AMAP Assessment 2006: Acidifying Pollutants, Arctic Haze, and Acidification in the Arctic. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. Xii + 112pp. Bell JNB & Trehow M (eds.) 2002. Air pollution and plant life. Wiley. 2nd edition. 480 pages.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Lectures, assay and seminar, excursion, closing report and seminar.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail
Read more about assessment criteria at the University of Oulu webpage.

Person responsible:

Doc. Kari Taulavuori.

Working life cooperation:

Possible excursion will include tours to the norther research stations.

Other information:

Field excursion is arranged if resources allow.

754626S: Field methods in freshwater biomonitoring, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Muotka, Timo Tapani, Heikki Mykrä, Kaisa-Leena Huttunen

Opintokohteen kielet: Finnish

Leikkaavuudet:

754616S	Field methods in freshwater biomonitoring	4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

M.Sc. 1.-2. year. Arranged if resources allow.

Learning outcomes:

The course familiarises students with methods used in biomonitoring of lakes and rivers.

Contents:

Sampling methods as well as biological and ecotoxicological laboratory analysis are practiced. Survey methods used to describe the state of habitats are applied to lake and river environments.

Mode of delivery:

Blended teaching.

Learning activities and teaching methods:

10 h lectures, 30 h field and laboratory exercises, group works.

Target group:

ECOz, ECOb.

Prerequisites and co-requisites:

Aquatic animals field course (755321A) and Basic course in hydrobiology (754322A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

Internet material, sample taking standards and instructions.

Assessment methods and criteria:

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

Grading:

Pass / Fail.

Person responsible:

Prof. Timo Muotka and Dr Heikki Mykrä.

Working life cooperation:

No.

Other information:

-

751651S: Advanced identification in animals, 4 - 8 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Muotka, Timo Tapani, Kari Koivula

Opintokohteen oppimateriaali:
Suomen luonto, , 1998
Suomen luonto, , 1997
Suomen luonto, , 1998
Koli, Lauri , , 1990
Siivonen, Lauri , , 1994
Koivisto, Ilkka, , 1984
Hildén, Olavi, , 1984
Koli, Lauri, , 1984
Opintokohteen kielet: Finnish

ECTS Credits:

4-8 ECTS credits / 107-213 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 1 st autumn.

Learning outcomes:

Student is able to identify special animal groups or species from museum samples and know the ecology and distribution in Finland.

Contents:

Identification of special animal groups (fishes; amphibian and reptiles; birds; mammals; some group of invertebrates), their ecology and distribution.
Student can get 5 cr from passed ornithological station bird ringing exam.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Independent study, oral final exam.

Target group:

ECOe.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Suomen eläimet 1-3; Suomen luonto: Linnut; Nisäkkäät; Kalat, Sammakkoeläimet ja matelijat, Koli, L.: Suomen kalat, Siivonen, L. & Sulkava, S.: Pohjolan nisäkkäät or relevant literature in English.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Oral exam or ornithological station bird ringing exam.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Prof. Timo Muotka.

Working life cooperation:

No.

Other information:

-

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

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

ECTS Credits:

2-6 ECTS credits / 53-160 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. degree.

Learning outcomes:

Preparation (including labels) and identification of self-collected insects.

Contents:

Preparation of a collection on one insect order. The specimens have to be preserved adequately, identified and provided with labels. In consultation with the responsible teacher.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Independent studying.

Target group:

-

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Literature related to the topic.

Assessment methods and criteria:

Collection is delivered to the person in responsible.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Pass / Fail.

Person responsible:

Doc. Marko Mutanen.

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

Learning outcomes:

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

Contents:

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

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

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

Target group:

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

Prerequisites and co-requisites:

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

Recommended optional programme components:

ECO: Basics in population ecology (756351A) and Advanced course in population ecology (755626S).
ECOGENeco: Basics in population ecology (756351A).

Recommended or required reading:

Beebee, T and Rowe G.2004 or 2008. An introduction to molecular ecology. Oxford University Press.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Final exam and seminar.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Doc. Laura Kvist.

Working life cooperation:

No.

Other information:

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

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

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Virtanen, Risto Juhani
Opintokohteen oppimateriaali:
Eurola, Seppo , , 1999
Opintokohteen kielet: Finnish

ECTS Credits:

4 ECTS credits / 107 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 2 nd or 3 rd autumn. M.Sc. 1 st or 2 nd autumn. Every second year at the Kilpisjärvi biological station. Arranged if resources allow.

Learning outcomes:

By passing this course a student is able to identify plant and animal species, nature types, vegetation of NW Fennoscandian mountain areas, understand ecology of northern ecosystems, ecological interactions and adaptation. Advanced training in experimental and observational field research.

Contents:

Arctic-alpine ecosystems as one the main biomes of the world. Plant and animal species of arctic-alpine areas. Vegetation and ecology of NW Fennoscandian mountain areas. Plant-herbivore interactions in tundra ecosystems.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Field course.

Target group:

Ecology students.

Prerequisites and co-requisites:

Ecological botany field course (756343A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

Disseminated during course, internet resources. Literature on arctic-alpine ecosystems.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Field course, field exercise. Planning of the study, field work and analyzing data. Making a report with reference to scientific literature. Oral presentation of the study (Power Point).
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Field exam including questions about the species and arctic-alpine nature.
Pass / Fail.

Person responsible:

Doc. Risto Virtanen.

Working life cooperation:

No.

Other information:

Arranged with cooperation of the University of Eastern Finland.

752692S: Mire ecology, 5 op

Voimassaolo: 01.08.2003 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Virtanen, Risto Juhani

Opintokohteen oppimateriaali:

Eurola, Seppo , , 1995
Eurola, Seppo , , 1992

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay752692S Mire ecology 5.0 op

ECTS Credits:

4 ECTS credits / 107 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 2 nd or 3 rd autumn. M.Sc. 1 st or 2 nd autumn. Every second year at the Oulanka research station. Arranged if resources allow.

Learning outcomes:

By passing this course a student is able to identify plant species (bryophytes and vascular plants), mire types, vegetation of boreal areas, species indicator values, determine mire types, interpret ecology of mire systems and make inventories on mire landscapes.

Contents:

Plant species (bryophytes and vascular plants), mire types, vegetation of boreal areas. Regional patterns in mire vegetation, mire types and underlying ecological gradients. Mire hydrotopography and peat stratigraphy. Red list status of mire vegetation.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures 9 h, field course, demonstations and field exercises 47 h.

Target group:

Plant ecology students.

Prerequisites and co-requisites:

Plant ecology field course (756343A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

Eurola, S., Huttunen, A. & Kukko-oja. K. 1995: Suokasvillisuusopas. Oulanka Reports 14: 1-85 ja Eurola, S., Bendiksen, K. & Rönkä, A. 1990: Suokasviopas. Oulanka Reports 9: 1-205.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Mire type and species exam.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Mire types and species exam. 1-5 / Fail.

Person responsible:

Doc. Risto Virtanen.

Working life cooperation:

No.

Other information:

Organised together with the University of Eastern Finland.

752616S: Macro fungi, 3 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen oppimateriaali:
Salo, Pertti (1) , , 2006
Opintokohteen kielet: Finnish

ECTS Credits:

3 ECTS credits / 80 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 3rd autumn. NNE.

Learning outcomes:

Student is able to identify most common macrofungal species as fresh specimens and knows basics of fungal ecology.

Contents:

Demonstrations of macrofungi in the field, basics of identification, ecology and distribution.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

14 h lectures, 25 h exercises including excursions, identification exam.

Target group:

Optional course.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Course handout, Salo, P. and Nummela-Salo, U. 2002: Sienikurssi (752316). Toinen uusittu painos. Lajiesittelyt. Biologian laitoksen monisteita 2/2002, 41 p. and mushroom guides.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Doc. Annamari Markkola.

Working life cooperation:

No.

Other information:

-

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

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

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

2-4 ECTS credits / 53-107 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 1 st or 2 nd year. Arranged if resources allow every second year. See WebOodi.

Learning outcomes:

By passing this course a student is able to identify species of the given taxonomic group, understand the ecology of the species, and know their distribution and systematic position.

Contents:

A laboratory course, field course or blended course. Species identification by means of macroscopic or microscopic characters. Making a collection of specimens, sampling and handling of the material. Preparation of herbarium specimens. Field instruction on species mapping and quantitative approach. Species' characters (morphological and chemical). Inventory methods on red listed species. Alternative themes (lichens, polypores and other fungi, and bryophytes).

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Demonstrations, identification exercises and field exercises.

Target group:

Students of plant ecology.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Material given in the course.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

doc. Anna Liisa Ruotsalainen.

Working life cooperation:

No.

Other information:

Course subject vary (lichens, polypore and other fungi, bryophytes).

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

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Anna Ruotsalainen

Opintokohteen oppimateriaali:

Hämet-Ahti, L., Suominen, J., Ulvinen, T. & Uotila, P., , 1998
Opintokohteen kielet: Finnish

ECTS Credits:

6 ECTS credits / 160 hours of work.

Language of instruction:

Finnish / English

Timing:

B.Sc. 3 rd year, M.Sc. 1 st year.

Learning outcomes:

Advanced identification of the vascular plants of Finland.

Contents:

Independent studying of herbarium samples. Distribution types of plants in Fennoscandia excluding the Russian parts.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Independent studying of herbarium samples. The course could be examined in two parts: 1) monocots, 2) ferns, dicots and distributions.

Target group:

-

Prerequisites and co-requisites:

Identification of plant species, extensive (756354A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

Hämet-Ahti et al. 1998: Retkeilykasvio (Field Flora of Finland), Ed. 4. Finnish Museum of Natural History, Helsinki. 656 p.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Doc. Anna Liisa Ruotsalainen.

Working life cooperation:

No.

Other information:

-

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

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

ECTS Credits:

5-8 ECTS credits / 133-213 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 1 st or 2 nd year.

Learning outcomes:

Identification of systematically or ecologically limited groups. For example macrofungi, mosses, lichens, phytoplankton, aquatic, shore, forest, meadow, peatland or fell plants, species of primeval forest and macroscopic plant remains.

Contents:

Identification of systematically or ecologically limited groups from herbarium samples and preparates. Lichens 8 cr., others 5 cr.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Independent studying of herbarium samples or preparations, species exam.

Target group:

Ecology students.

Prerequisites and co-requisites:

Identification of plant species (756342A).

Recommended optional programme components:

-

Recommended or required reading:

Literature related to the topic.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Doc. Anna Liisa Ruotsalainen.

Working life cooperation:

No.

Other information:

-

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

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

ECTS Credits:

2-5 ECTS credits / 53-133 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 3 rd summer or M.Sc. 1 st or 2 nd summer.

Learning outcomes:

Train oneself in floristic mapping skills.

Contents:

Floristic mapping of plants with special emphasis on endangered species. Participant should agree with the Botanical Museum in advance. Field work in the provinces of Oulu and Lapland, including sample collection, identification, preparation of herbarium specimens in consultation with the responsible teacher.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Field excursions.

Target group:

-

Prerequisites and co-requisites:

Identification of plant species, extensive (756354A), Plant ecology field course (756343A) and Advanced identification of plant species (752608S) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

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

Grading:

Pass / Fail.

Person responsible:

Doc. Anna Liisa Ruotsalainen.

Working life cooperation:

No.

Other information:

-

755624S: Functional animal ecology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Seppo Rytkönen

Opintokohteen kielet: Finnish

Leikkaavuudet:

751678S	Functional animal ecology	6.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Lectures in Finnish, exercises in Finnish / English.

Timing:

B.Sc. 2 nd spring or M.Sc. 1 st spring. NNE.

Learning outcomes:

The aim of the course is to understand the relationship between morphology and function by the means of general ecomorphological model. The student will get both theoretical and practical basics for ecomorphological (and. general scientific) research procedures: scientific hypothesizing, sampling, data analysis and reporting and interpreting the results.

Contents:

The course focuses on the relationship between phenotype and function, especially the correlation between animal morphology and behaviour. The course consists of two parts: A) Lectures in Finnish. However, articles about each subject are available for foreign students, including ecomorphological models and correlations, measurement error, allometry, fluctuating asymmetry and phylogenetic analyses. B) Exercises consisting of miniature studies, field and laboratory work, and seminar. The results of the mini studies, in form of PowerPoint presentations, are presented in the seminar. Before the exercises, students write a home essay (or take an exam).

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

12 h lectures, 40 h exercises, seminar and essay (or exam).

Target group:

Recommended for ecology students.

Prerequisites and co-requisites:

Recommended Evolution, systematics and morphology of animals, practicals (750374A), Introduction to statistics 5 cr (806118P) and A second course in statistics 5 cr (806119P).

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Doc. Seppo Rytkönen.

Working life cooperation:

No.

Other information:

-

755608S: Bird ecology and conservation, 2 op

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

ECTS Credits:

2 ECTS credits / 53 hours of work.

Language of instruction:

English

Timing:

M.Sc. degree. Every second year (arranged if resources allow).

Learning outcomes:

Student gets current scientific research knowledge in animal reproductive ecology and behaviour.

Contents:

Introduction to sexual reproduction and parental care in animals. Birds are used as a taxonomic reference group, but the concepts and theories are discussed in the general evolutionary ecological framework. Topics: e.g. habitat selection, territoriality, mating systems and brood parasitism.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

24 h lectures, exam.

Target group:

-

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Doc. Seppo Rytkönen and Doc. Kari Koivula.

Working life cooperation:

No.

Other information:

-

754627S: Special course in aquatic invertebrates, 5 op

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

751648S	Special course in aquatic invertebrates	2.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 1 st or 2 nd year. Every third year.

Learning outcomes:

After the course, the student will have basic knowledge on quantitative sampling of benthic invertebrates in various inland waters (mainly streams) and species level identification of benthic invertebrates.

Contents:

Field sampling and identification practices in the laboratory.

Mode of delivery:

Blended teaching.

Learning activities and teaching methods:

40 h demonstrations, lectures and exercises.

Target group:

ECOz, elective.

Prerequisites and co-requisites:

Aquatic animals field course (755321A) and Introduction to hydrobiology (754322A).

Recommended optional programme components:

-

Recommended or required reading:

Course material.

Assessment methods and criteria:

-

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

Grading:

Pass / Fail.

Person responsible:

Prof. Timo Muotka.

Working life cooperation:

No.

Other information:

-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Muotka, Timo Tapani, Heikki Mykrä

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 3 rd or M.Sc. 1 st autumn, arranged if resources allow.

Learning outcomes:

The aim of this course is to give basic knowledge on the methods of typology, ecological status assessment, classification and biomonitoring of rivers and lakes.

Contents:

Theoretical and practical methods for setting environmental objectives and quality standards for surface waters will get acquainted.

Mode of delivery:

Blended teaching.

Learning activities and teaching methods:

20 h lectures, literature, learning assignment, final exam.

Target group:

ECOz, ECOb.

Prerequisites and co-requisites:

Aquatic animals field course (755321A) and Basic course in hydrobiology (754322A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

Handouts, Internet material.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Prof. Timo Muotka.

Working life cooperation:

No.

Other information:

-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Koivula, Jouni Aspi

Opintokohteen kielet: Finnish

Leikkaavuudet:

751668S	Wildlife management and game animal ecology	6.0 op

ECTS Credits:

5 cr / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 3rd autumn or M.Sc. 1st autumn (arranged if resources allow).

Learning outcomes:

After carrying out the study module the student will be able to recognize special ecological traits of the game animals and relate them to the general ecological framework. The student will be also to appraise the basics of durable hunting of game animals. The student will be also able to appraise the basics of durable hunting of game animals and critically judge different wildlife management methods from the scientific starting point.

Contents:

The ecology of game species, their life histories, population dynamics and predator-prey relationships. Hunting ecology: man as predator, management and hunting of the game species. The impact of forestry on the game species' populations. Students are also introduced to wildlife management in practice and to the social aspect of wildlife-human relationship.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

24 h lectures, one-day excursion to a game breeding area, seminar with written reports and exam.

Target group:

-

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

Seminar with report and exam.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Prof. Jouni Aspi ja Doc. Kari Koivula.

Working life cooperation:

Yes.

Other information:

-

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

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

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

M.Sc. degree, (arranged if resources allow).

Learning outcomes:

After finishing the course student get acquainted to inventory approaches of natural ecosystems and is able to apply knowledge to environmental impact assessments. Student has skills to fulfill environmental impact assessments based on different types of case studies. Additionally, student knows the legal procedure to act as responsible person for EIA.

Contents:

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

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

24 h lectures, 18 h seminars.

Target group:

-

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

http://ec.europa.eu/environment/eia/eia-support.htm

Assessment methods and criteria:

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

Grading:

1-5 / Failed.

Person responsible:

Doc. Annamari Markkola and Seppo Rytkönen.

Working life cooperation:

No.

Other information:

-

750616S: Legislation in environmental protection, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Kari Taulavuori
Opintokohteen oppimateriaali:
Hollo, Erkki J. , , 2001
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 2nd or 3rd autumn or M.Sc. 1 st autumn. Arranged if resources allow.

Learning outcomes:

To familiarise students with environmental legislation in European Union with regard to environmental protection and natural resources. Student is able to apply his knowledge to different environmental questions and analyze the needed means. Student knows the environmental administration and organisations in environmental protection and natural resources.

Contents:

Environmental protection and natural resources legislation in Finland and in Europe. Environmental administration and organisations, use and protection of natural resources, prevention of environmental destruction, assessment of environmental effect as well as principles of environmental legislation and main international conventions, environmental issues in UNEP and OECD are covered.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

24 h lectures, 18 h exercises including demonstrations.

Target group:

Compulsory to students who are doing the environmental protection 25 cr. study module.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

Compulsory to students who are doing the environmental protection 25 cr. study module.

Recommended or required reading:

Erkki J. Hollo 2001: Ympäristönsuojeluoikeus, WSOY, 592 s, Kokkonen, Tuomas (toim.): Ympäristölainsäädäntö 2011. 1269 s Talentum.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Exam or learning diary.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Doc. Kari Taulavuori.

Working life cooperation:

No.

Other information:

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

755632S: Restoration ecology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola, Tolvanen, Anne Kristiina

Opintokohteen kielet: Finnish

Leikkaavuudet:

756607S	Restoration ecology	2.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. degree.

Learning outcomes:

Lectures: the student understands the ecological principles of restoration and remembers the basics of restoration options in different ecosystems. Exercises and excursion: the student is able to evaluate the need for restoration and possibilities of an ecosystem to regenerate, and apply the restoration techniques in practical restoration planning.

Contents:

Land-use impacts and ecosystem malfunctions caused by humans, ecological principles of restoration, prevention and restoration of manmade damage in the ecosystems. Examples from restoration options and practical techniques in terrestrial and aquatic ecosystems, and cultural landscapes.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

24 h lectures, exercises and an excursion.

Target group:

ECO.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Andre Clewell, James Aronson 2008: Ecological Restoration, Principles, Values, and Structure of an Emerging Profession, Island Press, 230 p. and articles in the Restoration Ecology journal.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Prof. Anne Tolvanen.

Working life cooperation:

No.

Other information:

-

750677S: Winter ecology and physiology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

Leikkaavuudet:

750625S Winter ecology and physiology 3.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

English.

Timing:

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

Learning outcomes:

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

Contents:

Two independent units: 1) Winter ecology and physiology course (7 h lectures and 13 h laboratory practicals and 4 h seminar in Oulu, and 4 day long field excursion to the Oulanka Research Station (total about 50 h, 3 cr); 2) Book exam on a common exam day 2 cr: Marchand, P. J. 1996: Life in the cold. An introduction to winter ecology.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures, exercises, report and seminar presentation.

Target group:

Biology students.

Prerequisites and co-requisites:

Courses Basics of ecology (750124P), Cell biology (750121P), Terrestrial animals field course (755322A), Aquatic ecology field course (755321A), Plant ecology field course (756343A), and Basics of plant biology, lectures (756346A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

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

Assessment methods and criteria:

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

Grading:

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

Person responsible:

Doc. Kari Taulavuori.

Working life cooperation:

No.

Other information:

-

756604S: Plant ecophysiology in changing environments, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen oppimateriaali:

Lambers, Hans , , 1998
Prasad, M.N.V (ed.), , 1997
Hall, D.O. et al., , 1993

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

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

Learning outcomes:

After finishing the course student understands interactions between plant and environment, and has become acquainted to most important experimental methods in physiological plant ecology and student can apply research parameters. Student can apply the knowledge to plant production and environmental protection issues.

Contents:

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

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

20 h lectures and demonstrations, 35 h exercises, exam and report.

Target group:

ECOb, BSb, Ph.D. students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

Course is related both to plant ecology and plant physiology basic studies.

Recommended or required reading:

Hans Lambers, F.Stuart Chapin III, Thijs L. Pons 2008: Plant Physiological Ecology. Springer Verlag. 540 s. Second edition.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Doc. Kari Taulavuori.

Working life cooperation:

No.

Other information:

-

756649S: Symbiosis, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Anna-Maria Pirttilä

Opintokohteen kielet: Finnish

Leikkaavuudet:

750346A	Symbiosis	4.0 op
750646S	Symbiosis	4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. degree 3rd spring, M.Sc. 1. or 2nd spring, arranged if resources allow.

Learning outcomes:

The student knows the concept of symbiosis, understands the extent of diversity of symbiotic interactions both at the community and molecular level.

Contents:

Lately new forms of symbiosis have been discovered, extending the diversity of symbiotic interactions. Therefore the significance of symbiosis in biotechnology and for example in human health has increased. Various forms of symbiosis, their importance for the host and interaction at the molecular level are covered.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

30 h Lectures / laboratory work / demonstrations, seminar, essay, lecture diary.

Target group:

BS and ecophysiology students.

Prerequisites and co-requisites:

Studies in bioscience.

Recommended optional programme components:

-

Recommended or required reading:

Lecture notes.

Assessment methods and criteria:

Seminar, essay, lecture diary.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Doc. Anna Maria Pirttilä.

Working life cooperation:

No.

Other information:

-

750618S: Thursday seminar in biology, 2 op

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

ECTS Credits:

2 ECTS credits / 53 hours of work.

Language of instruction:

English.

Timing:

M.Sc. or Ph.D. degree.

Learning outcomes:

Students get knowledge about the current results and theories in biology.

Contents:

Lectures in English on current topics in biology given by guest lecturers from Finland and abroad.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Guest lectures on Thursdays 12 am-1 pm. See seminar programme: https://noppa.oulu.fi/noppa/kurssi/750618s/etusivu

Target group:

Undergraduate and postgraduate students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

10 participations and 10 one page long reports. You can combine lectures from different academic terms to make the needed 10 essays.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Pass / Fail.

Person responsible:

Doc. Helmi Kuittinen.

Working life cooperation:

No.

Other information:

-

750629S: Kaamos symposium, 2 - 4 op

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

ECTS Credits:

2-4 ECTS credits / 53-107 hours of work.

Language of instruction:

English.

Timing:

M.Sc. and Ph.D. autumn.

Learning outcomes:

Students get acquainted to preparing, presenting and evaluating a scientific oral presentation.

Contents:

The Kaamos Symposium consisting of presenting current research projects is held every year at the end of autumn period. Through presenting their research work and projects and obtaining feedback from the audience (students and the staff of the department) post graduate students gain experience in holding a scientific presentation.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Own presentation and the whole symposium 2 cr (postgraduate students). Summary of five presentations and symposium 2 cr (undergraduate students). Poster 0,5 cr (postgraduate students).

Target group:

Undergraduate biology students (2 cr) and postgraduate biology students (2-4 cr).

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Abstract book.

Assessment methods and criteria:

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

Grading:

Pass / Fail.

Person responsible:

Prof. Timo Muotka.

Working life cooperation:

No.

Other information:

-

A251104: Pedagogical Studies in Master's Degree, 25 - 30 op

Voimassaolo: 01.08.2005 -
Opiskelumuoto: Intermediate Studies
Laji: Study module
Vastuuyksikkö: Faculty of Education
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

Pakollinen

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. English for the ITE students.

Timing:

1st year

Learning outcomes:

After completion the student is 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
- to apply social, multicultural and juridical issues related to education and schooling in everyday life situations
- to describe the historical, socio-political and professional starting points of Finnish education system and educational politics

Contents:

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
- The social, multicultural and juridical issues related to education
- Education systems as part of the historical development of society
- Education politics as a part of social politics

Mode of delivery:

Face-to-face teaching / blended teaching and learning

Learning activities and teaching methods:

Basic part 3 ECTS: Lectures for all 14 h, independent working 67 h
The basic part is composed of studying pre-given material, expert lectures (possibly by guest lecturers), and learning task. In addition, the adoption of learning outcomes are measured by separate assignment (e.g. examination or essay).

Seminar part 2 ECTS: Contact teaching in small study programme groups 10 h, independent working 44 h

The assignment can be for instance learning portfolio, which combines the contents of basic part and student's own life-world experiences.

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:

(in applicable parts; to be negotiated with instructor):

- Arum, R., Beattie, I. R. & Ford, K. (Eds.). (2011). The Structure of schooling: Readings in the sociology of education. Los Angeles: SAGE.
- Ballantine, J. H. & Spade, J. Z. (Eds.). (2012). Schools and society: A sociological approach to education. Los Angeles: SAGE.
- Demaine, J. (Ed.). (2001). Sociology of education today. London: Palgrave.
- Simola, H. (Ed.). (2014). Finnish education mystery: Historical and sociological essays on schooling in Finland. London: Routledge.
- Verdugo, R. R. (Ed.). (2014). Educational reform in Europe: History, culture, and ideology. Information Age Publishing.
- Original text from one of these theorists: Louis Althusser, Basil Bernstein, Pierre Bourdieu, Michel Foucault, Henry Giroux, Jürgen Habermas, Axel Honneth, Peter Jarvis, Peter McLaren, Paul Willis, or Thomas Ziehe.

Assessment methods and criteria:

Basic part 3 ECTS.
Assessment method: Both learning task and examination or essay based on the learning material and lectures.

Seminar part 2 ECTS.
Assessment method: Learning portfolio in study group working

The assessment criteria are weighted in the following way:

- first learning outcome is highlighted in learning task (Basic part)
- all three learning outcomes are highlighted in examination or essay (Basic part)
- third learning outcome is highlighted in portfolio (Seminar part)

In approved (Pass) completion of the course, the use of central concepts of social sciences in educational research and analytical handling of basic issues in various contexts of education and growth is clearly structured, and matters are connected to each other at least to some degree. The handling of social, multicultural and juridical issues related to education and schooling in everyday life situations is reflective, and connections between matters are handled at least to some degree. In addition, the description of the historical, socio-political and professional starting points of Finnish education system and educational politics is clear and appropriate. In all assignments, there has to be a visible plot and mainly the use of references has to be at a good level.

In not approved (Fail) completion of the course, student's study products are unfinished, fragmentary and superficial, matters are presented in disconnected way, or the presentation does not show own thinking nor acquisition to the core themes of the course. Study material is not utilized sufficiently, and references are weakly used.

Grading:

pass/fail

Person responsible:

Vesa Puuronen (Veli-Matti Ulvinen)

Working life cooperation:

The seminar part contains working life cooperation.

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

Timing:

4. year, 1. period

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
- utlilization 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

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: Eetu Pikkarainen

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. For ITE students: English

Timing:

1st year

Learning outcomes:

- 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

Target group:

ITE, LO, Taika, Tekno, Vaka, Kako, AO, Avoin, AMOK

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:

Jouni Peltonen, Eetu Pikkarainen

Working life cooperation:

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

050126A: Subject Didactics/Music, 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:

4. year, autumn

Learning outcomes:

- Having completed the study module, the student knows how to apply the working methods and learning environments of music education in a variety of ways to the contents and teaching materials of primary and secondary schools, and how to evaluate the progress of learning processes.
- The student knows how to apply the main methods of music education in various learning environments.
- The student gets practice in constructing lesson and period plans.
- Having completed the study module, the student knows how to view the activities of a music teacher as an artistic and cultural actor in the school communities and how to plan for events to involve different target groups, making use of the working methods and learning environments of music education.

Contents:

- The course introduces the student to the national core curriculum and to the municipal curricula.
- The course involves themes of special education, youth culture, multiculturalism and developmental psychology.

- Construction and analysis of the student's own music educatorship, professional identity

Mode of delivery:

Blended lectures, indepedent work alone or in groups

Learning activities and teaching methods:

Lectures 40 h, independent work 95 h

Target group:

Students of music education

Prerequisites and co-requisites:

Broad-based subject didactics 050122A
Theories and Practices of Music Education 422268A

Recommended optional programme components:

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

Recommended or required reading:

Current teaching materials in music, core curricula.
Materials to be handed out during the course.

Assessment methods and criteria:

Participation in the exercises.
Continuous assessment is used in the course, with a final examination.
A learning diary is kept on the lectures and independent work.

Grading:

0-5

Person responsible:

Kari Kuivamäki

Working life cooperation:

Advanced Teaching Practice

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

Timing:

4. year, 2. period

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 ach) 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

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

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

ECTS Credits:
1-4 credits
Language of instruction:
Finnish
Timing:
1st-5th year

300002M: Advanced Information Skills, 1 op

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

ECTS Credits:
1 ECTS credit / 27 hours of work
Language of instruction:
Finnish
Timing:
The course is held once in the autumn semester, during period II and in the spring semester, during period IV. Intended for degree students working on their diploma/master's thesis.
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
- understands the principles of scientific publishing
- can use the 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 RefWorks reference management tool.
Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Lectures 10 h, self-study 17 h
Target group:
Optional
Recommended or required reading:
Web learning material:
http://libguides.oulu.fi/tieteellinentiedonhankinta

http://libguides.oulu.fi/julkaisujenarviointi
Assessment methods and criteria:
Passing the course requires participation in the lectures and successful completion of the course assignments.
Grading:
pass/fail
Person responsible:
Ursula Heinikoski

750033Y: Tutorial for new students, 1 op

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Vanhatalo, Minna-Liisa, Annamari Markkola

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
1 ECTS credit / 27 hours of work
Language of instruction:
Finnish.
Timing:
B.Sc. 3 rd autumn / M.Sc. 1 st autumn.
Learning outcomes:
Course develops students' skills to guide, make presentations, work in group and organize. It also advances planning, arrangement and guidance abilities as well as responsibility.
Contents:
The student guides a group of new students during the orientation course introducing them to the university, academic learning environment, the department, curriculum and other students with the help of small group meetings and presentations.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Tutorials and presentations. Minimum 15 hours. In addition indenpendent work includes the preparation of the tutorials.
Target group:
Second and third year biology students.
Prerequisites and co-requisites:
Course 750031Y.
Recommended optional programme components:
-
Recommended or required reading:
Study guide and training material.
Assessment methods and criteria:
Tutoring report.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Doc. annamari Markkola and Ph.Lic. Minna Vanhatalo.
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 professor in beforehand.
Mode of delivery:
Itsenäinen opiskelu: kirjatentti.
Learning activities and teaching methods:
Book exam (3 h). Exam is held in Examinarium, instructions: http://www.oulu.fi/english/studying/examinarium
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, doc. Kari Koivula February-April 2019):

- 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. Annamari Markkola):

- 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 (doc. Heikki Helanterä):

- Lewin Genes (XI) (or equal)

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

- Nielsen, R. ja Slatkin, M. 2013 An introduction to population genetics. Sinauer, 287 p.

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

Animal physiology orientation (Henrika Honkanen):

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

Plant physiologi orientation (prof. Hely Häggman)

- Beeckman 2009. Root Development. Annual Plant Reviews 37. - Wiley-Blackwell. ISBN 978-1-4051-6150-3
- Coruzzi Gutierrez 2009. Plant Systems Biology. Annual Plant Reviews 35. - Wiley-Blackwell. ISBN 978-1-4051-6283-8.
- Dickison, W.C. 2000. Integrative plant anatomy. 533 s. ISBN 0-12-215170-4
- Fahn, A. 1990. Plant anatomy. 4. rev. ed. 588 s. ISBN 0-08-037490
- Gan 2007. Senescence processes in plants. - Wiley-Blackwell. ISBN 978-0-8138-1963-1
- Hayat, Mori, Pichtel & Ahmad 2010. Nitric oxide in plant physiology. - Wiley-Blackwell. ISBN 978-3-527-32519-1
- Hvoslef-Eide, A.K. & Preil, W. 2005. Liquid culture systems for in vitro plant propagation. Springer ISBN 1-4020-3199-8
- Jenks & Wood 2009. Genes for Plant Abiotic Stress. - Wiley-Blackwell. ISBN 978-1-4051-3984-7
- Kinight, Perroud, Cove 2009. The Moss Physcomitrella- Annual Plant Reviews, volume 36 - Wiley-Blackwell. ISBN 978-1-4051-8189-1.
- Lambers, H., Chapin III, F.S., Pons, T.L. 2008. Plant physiological ecology. Springer. 610 p. ISBN 978-0-387-78340-6
- Osbourn, A.E. & Lanzotti, V. 2009. Plant-derived natural products: synthesis, function, and application. 587 s. Springer. (Printed or electronical book version in the library)
- Parker 2008. Molecular aspects of plant disease resistance. Annual Plant Reviews , volume 34. - Wiley-Blackwell. ISBN 978-1-4051-7532-6
- Reed, B.M. 2008. Plant Cryopreservation: A Practical Guide. Springer ISBN 978-0-387-72275-7
- Smith & Read 2008. Mycorrhizal symbiosis. 3. painos. Academic Press. 800 p.
- Taiz, L. et al. 2015. Plant Physiology and Development. Sixth Edition.761 p. Sinauer Associates, Inc. ISBN-9781605352558
- Wink 2010. Biochemistry of plant secondary metabolism. Annual Plant Reviews, volume 40. - Wiley-Blackwell. ISBN 978-1-4051-83970. Electronical book. Link can be found for example from OULA library cataloque. Dawsonera can be accessed with koivu/paju password. http://www.dawsonera.com/depp/reader/protected/external/AbstractView/S9781444320510
- Yeo & Flowers 2007. Plant Solute Transport. - Wiley-Blackwell. ISBN 978-1-4051-3995-3
- Yoshioka & Shinozaki 2009. Signal Crosstalk in Plant Stress Responses - Wiley-Blackwell. ISBN 978-0-8138-1963-1

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

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:

1-5 / Fail.

Person responsible:

M.Sc. Henrika Honkanen, Prof. Hely Häggman, Doc. Annamari Markkola, Prof. Timo Muotka or Doc. Heikki Helanterä.

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: 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 opponenting, eight research seminar and eight result seminar attendances. Research plan seminar and results seminar presentations cannot be given at same day. Topics and dates have to be agreed with the professor in beforehand. See degree programme notice board for the schedule and instructions.
Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Seminar presentations, attendance and opponenting. Detailed instructions on the 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 Master of Science Thesis, the student will give summary in Finnish, Swedish or English to show his/her familiarity with the topic of the thesis. If the international degree student has not done a maturity exam in her /his B.Sc. degree the student has to make a 4 pages long essay about the thesis subject in Examinarium.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Instructions at the Faculty of Science internet homepage. One teacher examine the maturity exam and Pro gradu working group accepts it.

Target group:
Compulsory to the biology students. After completing the thesis.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Summary form at the Faculty of Science internet homepage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Hely Häggman, Prof. Jari Oksanen, Prof. Markku Orell or Prof. Outi Savolainen.
Working life cooperation:
No.
Other information:
-

750658S: Pro gradu thesis in biology, 40 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Diploma thesis

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

ECTS Credits:
40 ECTS credits / 1067 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st or 2 nd year.
Learning outcomes:
Student knows the research methods in specific field of biology. She is conversant with her field of thesis and is able to scientific thinking, estimating the results, analysing, drawing conclusions and scientific communicating.
Contents:
Literary work which in general includes experimental research work. Student gets profoundly acquainted on certain special field in biology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Independent research work on a scientific subject in agreement with the responsible professor and under the supervision of the Department. The supervisors may be professors of the department, docents and other teachers and researchers who have the docent's status. The student may
have several supervisors, the other supervisor may be from other department, university (also abroad) or from research institute. The subject must be agreed on with the professor in advance. The research work can contain fieldwork, laboratory work, theoretical work or work on collections in museum. The work always includes a literature survey. After having completed the thesis, the student writes the Maturity Exam. The programme director will order the final examiners by the proposal of the professor. Pro gradu working group accepts and grades the thesis on the basis of the final examiners' opinions.
Target group:
ECO and BS: compulsory 40 cr. TEA: 40 cr. optional. So called didactic pro gradu thesis cannot be 40 cr.
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:
1-5 / Fail.
Person responsible:
M.Sc. Henrika Honkanen, Prof. Hely Häggman, prof. Jari Oksanen, Prof. Timo Muotka or Prof. Outi Savolainen.
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.

Chose from

757617S: Molecular methods II, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Anna-Maria Pirttilä, Henrika Honkanen
Opintokohteen kielet: Finnish
Leikkaavuudet:

750365A	Molecular methods II	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1st autumn.
Learning outcomes:
The student knows how to study gene expression at different levels (transcription, translation) and understands the benefits and limitations of each method used.
Contents:
The course consists of laboratory work elaborating principles of gene expression by molecular biology.
Mode of delivery:
Face-to-face teaching.

Learning activities and teaching methods:

50 h exercises including demonstrations, 50 h independent work, work reports.

Target group:

Compulsory to BS.

Prerequisites and co-requisites:

Molecular methods I (757311A).

Recommended optional programme components:

-

Recommended or required reading:

Course handout.

Assessment methods and criteria:

Demonstrations, exercises, reports.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Doc. Anna Maria Pirttilä and Dr. Janne Koskimäki.

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 cr / 133 hours of work.

Language of instruction:

Finnish / 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. Usage of molecular methods for identification of species, sex and individuals, behavioral ecology (mating systems, cooperation, mating success) and conservation.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

22 h lectures, 24 h exercises (problem solving, laboratory and computer exercises), 4 h seminars, take-home exam.

Target group:

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

Prerequisites and co-requisites:

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

Recommended optional programme components:

Compulsory prequisite for courses Experimental course in evolutionary genomics (757621S), Advanced course in bioinformatics (757619S) and DNA analysis in population genetics (757618S). Recommended prerequisite for course Quantitative genetics (805338A).

Recommended or required reading:

Hamilton, M. B. 2009: Population genetics, Wiley-Blackwell.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Take-home exam, problem solving, laboratory and computer exercises, seminar.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Doc. Lumi Viljakainen.

Working life cooperation:

No.

Other information:

Note that Introduction to 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: Tanja Pyhäjärvi

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

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.

Learning activities and teaching methods:

24 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:

1-5 / Fail.

Person responsible:

Doc. Tanja Pyhäjärvi.

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. 2 nd or M.Sc. 1 st autumn.

Learning outcomes:

The course aims to help students learn to basic plant tissue culture concepts, to establish tissue culture systems and to understand totipotency.

Contents:

Preparation of culture media and establishment of sterile cultures starting from different plant organs and tissues. Cytodifferentiation and viability tests are also included in the course. Students are able to follow how plant hormones determine the differentiation of tissues.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

8 h lectures, 35 h demonstrations and exercises, literature work, seminar, 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.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

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

Working life cooperation:

No.

Other information:

-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

2-5 ECTS credits / 53-133 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. or Ph.D. degree. Arranged if resources allow.

Learning outcomes:

Students will be acquainted to current issues in biology.

Contents:

Seminars on current issues in biology.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Course specific.

Target group:

Biology students.

Prerequisites and co-requisites:

Varying.

Recommended optional programme components:

-

Recommended or required reading:

Varying.

Assessment methods and criteria:

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

Grading:

1-5 / Fail or Pass / Fail.

Person responsible:

Prof. Timo Muotka, Prof. Jari Oksanen, Prof. Outi Savolainen and Prof. Hely Häggman.

Working life cooperation:

No.

Other information:

-

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

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

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

ECTS Credits:

2-5 ECTS credits / 53-133 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. or Ph.D. degree. Arranged if resourses allow

Learning outcomes:

Students will be acquainted to current issues in biology.

Contents:

Seminars on current issues in biology.

Mode of delivery:

Varying.

Learning activities and teaching methods:

Varying.

Target group:

Biology students.

Prerequisites and co-requisites:

Varying.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

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

Grading:

1-5 / Fail or Pass / Fail.

Person responsible:

Prof. Timo Muotka, Prof. Jari Oksanen, Prof. Outi Savolainen and Prof. Hely Häggman.

Working life cooperation:

No.

Other information:

-

757615S: Human genetics, 5 op

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

753607S	Human genetics	4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. or M.Sc. degree, autumn. Arranged if resources allow.

Learning outcomes:

To understand human evolution and man as a biological species.

Contents:

Human evolution in Africa, spread of different human species to other continents, research methods including population genetics and genomics, molecular human genetics: inherited diseases and susceptibilities.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures, home works.

Target group:

Arranged every second autumn. Course neccessary for students of genetics, not compulsory. Suitable also for biochemistry students and education students.

Prerequisites and co-requisites:

Concepts of genetics (757109P) or equivalent knowledge.

Recommended optional programme components:

Educational, voluntary.

Recommended or required reading:

Jobling et al. 2014: Human evolutionary genetics. 2nd ed. Garland Science, ISBN 9780815341482.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Learning diary, controlled exam and student activity.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Prof. Outi Savolainen.

Working life cooperation:

No.

Other information:

-

757619S: Advanced course in bioinformatics, 5 op

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

753629S	Advanced course in bioinformatics	4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

English.

Timing:

M.Sc. 2nd spring.

Learning outcomes:

The main objective of this course is to provide students with understanding and experience of the main techniques required to manipulate, analyse and interpret next generation sequence data. Students will understand different technologies; be capable of manipulating data files and assess data quality; assemble and map reads; identify genes and variants; complete some basic analyses of genome data.

Contents:

During the course, students will manipulate an example data set to provide a comprehensive experience of contemporary bioinformatics techniques required to identify genes and polymorphisms, as well as familiarity with the command terminal and basic LINUX commands. This course builds on Basics of bioinformatics (757314A) and complements the theory learnt in Introduction to population genetics (757313A), Introduction to molecular ecology (756650S) and Experimental course in evolutionary genomics (757621S). Lectures provide the core understanding of the main steps and principals behind data analyses, but the core content will be practical experience of handling and analysing large data sets.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Contact hours: 12 hrs lectures, 40 hrs computer exercises, 56 hr independent study. Continuous assessment (coursework) and a final exam.

Target group:

Bioscience and Ecology M.Sc.

Prerequisites and co-requisites:

Basics of bioinformatics (757314A) or equivalent knowledge, Introduction to population genetics (757313A), Molecular evolution (757312A).

Recommended optional programme components:

-

Recommended or required reading:

Good guide for much of this is the De Wit P. et al 2012: The simple fool's guide to population genomics via RNA-Seq: an introduction to high-throughput sequencing data analysis. Molecular Ecology Resourses. Molecular Ecology Resources. Volume 12, Issue 6, pages 1058–1067, November 2012 and other course material.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Continuous assessment, learning diary and project report.

Grading:

1-5 / Fail.

Person responsible:

Dr. Phillip Watts.

Working life cooperation:

No.

Other information:

-

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

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

753612S	Methods in genomics and genomics evolution	6.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 1st autumn.

Learning outcomes:

Student knows focal features of genome structure, evolution and research methods.

Contents:

Genome structure, composition, comparative genomics, recombination and evolutionary factors affecting genome composition. Theory and methods.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

24 h lectures, 24 h seminars, independent work 83 h, exam, reports.

Target group:

BSg.

Prerequisites and co-requisites:

Concepts of genetics 5 cr (757109P), Experimental course in general genetics 5 cr (757110P) and Basics in population genetics 5 cr (757313A).

Recommended optional programme components:

-

Recommended or required reading:

Recent review articles.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Prof. Outi Savolainen.

Working life cooperation:

No.

Other information:

-

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

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

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

Ei opintojaksokuvauksia.

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:

4 ECTS credits / 107 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 1 st or 2 nd spring, (arranged if resources allow).

Learning outcomes:

The students will assess the plant hormone action, understand hormone interactions and the significance of the hormone balance as well as the molecular mechanisms.

Contents:

Plant hormones are signalling molecules with profound effects on growth and development at trace quantities. Until quite recently plant development was considered to be regulated by auxins, gibberellins, cytokinins, ethylene and abscisic acid. New analytical and molecular methods have evidenced new plant hormone receptors and signalling pathways. During the lectures the mode of action of the hormones and the latest literature is used to gain the most recent view of the topic.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

20 h and exam.

Target group:

Suitable for BSb and ecophysiologists.

Prerequisites and co-requisites:

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

Recommended optional programme components:

-

Recommended or required reading:

Chapters concerning plant hormones from Taiz, L. 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:

1-5 / Fail.

Person responsible:

Prof. Hely Häggman and Doc. Anna Maria 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:

4 ECTS credits / 107 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 1 st or 2 nd spring, (arranged if resources allow).

Learning outcomes:

The student is able to assess the specific features of forest tree physiology and from this basis can judge the effect of climate change to forestry.

Contents:

Trees are long-living, often wind-pollinated, tall organisms. The juvenile phase may be long and the adult phase is characterized by both reproductive and vegetative growth which causes competition on both carbohydrates and nutrients. Cold- and drought resistance, water relations, carbon allocation and mineral nutrition will be discussed. Partly due to forest tree's economic importance biotechnological applications have been developed e.g. for the production of health promoting substances or vegetative propagation. Forest trees are interesting from the point of molecular biology- what makes a tree tree? The course will cover these topics but the emphasis may vary during the years.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

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:

1-5 / Fail.

Person responsible:

Prof. Hely Häggman and Doc. Anna Maria Pirttilä.

Working life cooperation:

No.

Other information:

-

756604S: Plant ecophysiology in changing environments, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen oppimateriaali:
Lambers, Hans , , 1998
Prasad, M.N.V (ed.), , 1997
Hall, D.O. et al., , 1993
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

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

Learning outcomes:

After finishing the course student understands interactions between plant and environment, and has become acquainted to most important experimental methods in physiological plant ecology and student can apply research parameters. Student can apply the knowledge to plant production and environmental protection issues.

Contents:

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

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

20 h lectures and demonstrations, 35 h exercises, exam and report.

Target group:

ECOb, BSb, Ph.D. students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

Course is related both to plant ecology and plant physiology basic studies.

Recommended or required reading:

Hans Lambers, F.Stuart Chapin III, Thijs L. Pons 2008: Plant Physiological Ecology. Springer Verlag. 540 s. Second edition.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Doc. Kari Taulavuori.

Working life cooperation:

No.

Other information:

-

756626S: Stress physiology of plants, 4 op

Voimassaolo: - 31.07.2020
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Häggman, Hely Margaretha, Anna-Maria Pirttilä
Opintokohteen kielet: Finnish

ECTS Credits:

4 ECTS credits / 107 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 1 st or 2 nd spring, (arranged if resources allow).

Learning outcomes:

The student will assess the effect of abiotic and biotic stresses on plant metabolism and the means of plants to cope with them.

Contents:

The course will cover all the stresses affecting plant metabolism at biochemical or molecular level. The signal transduction caused by the stresses will be followed as well as plant defense reactions. Plant pathogen biocontrol methods are introduced.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

20 h lectures, independent exercises or seminar and exam.

Target group:

Mainly for BS but also suitable for ECO.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Lecture handouts and literature given during the course.

Assessment methods and criteria:

Exam, essay/seminar.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Prof. Hely Häggman and Doc. Anna Maria Pirttilä.

Working life cooperation:

No.

Other information:

-

756649S: Symbiosis, 5 op

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

750346A	Symbiosis	4.0 op
750646S	Symbiosis	4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. degree 3rd spring, M.Sc. 1. or 2nd spring, arranged if resources allow.

Learning outcomes:

The student knows the concept of symbiosis, understands the extent of diversity of symbiotic interactions both at the community and molecular level.

Contents:

Lately new forms of symbiosis have been discovered, extending the diversity of symbiotic interactions. Therefore the significance of symbiosis in biotechnology and for example in human health has increased. Various forms of symbiosis, their importance for the host and interaction at the molecular level are covered.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

30 h Lectures / laboratory work / demonstrations, seminar, essay, lecture diary.

Target group:

BS and ecophysiology students.

Prerequisites and co-requisites:

Studies in bioscience.

Recommended optional programme components:

-

Recommended or required reading:

Lecture notes.

Assessment methods and criteria:

Seminar, essay, lecture diary.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Doc. Anna Maria Pirttilä.

Working life cooperation:

No.

Other information:

-

750677S: Winter ecology and physiology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

Leikkaavuudet:

750625S	Winter ecology and physiology	3.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

English.

Timing:

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

Learning outcomes:

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

Contents:

Two independent units: 1) Winter ecology and physiology course (7 h lectures and 13 h laboratory practicals and 4 h seminar in Oulu, and 4 day long field excursion to the Oulanka Research Station (total about 50 h, 3 cr); 2) Book exam on a common exam day 2 cr: Marchand, P. J. 1996: Life in the cold. An introduction to winter ecology.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures, exercises, report and seminar presentation.

Target group:

Biology students.

Prerequisites and co-requisites:

Courses Basics of ecology (750124P), Cell biology (750121P), Terrestrial animals field course (755322A), Aquatic ecology field course (755321A), Plant ecology field course (756343A), and Basics of plant biology, lectures (756346A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

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

Assessment methods and criteria:

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

Grading:

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

Person responsible:

Doc. Kari Taulavuori.

Working life cooperation:

No.

Other information:

-

750618S: Thursday seminar in biology, 2 op

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

ECTS Credits:

2 ECTS credits / 53 hours of work.

Language of instruction:

English.

Timing:

M.Sc. or Ph.D. degree.

Learning outcomes:

Students get knowledge about the current results and theories in biology.

Contents:

Lectures in English on current topics in biology given by guest lecturers from Finland and abroad.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Guest lectures on Thursdays 12 am-1 pm. See seminar programme: https://noppa.oulu.fi/noppa/kurssi/750618s/etusivu

Target group:

Undergraduate and postgraduate students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

10 participations and 10 one page long reports. You can combine lectures from different academic terms to make the needed 10 essays.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Pass / Fail.

Person responsible:

Doc. Helmi Kuittinen.

Working life cooperation:

No.

Other information:

-

750629S: Kaamos symposium, 2 - 4 op

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

ECTS Credits:

2-4 ECTS credits / 53-107 hours of work.

Language of instruction:

English.

Timing:

M.Sc. and Ph.D. autumn.

Learning outcomes:

Students get acquainted to preparing, presenting and evaluating a scientific oral presentation.

Contents:

The Kaamos Symposium consisting of presenting current research projects is held every year at the end of autumn period. Through presenting their research work and projects and obtaining feedback from the audience (students and the staff of the department) post graduate students gain experience in holding a scientific presentation.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Own presentation and the whole symposium 2 cr (postgraduate students). Summary of five presentations and symposium 2 cr (undergraduate students). Poster 0,5 cr (postgraduate students).

Target group:

Undergraduate biology students (2 cr) and postgraduate biology students (2-4 cr).

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Abstract book.

Assessment methods and criteria:

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

Grading:

Pass / Fail.

Person responsible:

Prof. Timo Muotka.

Working life cooperation:

No.

Other information:

-

A251104: Pedagogical Studies in Master's Degree, 25 - 30 op

Voimassaolo: 01.08.2005 -
Opiskelumuoto: Intermediate Studies
Laji: Study module
Vastuuyksikkö: Faculty of Education
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

Ei opintojaksokuvauksia.

Pakollinen

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. English for the ITE students.

Timing:

1st year

Learning outcomes:

After completion the student is 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
- to apply social, multicultural and juridical issues related to education and schooling in everyday life situations
- to describe the historical, socio-political and professional starting points of Finnish education system and educational politics

Contents:

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

- The social, multicultural and juridical issues related to education
- Education systems as part of the historical development of society
- Education politics as a part of social politics

Mode of delivery:

Face-to-face teaching / blended teaching and learning

Learning activities and teaching methods:

Basic part 3 ECTS: Lectures for all 14 h, independent working 67 h
The basic part is composed of studying pre-given material, expert lectures (possibly by guest lecturers), and learning task. In addition, the adoption of learning outcomes are measured by separate assignment (e.g. examination or essay).

Seminar part 2 ECTS: Contact teaching in small study programme groups 10 h, independent working 44 h
The assignment can be for instance learning portfolio, which combines the contents of basic part and student's own life-world experiences.

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:

(in applicable parts; to be negotiated with instructor):

- Arum, R., Beattie, I. R. & Ford, K. (Eds.). (2011). The Structure of schooling: Readings in the sociology of education. Los Angeles: SAGE.
- Ballantine, J. H. & Spade, J. Z. (Eds.). (2012). Schools and society: A sociological approach to education. Los Angeles: SAGE.
- Demaine, J. (Ed.). (2001). Sociology of education today. London: Palgrave.
- Simola, H. (Ed.). (2014). Finnish education mystery: Historical and sociological essays on schooling in Finland. London: Routledge.
- Verdugo, R. R. (Ed.). (2014). Educational reform in Europe: History, culture, and ideology. Information Age Publishing.
- Original text from one of these theorists: Louis Althusser, Basil Bernstein, Pierre Bourdieu, Michel Foucault, Henry Giroux, Jürgen Habermas, Axel Honneth, Peter Jarvis, Peter McLaren, Paul Willis, or Thomas Ziehe.

Assessment methods and criteria:

Basic part 3 ECTS.
Assessment method: Both learning task and examination or essay based on the learning material and lectures.

Seminar part 2 ECTS.
Assessment method: Learning portfolio in study group working

The assessment criteria are weighted in the following way:

- first learning outcome is highlighted in learning task (Basic part)
- all three learning outcomes are highlighted in examination or essay (Basic part)
- third learning outcome is highlighted in portfolio (Seminar part)

In approved (Pass) completion of the course, the use of central concepts of social sciences in educational research and analytical handling of basic issues in various contexts of education and growth is clearly structured, and matters are connected to each other at least to some degree. The handling of social, multicultural and juridical issues related to education and schooling in everyday life situations is reflective, and connections between matters are handled at least to some degree. In addition, the description of the historical, socio-political and professional starting points of Finnish education system and educational politics is clear and appropriate. In all assignments, there has to be a visible plot and mainly the use of references has to be at a good level.

In not approved (Fail) completion of the course, student's study products are unfinished, fragmentary and

superficial, matters are presented in disconnected way, or the presentation does not show own thinking nor acquisition to the core themes of the course. Study material is not utilized sufficiently, and references are weakly used.

Grading:

pass/fail

Person responsible:

Vesa Puuronen (Veli-Matti Ulvinen)

Working life cooperation:

The seminar part contains working life cooperation.

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

Timing:

4. year, 1. period

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
- utlilization 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

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: Eetu Pikkarainen

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. For ITE students: English

Timing:

1st year

Learning outcomes:

- 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

Target group:

ITE, LO, Taika, Tekno, Vaka, Kako, AO, Avoin, AMOK

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:

Jouni Peltonen, Eetu Pikkarainen

Working life cooperation:

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

050126A: Subject Didactics/Music, 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:

4. year, autumn

Learning outcomes:

- Having completed the study module, the student knows how to apply the working methods and learning environments of music education in a variety of ways to the contents and teaching materials of primary and secondary schools, and how to evaluate the progress of learning processes.
- The student knows how to apply the main methods of music education in various learning environments.
- The student gets practice in constructing lesson and period plans.
- Having completed the study module, the student knows how to view the activities of a music teacher as an artistic and cultural actor in the school communities and how to plan for events to involve different target groups, making use of the working methods and learning environments of music education.

Contents:

- The course introduces the student to the national core curriculum and to the municipal curricula.
- The course involves themes of special education, youth culture, multiculturalism and developmental psychology.
- Construction and analysis of the student's own music educatorship, professional identity

Mode of delivery:

Blended lectures, indepedent work alone or in groups

Learning activities and teaching methods:

Lectures 40 h, independent work 95 h

Target group:

Students of music education

Prerequisites and co-requisites:

Broad-based subject didactics 050122A
Theories and Practices of Music Education 422268A

Recommended optional programme components:

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

Recommended or required reading:

Current teaching materials in music, core curricula.
Materials to be handed out during the course.

Assessment methods and criteria:

Participation in the exercises.
Continuous assessment is used in the course, with a final examination.
A learning diary is kept on the lectures and independent work.

Grading:

0-5

Person responsible:

Kari Kuivamäki

Working life cooperation:

Advanced Teaching Practice

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

Timing:

4. year, 2. period

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 ach) 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

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

Voimassaolo: 01.01.2010 -

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Faculty of Science

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
1-4 credits
Language of instruction:
Finnish
Timing:
1st-5th year

300002M: Advanced Information Skills, 1 op

Voimassaolo: 01.08.2009 -

Opiskelumuoto: Other Studies

Laji: Course

Vastuuyksikkö: Faculty of Science

Arvostelu: 1 - 5, pass, fail

Opettajat: Ursula Heinikoski

Opintokohteen kielet: Finnish

ECTS Credits:
1 ECTS credit / 27 hours of work
Language of instruction:
Finnish
Timing:
The course is held once in the autumn semester, during period II and in the spring semester, during period IV. Intended for degree students working on their diploma/master’s thesis.
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
- understands the principles of scientific publishing
- can use the 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 RefWorks reference management tool.
Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Lectures 10 h, self-study 17 h
Target group:
Optional
Recommended or required reading:
Web learning material:
http://libguides.oulu.fi/tieteellinentiedonhankinta
http://libguides.oulu.fi/julkaisujenarviointi
Assessment methods and criteria:
Passing the course requires participation in the lectures and successful completion of the course assignments.
Grading:
pass/fail
Person responsible:
Ursula Heinikoski

750033Y: Tutorial for new students, 1 op

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Vanhatalo, Minna-Liisa, Annamari Markkola

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
1 ECTS credit / 27 hours of work
Language of instruction:
Finnish.
Timing:
B.Sc. 3 rd autumn / M.Sc. 1 st autumn.
Learning outcomes:
Course develops students' skills to guide, make presentations, work in group and organize. It also advances planning, arrangement and guidance abilities as well as responsibility.
Contents:
The student guides a group of new students during the orientation course introducing them to the university, academic learning environment, the department, curriculum and other students with the help of small group meetings and presentations.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Tutorials and presentations. Minimum 15 hours. In addition indenpendent work includes the preparation of the tutorials.
Target group:
Second and third year biology students.
Prerequisites and co-requisites:
Course 750031Y.
Recommended optional programme components:
-
Recommended or required reading:
Study guide and training material.
Assessment methods and criteria:
Tutoring report.

Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Doc. annamari Markkola and Ph.Lic. Minna Vanhatalo.
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 professor in beforehand.
Mode of delivery:
Itsenäinen opiskelu: kirjatentti.
Learning activities and teaching methods:
Book exam (3 h). Exam is held in Examinarium, instructions: http://www.oulu.fi/english/studying/examinarium
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, doc. Kari Koivula February-April 2019):

- 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. Annamari Markkola):

- 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 (doc. Heikki Helanterä):

- Lewin Genes (XI) (or equal)

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

- Nielsen, R. ja Slatkin, M. 2013 An introduction to population genetics. Sinauer, 287 p.

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

Animal physiology orientation (Henrika Honkanen):

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

Plant physiologi orientation (prof. Hely Häggman)

- Beeckman 2009. Root Development. Annual Plant Reviews 37. - Wiley-Blackwell. ISBN 978-1-4051-6150-3
- Coruzzi Gutierrez 2009. Plant Systems Biology. Annual Plant Reviews 35. - Wiley-Blackwell. ISBN 978-1-4051-6283-8.
- Dickison, W.C. 2000. Integrative plant anatomy. 533 s. ISBN 0-12-215170-4
- Fahn, A. 1990. Plant anatomy. 4. rev. ed. 588 s. ISBN 0-08-037490
- Gan 2007. Senescence processes in plants. - Wiley-Blackwell. ISBN 978-0-8138-1963-1
- Hayat, Mori, Pichtel & Ahmad 2010. Nitric oxide in plant physiology. - Wiley-Blackwell. ISBN 978-3-527-32519-1
- Hvoslef-Eide, A.K. & Preil, W. 2005. Liquid culture systems for in vitro plant propagation. Springer ISBN 1-4020-3199-8
- Jenks & Wood 2009. Genes for Plant Abiotic Stress. - Wiley-Blackwell. ISBN 978-1-4051-3984-7
- Kinight, Perroud, Cove 2009. The Moss Physcomitrella- Annual Plant Reviews, volume 36 - Wiley-Blackwell. ISBN 978-1-4051-8189-1.
- Lambers, H., Chapin III, F.S., Pons, T.L. 2008. Plant physiological ecology. Springer. 610 p. ISBN 978-0-387-78340-6
- Osbourn, A.E. & Lanzotti, V. 2009. Plant-derived natural products: synthesis, function, and application. 587 s. Springer. (Printed or electronical book version in the library)
- Parker 2008. Molecular aspects of plant disease resistance. Annual Plant Reviews , volume 34. - Wiley-Blackwell. ISBN 978-1-4051-7532-6
- Reed, B.M. 2008. Plant Cryopreservation: A Practical Guide. Springer ISBN 978-0-387-72275-7
- Smith & Read 2008. Mycorrhizal symbiosis. 3. painos. Academic Press. 800 p.
- Taiz, L. et al. 2015. Plant Physiology and Development. Sixth Edition.761 p. Sinauer Associates, Inc. ISBN-9781605352558
- Wink 2010. Biochemistry of plant secondary metabolism. Annual Plant Reviews, volume 40. - Wiley-Blackwell. ISBN 978-1-4051-83970. Electronical book. Link can be found for example from OULA library cataloque. Dawsonera can be accessed with koivu/paju password. http://www.dawsonera.com/depp/reader/protected/external/AbstractView/S9781444320510
- Yeo & Flowers 2007. Plant Solute Transport. - Wiley-Blackwell. ISBN 978-1-4051-3995-3
- Yoshioka & Shinozaki 2009. Signal Crosstalk in Plant Stress Responses - Wiley-Blackwell. ISBN 978-0-8138-1963-1

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

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:

1-5 / Fail.

Person responsible:

M.Sc. Henrika Honkanen, Prof. Hely Häggman, Doc. Annamari Markkola, Prof. Timo Muotka or Doc. Heikki Helanterä.

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: 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 opponenting, eight research seminar and eight result seminar attendances. Research plan seminar and results seminar presentations cannot be given at same day. Topics and dates have to be agreed with the professor in beforehand. See degree programme notice board for the schedule and instructions.
Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Seminar presentations, attendance and opponenting. Detailed instructions on the 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 Master of Science Thesis, the student will give summary in Finnish, Swedish or English to show his/her familiarity with the topic of the thesis. If the international degree student has not done a maturity exam in her /his B.Sc. degree the student has to make a 4 pages long essay about the thesis subject in Examinarium.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Instructions at the Faculty of Science internet homepage. One teacher examine the maturity exam and Pro gradu working group accepts it.
Target group:
Compulsory to the biology students. After completing the thesis.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Summary form at the Faculty of Science internet homepage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Hely Häggman, Prof. Jari Oksanen, Prof. Markku Orell or Prof. Outi Savolainen.
Working life cooperation:
No.
Other information:
-

750658S: Pro gradu thesis in biology, 40 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Diploma thesis

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

ECTS Credits:
40 ECTS credits / 1067 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st or 2 nd year.
Learning outcomes:
Student knows the research methods in specific field of biology. She is conversant with her field of thesis and is able to scientific thinking, estimating the results, analysing, drawing conclusions and scientific communicating.
Contents:
Literary work which in general includes experimental research work. Student gets profoundly acquainted on certain special field in biology.

Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Independent research work on a scientific subject in agreement with the responsible professor and under the supervision of the Department. The supervisors may be professors of the department, docents and other teachers and researchers who have the docent's status. The student may
have several supervisors, the other supervisor may be from other department, university (also abroad) or from research institute. The subject must be agreed on with the professor in advance. The research work can contain fieldwork, laboratory work, theoretical work or work on collections in museum. The work always includes a literature survey. After having completed the thesis, the student writes the Maturity Exam. The programme director will order the final examiners by the proposal of the professor. Pro gradu working group accepts and grades the thesis on the basis of the final examiners' opinions.
Target group:
ECO and BS: compulsory 40 cr. TEA: 40 cr. optional. So called didactic pro gradu thesis cannot be 40 cr.
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:
1-5 / Fail.
Person responsible:
M.Sc. Henrika Honkanen, Prof. Hely Häggman, prof. Jari Oksanen, Prof. Timo Muotka or Prof. Outi Savolainen.
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 cr / 133 hours of work.
Language of instruction:
Finnish / 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. Usage of molecular methods for identification of species, sex and individuals, behavioral ecology (mating systems, cooperation, mating success) and conservation.
Mode of delivery:
Face-to-face teaching.

Learning activities and teaching methods:
22 h lectures, 24 h exercises (problem solving, laboratory and computer exercises), 4 h seminars, take-home exam.
Target group:
B.Sc. 2nd spring BSg, M.Sc. 1st spring, ECOGENgen 1st spring, genetics: compulsory in M.Sc. degree.
Prerequisites and co-requisites:
Concepts of genetics (757109P), Experimental course in general genetics (757110P) and Molecular evolution (757312A) or equivalent knowledge.
Recommended optional programme components:
Compulsory prequisite for courses Experimental course in evolutionary genomics (757621S), Advanced course in bioinformatics (757619S) and DNA analysis in population genetics (757618S). Recommended prerequisite for course Quantitative genetics (805338A).
Recommended or required reading:
Hamilton, M. B. 2009: Population genetics, Wiley-Blackwell.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Take-home exam, problem solving, laboratory and computer exercises, seminar.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail.
Person responsible:
Doc. Lumi Viljakainen.
Working life cooperation:
No.
Other information:
Note that Introduction to 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: Tanja Pyhäjärvi

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

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.
Learning activities and teaching methods:
24 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:
1-5 / Fail.
Person responsible:
Doc. Tanja Pyhäjärvi.
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: Lumi Viljakainen

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 from different organisms, estimate the quality and measure the quantity of DNA, amplify DNA fragments, design PCR primers, clone and sequence DNA. The student is able to evaluate her results and optimize the methods and is able to make a scientific report.
Contents:
Isolation of genomic DNA, amplification of DNA by PCR, primer design, DNA sequencing, basic analysis of DNA-sequence and writing basic scientific reports.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
48 h exercises including demonstrations, 50 h independent work including homework and writing reports.
Target group:
ECOGEN compulsory.
Prerequisites and co-requisites:
Consepts of genetics (757110P) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Reports.
Read more about assessment criteria at the University of Oulu webpage.

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

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.

300002M: Advanced Information Skills, 1 op

Voimassaolo: 01.08.2009 -

Opiskelumuoto: Other Studies

Laji: Course

Vastuuyksikkö: Faculty of Science

Arvostelu: 1 - 5, pass, fail

Opettajat: Ursula Heinikoski

Opintokohteen kielet: Finnish

ECTS Credits:
1 ECTS credit / 27 hours of work
Language of instruction:
Finnish
Timing:
The course is held once in the autumn semester, during period II and in the spring semester, during period IV. Intended for degree students working on their diploma/master's thesis.
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
- understands the principles of scientific publishing
- can use the 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 RefWorks reference management tool.
Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Lectures 10 h, self-study 17 h
Target group:
Optional
Recommended or required reading:
Web learning material:
http://libguides.oulu.fi/tieteellinentiedonhankinta
http://libguides.oulu.fi/julkaisujenarviointi
Assessment methods and criteria:
Passing the course requires participation in the lectures and successful completion of the course assignments.

Grading:
pass/fail
Person responsible:
Ursula Heinikoski

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: Ursula Heinikoski, Sassali, Jani Henrik

Opintokohteen kielet: English

ECTS Credits:
1 ECTS credits / 27 hours of work
Language of instruction:
English
Timing:
International students in their 1st academic year, of Master's Degree Programme in Environmental Engineering and Industrial Engineering and Management (Product Management). The course is held once in the autumn semester, during period II and, once 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 RefWorks reference management tool.
Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Training sessions 8h, group work 7h, self-study 12 h
Target group:
The course is compulsory for the international students of Master's Degree Programme in Environmental Engineering (BEE) and for the Master's Degree Programme in Industrial Engineering and Management (Product Management)), and optional for other degree students working on their diploma/master's thesis.
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
Web learning material: "Finding scientific information" http://libguides.oulu.fi/findinginformation
Assessment methods and criteria:
Passing the course requires active participation in the training sessions and successful completion of the course assignments.

Grading:
Pass/fail
Person responsible:
Ursula Heinikoski
Working life cooperation:
-
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 professor in beforehand.
Mode of delivery:
Itsenäinen opiskelu: kirjatentti.
Learning activities and teaching methods:
Book exam (3 h). Exam is held in Examinarium, instructions: http://www.oulu.fi/english/studying/examinarium
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, doc. Kari Koivula February-April 2019):

- 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. Annamari Markkola):

- 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 (doc. Heikki Helanterä):

- Lewin Genes (XI) (or equal)

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

- Nielsen, R. ja Slatkin, M. 2013 An introduction to population genetics. Sinauer, 287 p.

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

Animal physiology orientation (Henrika Honkanen):

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

Plant physiologi orientation (prof. Hely Häggman)

- Beeckman 2009. Root Development. Annual Plant Reviews 37. - Wiley-Blackwell. ISBN 978-1-4051-6150-3
- Coruzzi Gutierrez 2009. Plant Systems Biology. Annual Plant Reviews 35. - Wiley-Blackwell. ISBN 978-1-4051-6283-8.
- Dickison, W.C. 2000. Integrative plant anatomy. 533 s. ISBN 0-12-215170-4
- Fahn, A. 1990. Plant anatomy. 4. rev. ed. 588 s. ISBN 0-08-037490
- Gan 2007. Senescence processes in plants. - Wiley-Blackwell. ISBN 978-0-8138-1963-1
- Hayat, Mori, Pichtel & Ahmad 2010. Nitric oxide in plant physiology. - Wiley-Blackwell. ISBN 978-3-527-32519-1
- Hvoslef-Eide, A.K. & Preil, W. 2005. Liquid culture systems for in vitro plant propagation. Springer ISBN 1-4020-3199-8
- Jenks & Wood 2009. Genes for Plant Abiotic Stress. - Wiley-Blackwell. ISBN 978-1-4051-3984-7
- Kinight, Perroud, Cove 2009. The Moss Physcomitrella- Annual Plant Reviews, volume 36 - Wiley-Blackwell. ISBN 978-1-4051-8189-1.
- Lambers, H., Chapin III, F.S., Pons, T.L. 2008. Plant physiological ecology. Springer. 610 p. ISBN 978-0-387-78340-6
- Osbourn, A.E. & Lanzotti, V. 2009. Plant-derived natural products: synthesis, function, and application. 587 s. Springer. (Printed or electronical book version in the library)
- Parker 2008. Molecular aspects of plant disease resistance. Annual Plant Reviews , volume 34. - Wiley-Blackwell. ISBN 978-1-4051-7532-6
- Reed, B.M. 2008. Plant Cryopreservation: A Practical Guide. Springer ISBN 978-0-387-72275-7
- Smith & Read 2008. Mycorrhizal symbiosis. 3. painos. Academic Press. 800 p.
- Taiz, L. et al. 2015. Plant Physiology and Development. Sixth Edition.761 p. Sinauer Associates, Inc. ISBN-9781605352558
- Wink 2010. Biochemistry of plant secondary metabolism. Annual Plant Reviews, volume 40. - Wiley-Blackwell. ISBN 978-1-4051-83970. Electronical book. Link can be found for example from OULA library cataloque. Dawsonera can be accessed with koivu/paju password. http://www.dawsonera.com/depp/reader/protected/external/AbstractView/S9781444320510
- Yeo & Flowers 2007. Plant Solute Transport. - Wiley-Blackwell. ISBN 978-1-4051-3995-3
- Yoshioka & Shinozaki 2009. Signal Crosstalk in Plant Stress Responses - Wiley-Blackwell. ISBN 978-0-8138-1963-1

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

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:

1-5 / Fail.

Person responsible:

M.Sc. Henrika Honkanen, Prof. Hely Häggman, Doc. Annamari Markkola, Prof. Timo Muotka or Doc. Heikki Helanterä.

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: 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 opponenting, eight research seminar and eight result seminar attendances. Research plan seminar and results seminar presentations cannot be given at same day. Topics and dates have to be agreed with the professor in beforehand. See degree programme notice board for the schedule and instructions.
Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Seminar presentations, attendance and opponenting. Detailed instructions on the 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 Master of Science Thesis, the student will give summary in Finnish, Swedish or English to show his/her familiarity with the topic of the thesis. If the international degree student has not done a maturity exam in her /his B.Sc. degree the student has to make a 4 pages long essay about the thesis subject in Examinarium.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:

Instructions at the Faculty of Science internet homepage. One teacher examine the maturity exam and Pro gradu working group accepts it.
Target group:
Compulsory to the biology students. After completing the thesis.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Summary form at the Faculty of Science internet homepage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Hely Häggman, Prof. Jari Oksanen, Prof. Markku Orell or Prof. Outi Savolainen.
Working life cooperation:
No.
Other information:
-

750658S: Pro gradu thesis in biology, 40 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Diploma thesis

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

ECTS Credits:
40 ECTS credits / 1067 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st or 2 nd year.
Learning outcomes:
Student knows the research methods in specific field of biology. She is conversant with her field of thesis and is able to scientific thinking, estimating the results, analysing, drawing conclusions and scientific communicating.
Contents:
Literary work which in general includes experimental research work. Student gets profoundly acquainted on certain special field in biology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Independent research work on a scientific subject in agreement with the responsible professor and under the supervision of the Department. The supervisors may be professors of the department, docents and other teachers and researchers who have the docent's status. The student may
have several supervisors, the other supervisor may be from other department, university (also abroad) or from research institute. The subject must be agreed on with the professor in advance. The research work can contain fieldwork, laboratory work, theoretical work or work on collections in museum. The work always includes a literature survey. After having completed the thesis, the student writes the Maturity Exam. The programme director will order the final examiners by the proposal of the professor. Pro gradu working group accepts and grades the thesis on the basis of the final examiners' opinions.
Target group:

ECO and BS: compulsory 40 cr. TEA: 40 cr. optional. So called didactic pro gradu thesis cannot be 40 cr.
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:
1-5 / Fail.
Person responsible:
M.Sc. Henrika Honkanen, Prof. Hely Häggman, prof. Jari Oksanen, Prof. Timo Muotka or Prof. Outi Savolainen.
Working life cooperation:
Thesis is made in research groups.
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. 2 nd spring or M.Sc. 1 st spring, ECOGEN ECO and BS.
Learning outcomes:
This course introduces genetic theories, basics of phylogenetics and usage of molecular biology methods in ecology. The aim is that students know the basic methodology, can apply them into variety of genetic and ecological questions and is familiar with basics of population genetics and phylogenetics in order to be able to analyze and interpret genetic data.
Contents:
Basics of population genetics (variation, effective population size, bottlenecks, population structure, gene flow), relationships between molecular and adaptive variation, phylogenetic methods and phylogeography. Usage of molecular methods for identification of species, sex and individuals, behavioural ecology (mating systems, cooperation, mating success) and conservation.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
20 h lectures, 36 h exercises (laboratory and computer exercises), seminar, final exam.
Target group:
M.Sc. degree: 1st spring ECO optional, ECOGEN eco 1st spring compulsory.
Prerequisites and co-requisites:
Concepts of genetics (757109P), Experimental course in general genetics (757110P) and Molecular evolution (757312A) or equivalent knowledge.
Recommended optional programme components:
ECO: Basics in population ecology (756351A) and Advanced course in population ecology (755626S).
ECOGENeco: Basics in population ecology (756351A).
Recommended or required reading:

Beebee, T and Rowe G.2004 or 2008. An introduction to molecular ecology. Oxford University Press.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Final exam and seminar.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Laura Kvist.
Working life cooperation:
No.
Other information:
Note that Introduction to Molecular ecology and Introduction to population genetics courses are alternative; students cannot get credits from both.

755625S: Methods in ecology I, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Koivula

Opintokohteen kielet: English

Leikkaavuudet:

750644S	Methods in ecology I	6.0 op

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

Grading:

1-5 / Fail.
Person responsible:
Doc. Kari Koivula and Doc. Seppo Rytkönen.
Working life cooperation:
No.
Other information:
-

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 Rytkönen

Opintokohteen kielet: English

Leikkaavuudet:

750647S	Methods in ecology II	7.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
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 wiki-pages.
Assessment methods and criteria:
Exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Seppo Rytkönen and Doc. Kari Koivula.
Working life cooperation:
No.
Other information:
-

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.

Choose from

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

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

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

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
2-5 ECTS credits / 53-133 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. or Ph.D. degree. Arranged if resources allow.
Learning outcomes:
Students will be acquainted to current issues in biology.
Contents:
Seminars on current issues in biology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Course specific.
Target group:
Biology students.
Prerequisites and co-requisites:
Varying.
Recommended optional programme components:
-
Recommended or required reading:
Varying.

Assessment methods and criteria:

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

Grading:

1-5 / Fail or Pass / Fail.

Person responsible:

Prof. Timo Muotka, Prof. Jari Oksanen, Prof. Outi Savolainen and Prof. Hely Häggman.

Working life cooperation:

No.

Other information:

-

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

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

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

ECTS Credits:

2-5 ECTS credits / 53-133 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. or Ph.D. degree. Arranged if resourses allow

Learning outcomes:

Students will be acquainted to current issues in biology.

Contents:

Seminars on current issues in biology.

Mode of delivery:

Varying.

Learning activities and teaching methods:

Varying.

Target group:

Biology students.

Prerequisites and co-requisites:

Varying.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

Varying.

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

Grading:

1-5 / Fail or Pass / Fail.

Person responsible:

Prof. Timo Muotka, Prof. Jari Oksanen, Prof. Outi Savolainen and Prof. Hely Häggman.

Working life cooperation:

No.

Other information:

-

750615S: Practical training, 10 - 15 op

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

ECTS Credits:

10-15 ECTS credits / 380-570 hours of traineeship work.

Language of instruction:

Finnish / English.

Timing:

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

Learning outcomes:

The aim of the course is for students to gain work experience in their own field of biology. Student applies the theoretical knowledge gained during the studies in practice.

Contents:

Minimum training period is two months full day work 10 cr. Students can obtain 15 credits for three months versatile training depending on the length and intensity of it. Student can do the training period in Finland or during her/his exchange period or train otherwise abroad.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

The trainee has to keep a journal of the work and its background factors. This journal and a summary of 6-8 pages have to be handed in to the responsible contact person after the training period. The summary should contain information on the training place, the ongoing research, the trainee's own work and its results. The journal is returned to the student after the summary has been approved. The student has also to be given a reference of the work. Offered training placements are announced in the internet page of Extension School. Entering for the practical training is made in 3rd autumn. Normally, the student has to find him/herself a placement in public or private sectors or abroad.

Target group:

Compulsory to BS and ECO in the M.Sc. degree.

Prerequisites and co-requisites:

About 80 credit amount of biology courses.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

Journal and final report.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Pass / Fail.

Person responsible:

Contact person Minna Vanhatalo. The supervisors of the practical training are Prof. Timo Muotka (ECOz), Prof. Jari Oksanen (ECOb), Prof. Hely Häggman (BSb), M.Sc. Henrika Honkanen (BSz) and Prof. Outi Savolainen (BSg).

Working life cooperation:

Yes. Participating to biology project gives working life skills.

Other information:

The student has to contact the professor and discuss about the suitability of the internship place in beforehand.

750613S: Research training, 2 - 15 op

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

ECTS Credits:

1-14 ECTS credits / 27-405 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. degree.

Learning outcomes:

Student applies the education given knowledge and skills in working life to gain hands-on experience.

Contents:

Work on special projects in the different biology research groups at the department or elsewhere or independent project work including field and/or laboratory work or work at the biological stations. The work is not included to other study modules in biology.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

The topic and the study plan have to be agreed on in advance (registration form). The student has to keep diary and prepare a report on the work.

Target group:

-

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

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

Grading:

Pass / Fail.

Person responsible:

Doc. Seppo Rytkönen ja Doc. Annamari Markkola (ECO), Prof. Outi Savolainen and Prof. Hely Häggman (BS).

Working life cooperation:

Yes. Participating to biology project gives working life skills.

Other information:

-

750661S: Research group seminar, 2 - 4 op

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

ECTS Credits:

2-4 ECTS credits / 53-107 hours of work.

Language of instruction:

Finnish / English.

Timing:

Autumn-spring.

Learning outcomes:

Students concern themselves to special features of biological research.

Contents:

Workshop type seminars in different fields of biology help by research groups. Advanced or postgraduate studies. 2 cr. per different seminar series.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

26 h seminars / workshops.

Target group:

M.Sc. or Ph.D. degree.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

Active participation to seminars.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Pass / Fail.

Person responsible:

Prof. Hely Häggman, Prof. Jari Oksanen, Prof. Markku Orell or Prof. Outi Savolainen.

Working life cooperation:

No.

Other information:

-

750618S: Thursday seminar in biology, 2 op

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

ECTS Credits:

2 ECTS credits / 53 hours of work.

Language of instruction:

English.

Timing:

M.Sc. or Ph.D. degree.

Learning outcomes:

Students get knowledge about the current results and theories in biology.

Contents:

Lectures in English on current topics in biology given by guest lecturers from Finland and abroad.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Guest lectures on Thursdays 12 am-1 pm. See seminar programme: https://noppa.oulu.fi/noppa/kurssi/750618s/etusivu

Target group:

Undergraduate and postgraduate students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

10 participations and 10 one page long reports. You can combine lectures from different academic terms to make the needed 10 essays.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Pass / Fail.

Person responsible:

Doc. Helmi Kuittinen.

Working life cooperation:

No.

Other information:

-

750629S: Kaamos symposium, 2 - 4 op

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

ECTS Credits:

2-4 ECTS credits / 53-107 hours of work.

Language of instruction:

English.

Timing:

M.Sc. and Ph.D. autumn.

Learning outcomes:

Students get acquainted to preparing, presenting and evaluating a scientific oral presentation.

Contents:

The Kaamos Symposium consisting of presenting current research projects is held every year at the end of autumn period. Through presenting their research work and projects and obtaining feedback from the audience (students and the staff of the department) post graduate students gain experience in holding a scientific presentation.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Own presentation and the whole symposium 2 cr (postgraduate students). Summary of five presentations and symposium 2 cr (undergraduate students). Poster 0,5 cr (postgraduate students).

Target group:

Undergraduate biology students (2 cr) and postgraduate biology students (2-4 cr).

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Abstract book.

Assessment methods and criteria:

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

Grading:

Pass / Fail.

Person responsible:

Prof. Timo Muotka.

Working life cooperation:

No.

Other information:

-

755633S: Identification of animals, 6 op

Voimassaolo: 01.08.2016 - 31.07.2019
Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Koivula

Opintokohteen kielet: Finnish

Leikkaavuudet:

755634S Identification of animals, vertebrates 4.0 op

ECTS Credits:

6 ECTS credits / 162 hours of work.

Language of instruction:

Finnish / English

Timing:

ECOGEN 1st autumn and spring.

Learning outcomes:

Main point of the course is to learn to indentify Finnish animal species (vertebrate) and families (invertebrate) from museum samples. Basics of species' ecology and classification of organisms.

Contents:

During the autumn semester (9 h lectures in Finnish, 16 h exercises, exam), the Finnish vertebrate fauna is studied using stuffed museum samples. In the spring semester (9 h lectures in Finnish, 16 h exercises, exam) the invertebrate taxons (mostly family- or genus-level) common in Finland are studied using museum samples.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

18 h lectures in Finnish, 32 h exercises, independent studying, 2 exams.

Target group:

ECOGEN.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

This course is needed for attending courses Field course in terrestrial animals (755322A) and Field course in aquatic animals (755321A).

Recommended or required reading:

Course handouts, Itämies J. ja Viro P. 1995: Eläinten lajintuntemus, selkärangattomat, 73 p.; Putaala, A., Marjakangas, A. & Rytkönen, S. 2001: Eläinten lajintuntemus, selkärankaiset, 42 p.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Doc. Kari Koivula.

Working life cooperation:

No.

Other information:

-

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

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

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

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
2-10 ECTS credits / 53-267 hours of work.
Language of instruction:
Depending on the book.
Timing:
B.Sc. degree 2.-3. year or M.Sc. degree 1.-2. year, Ph.D. degree.
Learning outcomes:
Student independently concerns him/herself to special issues in biology.
Contents:
Examinations on books, which are not compulsory in any other course unit.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Book exam in Examinarium.
Target group:
-
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
Literature chosen in agreement with the responsible teacher.
Assessment methods and criteria:
Book exam in Examinarium.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail.
Person responsible:
Prof. Jari Oksanen (ECOb), Prof. Timo Muotka (ECOa), Doc. Kari Taulavuori (ECOb), Doc. Seppo Rytkönen (ECOa), Doc. Annamari Markkola (ECOb), Prof. Outi Savolainen (BSg) and Prof. Hely Häggman (BSb).
Working life cooperation:
No.
Other information:
-

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

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

ECTS Credits:

2-6 ECTS credits / 53-160 hours of work. About 100 pages / 1 ECTS credit.

Language of instruction:

Most books are in English.

Timing:

B.Sc. or M.Sc. degree.

Learning outcomes:

To understand environmental protection in global context.

Contents:

Depends on the book.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Three times per both semesters in university exam days. Exam days are announced in WebOodi.

Target group:

Biology, geography, geology, environmental engineering, exchange students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Gaston & Spicer (2004) Biodiversity – an introduction. Blackwell Publishing, 191p; Lockwood et al. (2007) Ivasion Ecology, Blackwell Publishing, 304 p; ACIA (2005) Arctic Climate Impact Assessment, Cambridge University Press, 1042 p.; Dincer et al. (2013) Causes, Impacts and Solutions to Global Warming, Springer, 1183 p.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Doc. Kari Taulavuori.

Working life cooperation:

No.

Other information:

Student has to consult about the selected literature before exam.

755621S: Aquatic ecology field course, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Muotka, Timo Tapani, Heikki Mykrä

Opintokohteen kielet: English

Leikkaavuudet:

751607S Field course in aquatic animals 4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

ECOGEN ECOz 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: 6 h lectures in Oulu and 50 h of field work and demonstrations at the Oulanka research station, reading package and independent studying.

Target group:

ECOGEN.

Prerequisites and co-requisites:

Basic identification of animals (755333A) or equivalent knowledge (if necessary, selection to the course 755321A can be based on success in course 755333A).

Recommended optional programme components:

This course is a prerequisite for the following: Winter ecology and physiology (750377A), Special course in aquatic invertebrates (754627S), Assessment and monitoring of the ecological status of water bodies (754625S), Field methods in freshwater biomonitoring (754626S).

Recommended or required reading:

Reading package, handouts and lectures given before / during the course.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Prof. Timo Muotka.

Working life cooperation:

No.

Other information:

-

755622S: Terrestrial animals field course, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Seppo Rytkönen

Opintokohteen kielet: English

Leikkaavuudet:

751606S	Field course in terrestrial animals	4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

ECOGEN ECOz 1st summer.

Learning outcomes:

The aim of the course is to learn the basics of field identification and ecology of terrestrial animals in northern Finland. The student will understand that proper skills in species identification and knowledge of species' ecology are the basis of ecological research.

Contents:

The fauna in different kinds of terrestrial habitats is studied using several ecological sampling and research methods. The course is hold at the Oulanka Research Station, Kuusamo, and deals with identification and ecology of invertebrates, mammals (especially small mammals), gallinaceous birds and birds of prey. The exercises take place partly in the field and partly in the laboratory. Data gained during the course is analyzed. The results are reported (in PowerPoint) and presented in the final seminar in Kuusamo.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Part 1. (Oulu): 2 h demonstrations, independent studying. Part 2. (Oulanka): 49 h exercises and demonstrations, species and theory exam, seminar.

Target group:

ECOGEN.

Prerequisites and co-requisites:

Basic identification of animals (755333A) or equivalent knowledge.

Recommended optional programme components:

This course is a prerequisite to course Winter ecology and physiology (750377A).

Recommended or required reading:

Compulsory at Oulanka: 1) Rytkönen, S. ym. 2003: 751306 Maaeläimistön tuntemus ja ekologia. - Biologian laitoksen monisteita 3/2003. Oulun yliopisto, Oulu. 2) Pentinsaari, M. ym. 2015: Eläinten lajintuntemus, selkärangattomat. Oulun yliopisto, Oulu. Insect book recommended: Chinery, M. 1988 Pohjois-Euroopan hyönteisheimojen määritysopas, Tammi, Helsinki, 2. painos.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Theory exam, species identification exam, seminar presentation.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Doc. Seppo Rytkönen.

Working life cooperation:

No.

Other information:

Binoculars, bird identification book, suitable outfit. Preparation knife, preparation scissors and sharp cusp tweezers.

756647S: Conservation of biodiversity, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Phillip Watts

Opintokohteen kielet: English

Leikkaavuudet:

750621S	Conservation of biodiversity	3.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

English.

Timing:

M.Sc. ECOGEN.

Learning outcomes:

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

Contents:

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

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

28 h lectures, literature, exam.

Target group:

ECOGEN students (code S). Other students (code A).

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Hanski I. 2005: The Shrinking World. International Ecology Institute, Oldendorf/Luhe, Germany.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Dr. Phillip Watts.

Working life cooperation:

No.

Other information:

-

755632S: Restoration ecology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola, Tolvanen, Anne Kristiina

Opintokohteen kielet: Finnish

Leikkaavuudet:

756607S	Restoration ecology	2.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. degree.

Learning outcomes:

Lectures: the student understands the ecological principles of restoration and remembers the basics of restoration options in different ecosystems. Exercises and excursion: the student is able to evaluate the need for restoration and possibilities of an ecosystem to regenerate, and apply the restoration techniques in practical restoration planning.

Contents:

Land-use impacts and ecosystem malfunctions caused by humans, ecological principles of restoration, prevention and restoration of manmade damage in the ecosystems. Examples from restoration options and practical techniques in terrestrial and aquatic ecosystems, and cultural landscapes.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

24 h lectures, exercises and an excursion.

Target group:

ECO.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Andre Clewell, James Aronson 2008: Ecological Restoration, Principles, Values, and Structure of an Emerging Profession, Island Press, 230 p. and articles in the Restoration Ecology journal.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Prof. Anne Tolvanen.

Working life cooperation:

No.

Other information:

-

750677S: Winter ecology and physiology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

Leikkaavuudet:

750625S	Winter ecology and physiology	3.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

English.

Timing:

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

Learning outcomes:

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

Contents:

Two independent units: 1) Winter ecology and physiology course (7 h lectures and 13 h laboratory practicals and 4 h seminar in Oulu, and 4 day long field excursion to the Oulanka Research Station (total about 50 h, 3 cr); 2) Book exam on a common exam day 2 cr: Marchand, P. J. 1996: Life in the cold. An introduction to winter ecology.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures, exercises, report and seminar presentation.

Target group:

Biology students.

Prerequisites and co-requisites:

Courses Basics of ecology (750124P), Cell biology (750121P), Terrestrial animals field course (755322A), Aquatic ecology field course (755321A), Plant ecology field course (756343A), and Basics of plant biology, lectures (756346A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

Marchand, P. J. 1996: Life in the cold. An introduction to winter ecology. (3rd edition). University Press of New England. 304 p.

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

Assessment methods and criteria:

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

Grading:

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

Person responsible:

Doc. Kari Taulavuori.

Working life cooperation:

No.

Other information:

-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

ECTS Credits:

5 (- 8) cr / 133 (- 240) hours of work.

Language of instruction:

Finnish / English.

Timing:

B. Sc. / M. Sc. / Ph.D., (excursion arranged if resources alow).

Learning outcomes:

Student can identify the ecological and environmental effects of climate change and air pollution in the subarctic area. In addition, the student may learn basic research methods related to topic, and how to use the facilities provided by the subarctic research stations in the research.

Contents:

Lectures deal the ecological responses of global change and air pollution. The content is focused on the environmental effects and their ecological significance in the northern areas. During excursion the student familiarizes with the special features of northern areas and explores the action and research carried out in the northern research stations.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

1) 24 h lectures with exam, and 15 h independent studies (assay and seminar work) (5 cr); **(2)** 4 days summer excursion and closing seminar (3 cr); participation in excursion necessitates accepted credits in the first part (lectures, independent studies).

Target group:

Ecology students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

-ACIA (2005) Arctic Climate Impact Assessment, Cambridge University Press, 1042 p. -AMAP Assessment 2006: Acidifying Pollutants, Arctic Haze, and Acidification in the Arctic. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. Xii + 112pp. Bell JNB & Trehow M (eds.) 2002. Air pollution and plant life. Wiley. 2nd edition. 480 pages.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Lectures, assay and seminar, excursion, closing report and seminar.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail
Read more about assessment criteria at the University of Oulu webpage.

Person responsible:

Doc. Kari Taulavuori.

Working life cooperation:

Possible excursion will include tours to the norther research stations.

Other information:

Field excursion is arranged if resources allow.

755624S: Functional animal ecology, 5 op

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

751678S	Functional animal ecology	6.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Lectures in Finnish, exercises in Finnish / English.

Timing:

B.Sc. 2 nd spring or M.Sc. 1 st spring. NNE.

Learning outcomes:

The aim of the course is to understand the relationship between morphology and function by the means of general ecomorphological model. The student will get both theoretical and practical basics for ecomorphological (and. general scientific) research procedures: scientific hypothesizing, sampling, data analysis and reporting and interpreting the results.

Contents:

The course focuses on the relationship between phenotype and function, especially the correlation between animal morphology and behaviour. The course consists of two parts: A) Lectures in Finnish. However, articles about each subject are available for foreign students, including ecomorphological models and correlations, measurement error, allometry, fluctuating asymmetry and phylogenetic analyses. B) Exercises consisting of miniature studies, field and laboratory work, and seminar. The results of the mini studies, in form of PowerPoint presentations, are presented in the seminar. Before the exercises, students write a home essay (or take an exam).

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

12 h lectures, 40 h exercises, seminar and essay (or exam).

Target group:

Recommended for ecology students.

Prerequisites and co-requisites:

Recommended Evolution, systematics and morphology of animals, practicals (750374A), Introduction to statistics 5 cr (806118P) and A second course in statistics 5 cr (806119P).

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Doc. Seppo Rytkönen.

Working life cooperation:

No.

Other information:

-

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

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

751668S	Wildlife management and game animal ecology	6.0 op

ECTS Credits:

5 cr / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 3rd autumn or M.Sc. 1st autumn (arranged if resources allow).

Learning outcomes:

After carrying out the study module the student will be able to recognize special ecological traits of the game animals and relate them to the general ecological framework. The student will be also to appraise the basics of durable hunting of game animals. The student will be also able to appraise the basics of durable hunting of game animals and critically judge different wildlife management methods from the scientific starting point.

Contents:

The ecology of game species, their life histories, population dynamics and predator-prey relationships. Hunting ecology: man as predator, management and hunting of the game species. The impact of forestry

on the game species' populations. Students are also introduced to wildlife management in practice and to the social aspect of wildlife-human relationship.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

24 h lectures, one-day excursion to a game breeding area, seminar with written reports and exam.

Target group:

-

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

Seminar with report and exam.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Prof. Jouni Aspi ja Doc. Kari Koivula.

Working life cooperation:

Yes.

Other information:

-

756644S: Plant ecology, 5 - 7 op

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

752600S	Plant ecology	7.0 op

ECTS Credits:

5 cr / 133 hours of work.

Language of instruction:

Lectures Finnish, Exercises Finnish / English.

Timing:

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) 24 h lectures as book exam; **(2)** 10 h seminars on the literature of plant ecology; **(3)** 30 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:

ECOGEN ECO optional.

Prerequisites and co-requisites:

Basics of ecology (750124P) and Plant ecology field course (756343A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

Ridge, I. 2002: Plants, Oxford Univ. Press..
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Lecture Book exam (final grade), laboratory diary and seminar presentation (both accepted/rejected).
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Doc. Kari Taulavuori (lectures), doc. Kari Taulavuori and doc. Annamari Markkola (exercises).

Working life cooperation:

No.

Other information:

-

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

Voimassaolo: 01.08.2015 - 31.07.2017
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Annamari Markkola
Opintokohteen kielet: English
Leikkaavuudet:

752603S	Identification of plant species	3.0 op

ECTS Credits:

3-4 ECTS credits / 80-107 hours of work.

Language of instruction:

English.

Timing:

M.Sc. 1st autumn ECOGEN ECOb.

Learning outcomes:

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

Contents:

Demonstrations (16 h) and/or independent study of ca. 350 vascular plants, mosses and lichens in the boreal vegetation zone. 4 cr without the literature in the exam and 3 cr with the literature in the exam. In the identification exam student has to know specimens scientific name and
family in latin.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

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

Target group:

ECOGEN.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

Course done as 4 cr is prerequisite for the Field course in ecological botany (756643S) and for the advanced plant species identification courses.

Recommended or required reading:

Booklet Hanhela, P. & Halonen, P. 1995: Plant Identification.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Species exam. 4 cr without the course handout and 3 cr with the handout.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Doc. Annamari Markkola.

Working life cooperation:

No.

Other information:

-

756643S: Plant ecology field course, 5 op

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

752604S	Field course in ecological botany	5.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

English.

Timing:

ECOGEN 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:

ECOGEN.

Prerequisites and co-requisites:

Identification of plant species, extensive (756354A) 5 cr or equivalent knowledge.

Recommended optional programme components:

Course has capacity for 32 or 40 students. Possible elimination of the candidates is done by study success and Plant identification (756354A) grade. This course is a prerequisite for courses Plant ecology (752600S), Mire ecology (752692S) and Field course in Arctic-Alpine ecology and vegetation (752642S).

Recommended or required reading:

Laitinen et al. 2012: Field course in ecological botany; Hanhela, P. & Halonen, P. 1995: Plant identification; Huttunen, A: 1995: Introduction to forest types; Eurola, S., Hicks, S. and Kaakinen, H. 1994: Key to Finnish mire types, pp. 12-117 in: Moore, P. D. (ed.), 1994 European mires, London Academic Press, London, 367 p.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Field exams, report.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Doc. Annamari Markkola.

Working life cooperation:

Essential working life skills are learned during the field course.

Other information:

-

756604S: Plant ecophysiology in changing environments, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen oppimateriaali:
Lambers, Hans , , 1998

Prasad, M.N.V (ed.), , 1997
Hall, D.O. et al., , 1993
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

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

Learning outcomes:

After finishing the course student understands interactions between plant and environment, and has become acquainted to most important experimental methods in physiological plant ecology and student can apply research parameters. Student can apply the knowledge to plant production and environmental protection issues.

Contents:

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

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

20 h lectures and demonstrations, 35 h exercises, exam and report.

Target group:

ECOb, BSb, Ph.D. students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

Course is related both to plant ecology and plant physiology basic studies.

Recommended or required reading:

Hans Lambers, F.Stuart Chapin III, Thijs L. Pons 2008: Plant Physiological Ecology. Springer Verlag. 540 s. Second edition.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Doc. Kari Taulavuori.

Working life cooperation:

No.

Other information:

-

756649S: Symbiosis, 5 op

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

750346A	Symbiosis	4.0 op
750646S	Symbiosis	4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. degree 3rd spring, M.Sc. 1. or 2nd spring, arranged if resources allow.

Learning outcomes:

The student knows the concept of symbiosis, understands the extent of diversity of symbiotic interactions both at the community and molecular level.

Contents:

Lately new forms of symbiosis have been discovered, extending the diversity of symbiotic interactions. Therefore the significance of symbiosis in biotechnology and for example in human health has increased. Various forms of symbiosis, their importance for the host and interaction at the molecular level are covered.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

30 h Lectures / laboratory work / demonstrations, seminar, essay, lecture diary.

Target group:

BS and ecophysiology students.

Prerequisites and co-requisites:

Studies in bioscience.

Recommended optional programme components:

-

Recommended or required reading:

Lecture notes.

Assessment methods and criteria:

Seminar, essay, lecture diary.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Doc. Anna Maria Pirttilä.

Working life cooperation:

No.

Other information:

-

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: Ursula Heinikoski, Sassali, Jani Henrik

Opintokohteen kielet: English

ECTS Credits:
1 ECTS credits / 27 hours of work
Language of instruction:
English
Timing:
International students in their 1st academic year, of Master's Degree Programme in Environmental Engineering and Industrial Engineering and Management (Product Management). The course is held once in the autumn semester, during period II and, once 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 RefWorks reference management tool.
Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Training sessions 8h, group work 7h, self-study 12 h
Target group:
The course is compulsory for the international students of Master's Degree Programme in Environmental Engineering (BEE) and for the Master's Degree Programme in Industrial Engineering and Management (Product Management)), and optional for other degree students working on their diploma/master's thesis.
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
Web learning material: "Finding scientific information" http://libguides.oulu.fi/findinginformation
Assessment methods and criteria:
Passing the course requires active participation in the training sessions and successful completion of the course assignments.

Grading:
Pass/fail
Person responsible:
Ursula Heinikoski
Working life cooperation:
-
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: Lumi Viljakainen

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 from different organisms, estimate the quality and measure the quantity of DNA, amplify DNA fragments, design PCR primers, clone and sequence DNA. The student is able to evaluate her results and optimize the methods and is able to make a scientific report.
Contents:
Isolation of genomic DNA, amplification of DNA by PCR, primer design, DNA sequencing, basic analysis of DNA-sequence and writing basic scientific reports.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
48 h exercises including demonstrations, 50 h independent work including homework and writing reports.
Target group:
ECOGEN compulsory.
Prerequisites and co-requisites:
Consepts of genetics (757110P) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Reports.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Lumi Viljakainen.
Working life cooperation:
No.
Other information:
-

755626S: Advanced population ecology, 6 op

Voimassaolo: 01.08.2015 - 31.07.2019

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Veli-Matti Pakanen

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

ECTS Credits:
6 ECTS credits / 160 hours of work.
Language of instruction:
Finnish.
Timing:
M.Sc. 1st autumn.
Learning outcomes:
Student learns central methodologies how to derive population vital parameters from various kind of long-term data to apply the information to population viability analysis. The focus is to link modeling methods to real data.
Contents:
Introduction to the mechanisms and factors, which affect the structure, size and dynamics of a population. Topics include e.g. intraspecific relationships of species, predator-prey and parasite-host interactions, competition and the structure of environment and changes in it. Information of the relations between age distribution, birth rate, mortality rate and migration of the population are needed in viability analyses of a population. The aim of the course is to initiate into the methods by which the data of individuals is leaden to the parameters describing the condition and dynamics of the population.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
30 h lectures, 30 h computer exercises, independent work, exam.
Target group:
ECO: compulsory.
Prerequisites and co-requisites:
Basics in population ecology (756351A).
Recommended optional programme components:
-
Recommended or required reading:
Supplementary reading Morris, W.F & Doak, D.F. Quantitative conservation biology. Theory and practice of population viability analysis. Akçakaya, H.R., Burgman, M.A. & Ginzburg, L.R. Applied population ecology. Principles and computer exercises using RAMAS ® EcoLab. Lande, R., Engen,S. & Sæther, B-E. Stochastic population dynamics in ecology and conservation.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
N.N.
Working life cooperation:
No.
Other information:
-

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:
1-5 / 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 professor in beforehand.
Mode of delivery:
Itsenäinen opiskelu: kirjatentti.

Learning activities and teaching methods:
Book exam (3 h). Exam is held in Examinarium, instructions: http://www.oulu.fi/english/studying/examinarium
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, doc. Kari Koivula February-April 2019):

- 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. Annamari Markkola):

- 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 (doc. Heikki Helanterä):

- Lewin Genes (XI) (or equal)

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

- Nielsen, R. ja Slatkin, M. 2013 An introduction to population genetics. Sinauer, 287 p.

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

Animal physiology orientation (Henrika Honkanen):

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

Plant physiologi orientation (prof. Hely Häggman)

- Beeckman 2009. Root Development. Annual Plant Reviews 37. - Wiley-Blackwell. ISBN 978-1-4051-6150-3
- Coruzzi Gutierrez 2009. Plant Systems Biology. Annual Plant Reviews 35. - Wiley-Blackwell. ISBN 978-1-4051-6283-8.
- Dickison, W.C. 2000. Integrative plant anatomy. 533 s. ISBN 0-12-215170-4
- Fahn, A. 1990. Plant anatomy. 4. rev. ed. 588 s. ISBN 0-08-037490
- Gan 2007. Senescence processes in plants. - Wiley-Blackwell. ISBN 978-0-8138-1963-1
- Hayat, Mori, Pichtel & Ahmad 2010. Nitric oxide in plant physiology. - Wiley-Blackwell. ISBN 978-3-527-32519-1
- Hvoslef-Eide, A.K. & Preil, W. 2005. Liquid culture systems for in vitro plant propagation. Springer ISBN 1-4020-3199-8
- Jenks & Wood 2009. Genes for Plant Abiotic Stress. - Wiley-Blackwell. ISBN 978-1-4051-3984-7
- Kinight, Perroud, Cove 2009. The Moss Physcomitrella- Annual Plant Reviews, volume 36 - Wiley-Blackwell. ISBN 978-1-4051-8189-1.
- Lambers, H., Chapin III, F.S., Pons, T.L. 2008. Plant physiological ecology. Springer. 610 p. ISBN 978-0-387-78340-6
- Osbourn, A.E. & Lanzotti, V. 2009. Plant-derived natural products: synthesis, function, and application. 587 s. Springer. (Printed or electronical book version in the library)
- Parker 2008. Molecular aspects of plant disease resistance. Annual Plant Reviews , volume 34. - Wiley-Blackwell. ISBN 978-1-4051-7532-6
- Reed, B.M. 2008. Plant Cryopreservation: A Practical Guide. Springer ISBN 978-0-387-72275-7
- Smith & Read 2008. Mycorrhizal symbiosis. 3. painos. Academic Press. 800 p.
- Taiz, L. et al. 2015. Plant Physiology and Development. Sixth Edition.761 p. Sinauer Associates, Inc. ISBN-9781605352558

- Wink 2010. Biochemistry of plant secondary metabolism. Annual Plant Reviews, volume 40. - Wiley-Blackwell. ISBN 978-1-4051-83970. Electronical book. Link can be found for example from OULA library cataloque. Dawsonera can be accessed with koivu/paju password. http://www.dawsonera.com/depp/reader/protected/external/AbstractView/S9781444320510
- Yeo & Flowers 2007. Plant Solute Transport. - Wiley-Blackwell. ISBN 978-1-4051-3995-3
- Yoshioka & Shinozaki 2009. Signal Crosstalk in Plant Stress Responses - Wiley-Blackwell. ISBN 978-0-8138-1963-1

The availability of the literature can be checked from this link.
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:
1-5 / Fail.
Person responsible:
M.Sc. Henrika Honkanen, Prof. Hely Häggman, Doc. Annamari Markkola, Prof. Timo Muotka or Doc. Heikki Helanterä.
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: 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 opponenting, eight research seminar and eight result seminar attendances. Research plan seminar and results seminar presentations cannot be given at same day. Topics and dates have to be agreed with the professor in beforehand. See degree programme notice board for the schedule and instructions.
Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:

Seminar presentations, attendance and opponenting. Detailed instructions on the 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 Master of Science Thesis, the student will give summary in Finnish, Swedish or English to show his/her familiarity with the topic of the thesis. If the international degree student has not done a maturity exam in her /his B.Sc. degree the student has to make a 4 pages long essay about the thesis subject in Examinarium.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Instructions at the Faculty of Science internet homepage. One teacher examine the maturity exam and Pro gradu working group accepts it.
Target group:
Compulsory to the biology students. After completing the thesis.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Summary form at the Faculty of Science internet homepage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Hely Häggman, Prof. Jari Oksanen, Prof. Markku Orell or Prof. Outi Savolainen.
Working life cooperation:
No.
Other information:
-

750615S: Practical training, 10 - 15 op

Opiskelumuoto: Advanced Studies

Laji: Practical training

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

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

Target group:
Compulsory to BS and ECO in the M.Sc. degree.
Prerequisites and co-requisites:
About 80 credit amount of biology courses.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Journal and final report.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Contact person Minna Vanhatalo. The supervisors of the practical training are Prof. Timo Muotka (ECOz), Prof. Jari Oksanen (ECOb), Prof. Hely Häggman (BSb), M.Sc. Henrika Honkanen (BSz) and Prof. Outi Savolainen (BSg).
Working life cooperation:
Yes. Participating to biology project gives working life skills.
Other information:
The student has to contact the professor and discuss about the suitability of the internship place in beforehand.

750658S: Pro gradu thesis in biology, 40 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Diploma thesis

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

757602S Master of science thesis in genetics 40.0 op

ECTS Credits:
40 ECTS credits / 1067 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st or 2 nd year.
Learning outcomes:
Student knows the research methods in specific field of biology. She is conversant with her field of thesis and is able to scientific thinking, estimating the results, analysing, drawing conclusions and scientific communicating.
Contents:
Literary work which in general includes experimental research work. Student gets profoundly acquainted on certain special field in biology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Independent research work on a scientific subject in agreement with the responsible professor and under the supervision of the Department. The supervisors may be professors of the department, docents and other teachers and researchers who have the docent's status. The student may
have several supervisors, the other supervisor may be from other department, university (also abroad) or from research institute. The subject must be agreed on with the professor in advance. The research work can contain fieldwork, laboratory work, theoretical work or work on collections in museum. The work always includes a literature survey. After having completed the thesis, the student writes the Maturity Exam. The programme director will order the final examiners by the proposal of the professor. Pro gradu working group accepts and grades the thesis on the basis of the final examiners' opinions.
Target group:
ECO and BS: compulsory 40 cr. TEA: 40 cr. optional. So called didactic pro gradu thesis cannot be 40 cr.
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:
1-5 / Fail.
Person responsible:
M.Sc. Henrika Honkanen, Prof. Hely Häggman, prof. Jari Oksanen, Prof. Timo Muotka or Prof. Outi Savolainen.
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

Opettajat: Kaitala Arja

Opintokohteen oppimateriaali:
Viitala, Jussi , , 2005
Krebs, John R. , , 1993
Opintokohteen kielet: Finnish

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

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

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

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Koivula

Opintokohteen kielet: Finnish

ECTS Credits:
2 ECTS credits / 53 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st spring (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:
1-5 / 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.

Choose from

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

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

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

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
2-5 ECTS credits / 53-133 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. or Ph.D. degree. Arranged if resources allow.
Learning outcomes:
Students will be acquainted to current issues in biology.
Contents:

Seminars on current issues in biology.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Course specific.

Target group:

Biology students.

Prerequisites and co-requisites:

Varying.

Recommended optional programme components:

-

Recommended or required reading:

Varying.

Assessment methods and criteria:

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

Grading:

1-5 / Fail or Pass / Fail.

Person responsible:

Prof. Timo Muotka, Prof. Jari Oksanen, Prof. Outi Savolainen and Prof. Hely Häggman.

Working life cooperation:

No.

Other information:

-

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

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

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

ECTS Credits:

2-5 ECTS credits / 53-133 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. or Ph.D. degree. Arranged if resourses allow

Learning outcomes:

Students will be acquainted to current issues in biology.

Contents:

Seminars on current issues in biology.

Mode of delivery:

Varying.

Learning activities and teaching methods:

Varying.

Target group:

Biology students.

Prerequisites and co-requisites:

Varying.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

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

Grading:

1-5 / Fail or Pass / Fail.

Person responsible:

Prof. Timo Muotka, Prof. Jari Oksanen, Prof. Outi Savolainen and Prof. Hely Häggman.

Working life cooperation:

No.

Other information:

-

757619S: Advanced course in bioinformatics, 5 op

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

753629S	Advanced course in bioinformatics	4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

English.

Timing:

M.Sc. 2nd spring.

Learning outcomes:

The main objective of this course is to provide students with understanding and experience of the main techniques required to manipulate, analyse and interpret next generation sequence data. Students will understand different technologies; be capable of manipulating data files and assess data quality; assemble and map reads; identify genes and variants; complete some basic analyses of genome data.

Contents:

During the course, students will manipulate an example data set to provide a comprehensive experience of contemporary bioinformatics techniques required to identify genes and polymorphisms, as well as familiarity with the command terminal and basic LINUX commands. This course builds on Basics of bioinformatics (757314A) and complements the theory learnt in Introduction to population genetics

(757313A), Introduction to molecular ecology (756650S) and Experimental course in evolutionary genomics (757621S). Lectures provide the core understanding of the main steps and principals behind data analyses, but the core content will be practical experience of handling and analysing large data sets.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Contact hours: 12 hrs lectures, 40 hrs computer exercises, 56 hr independent study. Continuous assessment (coursework) and a final exam.

Target group:

Bioscience and Ecology M.Sc.

Prerequisites and co-requisites:

Basics of bioinformatics (757314A) or equivalent knowledge, Introduction to population genetics (757313A), Molecular evolution (757312A).

Recommended optional programme components:

-

Recommended or required reading:

Good guide for much of this is the De Wit P. et al 2012: The simple fool's guide to population genomics via RNA-Seq: an introduction to high-throughput sequencing data analysis. Molecular Ecology Resourses. Molecular Ecology Resources. Volume 12, Issue 6, pages 1058–1067, November 2012 and other course material.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Continuous assessment, learning diary and project report.

Grading:

1-5 / Fail.

Person responsible:

Dr. Phillip Watts.

Working life cooperation:

No.

Other information:

-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

ECTS Credits:

5 (- 8) cr / 133 (- 240) hours of work.

Language of instruction:

Finnish / English.

Timing:

B. Sc. / M. Sc. / Ph.D., (excursion arranged if resources alow).

Learning outcomes:

Student can identify the ecological and environmental effects of climate change and air pollution in the subarctic area. In addition, the student may learn basic research methods related to topic, and how to use the facilities provided by the subarctic research stations in the research.

Contents:

Lectures deal the ecological responses of global change and air pollution. The content is focused on the environmental effects and their ecological significance in the northern areas. During excursion the student familiarizes with the special features of northern areas and explores the action and research carried out in the northern research stations.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

1) 24 h lectures with exam, and 15 h independent studies (assay and seminar work) (5 cr); **(2)** 4 days summer excursion and closing seminar (3 cr); participation in excursion necessitates accepted credits in the first part (lectures, independent studies).

Target group:

Ecology students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

-ACIA (2005) Arctic Climate Impact Assessment, Cambridge University Press, 1042 p. -AMAP Assessment 2006: Acidifying Pollutants, Arctic Haze, and Acidification in the Arctic. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. Xii + 112pp. Bell JNB & Trehow M (eds.) 2002. Air pollution and plant life. Wiley. 2nd edition. 480 pages.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Lectures, assay and seminar, excursion, closing report and seminar.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail
Read more about assessment criteria at the University of Oulu webpage.

Person responsible:

Doc. Kari Taulavuori.

Working life cooperation:

Possible excursion will include tours to the norther research stations.

Other information:

Field excursion is arranged if resources allow.

754626S: Field methods in freshwater biomonitoring, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Muotka, Timo Tapani, Heikki Mykrä, Kaisa-Leena Huttunen

Opintokohteen kielet: Finnish

Leikkaavuudet:

754616S	Field methods in freshwater biomonitoring	4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

M.Sc. 1.-2. year. Arranged if resources allow.

Learning outcomes:

The course familiarises students with methods used in biomonitoring of lakes and rivers.

Contents:

Sampling methods as well as biological and ecotoxicological laboratory analysis are practiced. Survey methods used to describe the state of habitats are applied to lake and river environments.

Mode of delivery:

Blended teaching.

Learning activities and teaching methods:

10 h lectures, 30 h field and laboratory exercises, group works.

Target group:

ECOz, ECOb.

Prerequisites and co-requisites:

Aquatic animals field course (755321A) and Basic course in hydrobiology (754322A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

Internet material, sample taking standards and instructions.

Assessment methods and criteria:

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

Grading:

Pass / Fail.

Person responsible:

Prof. Timo Muotka and Dr Heikki Mykrä.

Working life cooperation:

No.

Other information:

-

751651S: Advanced identification in animals, 4 - 8 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Muotka, Timo Tapani, Kari Koivula

Opintokohteen oppimateriaali:
Suomen luonto, , 1998
Suomen luonto, , 1997
Suomen luonto, , 1998
Koli, Lauri , , 1990
Siivonen, Lauri , , 1994
Koivisto, Ilkka, , 1984

Hildén, Olavi, , 1984
Koli, Lauri, , 1984
Opintokohteen kielet: Finnish

ECTS Credits:

4-8 ECTS credits / 107-213 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 1 st autumn.

Learning outcomes:

Student is able to identify special animal groups or species from museum samples and know the ecology and distribution in Finland.

Contents:

Identification of special animal groups (fishes; amphibian and reptiles; birds; mammals; some group of invertebrates), their ecology and distribution.
Student can get 5 cr from passed ornithological station bird ringing exam.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Independent study, oral final exam.

Target group:

ECOe.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Suomen eläimet 1-3; Suomen luonto: Linnut; Nisäkkäät; Kalat, Sammakkoeläimet ja matelijat, Koli, L.: Suomen kalat, Siivonen, L. & Sulkava, S.: Pohjolan nisäkkäät or relevant literature in English.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Oral exam or ornithological station bird ringing exam.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Prof. Timo Muotka.

Working life cooperation:

No.

Other information:

-

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

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

Opintokohteen kielet: Finnish

ECTS Credits:

2-6 ECTS credits / 53-160 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. degree.

Learning outcomes:

Preparation (including labels) and identification of self-collected insects.

Contents:

Preparation of a collection on one insect order. The specimens have to be preserved adequately, identified and provided with labels. In consultation with the responsible teacher.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Independent studying.

Target group:

-

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Literature related to the topic.

Assessment methods and criteria:

Collection is delivered to the person in responsible.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Pass / Fail.

Person responsible:

Doc. Marko Mutanen.

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

Learning outcomes:

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

Contents:

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

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

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

Target group:

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

Prerequisites and co-requisites:

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

Recommended optional programme components:

ECO: Basics in population ecology (756351A) and Advanced course in population ecology (755626S).
ECOGENeco: Basics in population ecology (756351A).

Recommended or required reading:

Beebee, T and Rowe G.2004 or 2008. An introduction to molecular ecology. Oxford University Press.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Final exam and seminar.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Doc. Laura Kvist.

Working life cooperation:

No.

Other information:

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

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

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Virtanen, Risto Juhani

Opintokohteen oppimateriaali:
Eurola, Seppo , , 1999
Opintokohteen kielet: Finnish

ECTS Credits:

4 ECTS credits / 107 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 2 nd or 3 rd autumn. M.Sc. 1 st or 2 nd autumn. Every second year at the Kilpisjärvi biological station. Arranged if resources allow.

Learning outcomes:

By passing this course a student is able to identify plant and animal species, nature types, vegetation of NW Fennoscandian mountain areas, understand ecology of northern ecosystems, ecological interactions and adaptation. Advanced training in experimental and observational field research.

Contents:

Arctic-alpine ecosystems as one the main biomes of the world. Plant and animal species of arctic-alpine areas. Vegetation and ecology of NW Fennoscandian mountain areas. Plant-herbivore interactions in tundra ecosystems.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Field course.

Target group:

Ecology students.

Prerequisites and co-requisites:

Ecological botany field course (756343A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

Disseminated during course, internet resources. Literature on arctic-alpine ecosystems.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Field course, field exercise. Planning of the study, field work and analyzing data. Making a report with reference to scientific literature. Oral presentation of the study (Power Point).
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Field exam including questions about the species and arctic-alpine nature.
Pass / Fail.

Person responsible:

Doc. Risto Virtanen.

Working life cooperation:

No.

Other information:

Arranged with cooperation of the University of Eastern Finland.

752692S: Mire ecology, 5 op

Voimassaolo: 01.08.2003 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Virtanen, Risto Juhani

Opintokohteen oppimateriaali:
Eurola, Seppo , , 1995
Eurola, Seppo , , 1992

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay752692S Mire ecology 5.0 op

ECTS Credits:

4 ECTS credits / 107 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 2 nd or 3 rd autumn. M.Sc. 1 st or 2 nd autumn. Every second year at the Oulanka research station. Arranged if resources allow.

Learning outcomes:

By passing this course a student is able to identify plant species (bryophytes and vascular plants), mire types, vegetation of boreal areas, species indicator values, determine mire types, interpret ecology of mire systems and make inventories on mire landscapes.

Contents:

Plant species (bryophytes and vascular plants), mire types, vegetation of boreal areas. Regional patterns in mire vegetation, mire types and underlying ecological gradients. Mire hydrotopography and peat stratigraphy. Red list status of mire vegetation.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures 9 h, field course, demonstations and field exercises 47 h.

Target group:

Plant ecology students.

Prerequisites and co-requisites:

Plant ecology field course (756343A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

Eurola, S., Huttunen, A. & Kukko-oja. K. 1995: Suokasvillisuusopas. Oulanka Reports 14: 1-85 ja Eurola, S., Bendiksen, K. & Rönkä, A. 1990: Suokasviopas. Oulanka Reports 9: 1-205.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Mire type and species exam.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Mire types and species exam. 1-5 / Fail.

Person responsible:

Doc. Risto Virtanen.

Working life cooperation:

No.

Other information:

Organised together with the University of Eastern Finland.

752616S: Macro fungi, 3 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opintokohteen oppimateriaali:
Salo, Pertti (1) , , 2006
Opintokohteen kielet: Finnish

ECTS Credits:

3 ECTS credits / 80 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 3rd autumn. NNE.

Learning outcomes:

Student is able to identify most common macrofungal species as fresh specimens and knows basics of fungal ecology.

Contents:

Demonstrations of macrofungi in the field, basics of identification, ecology and distribution.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

14 h lectures, 25 h exercises including excursions, identification exam.

Target group:

Optional course.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Course handout, Salo, P. and Nummela-Salo, U. 2002: Sienikurssi (752316). Toinen uusittu painos. Lajiesittelyt. Biologian laitoksen monisteita 2/2002, 41 p. and mushroom guides.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Doc. Annamari Markkola.

Working life cooperation:

No.

Other information:

-

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

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Anna Ruotsalainen

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

2-4 ECTS credits / 53-107 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 1 st or 2 nd year. Arranged if resources allow every second year. See WebOodi.

Learning outcomes:

By passing this course a student is able to identify species of the given taxonomic group, understand the ecology of the species, and know their distribution and systematic position.

Contents:

A laboratory course, field course or blended course. Species identification by means of macroscopic or microscopic characters. Making a collection of specimens, sampling and handling of the material. Preparation of herbarium specimens. Field instruction on species mapping and quantitative approach. Species' characters (morphological and chemical). Inventory methods on red listed species. Alternative themes (lichens, polypores and other fungi, and bryophytes).

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Demonstrations, identification exercises and field exercises.

Target group:

Students of plant ecology.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Material given in the course.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

doc. Anna Liisa Ruotsalainen.

Working life cooperation:

No.

Other information:

Course subject vary (lichens, polypore and other fungi, bryophytes).

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

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Anna Ruotsalainen

Opintokohteen oppimateriaali:
Hämet-Ahti, L., Suominen, J., Ulvinen, T. & Uotila, P., , 1998
Opintokohteen kielet: Finnish

ECTS Credits:

6 ECTS credits / 160 hours of work.

Language of instruction:

Finnish / English

Timing:

B.Sc. 3 rd year, M.Sc. 1 st year.

Learning outcomes:

Advanced identification of the vascular plants of Finland.

Contents:

Independent studying of herbarium samples. Distribution types of plants in Fennoscandia excluding the Russian parts.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Independent studying of herbarium samples. The course could be examined in two parts: 1) monocots, 2) ferns, dicots and distributions.

Target group:

-

Prerequisites and co-requisites:

Identification of plant species, extensive (756354A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

Hämet-Ahti et al. 1998: Retkeilykasvio (Field Flora of Finland), Ed. 4. Finnish Museum of Natural History, Helsinki. 656 p.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Doc. Anna Liisa Ruotsalainen.

Working life cooperation:

No.

Other information:

-

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

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Anna Ruotsalainen

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5-8 ECTS credits / 133-213 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 1 st or 2 nd year.

Learning outcomes:

Identification of systematically or ecologically limited groups. For example macrofungi, mosses, lichens, phytoplankton, aquatic, shore, forest, meadow, peatland or fell plants, species of primeval forest and macroscopic plant remains.

Contents:

Identification of systematically or ecologically limited groups from herbarium samples and preparates. Lichens 8 cr., others 5 cr.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Independent studying of herbarium samples or preparations, species exam.

Target group:

Ecology students.

Prerequisites and co-requisites:

Identification of plant species (756342A).

Recommended optional programme components:

-

Recommended or required reading:

Literature related to the topic.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Doc. Anna Liisa Ruotsalainen.

Working life cooperation:

No.

Other information:

-

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

Voimassaolo: - 31.07.2019

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Anna Ruotsalainen

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

2-5 ECTS credits / 53-133 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 3 rd summer or M.Sc. 1 st or 2 nd summer.

Learning outcomes:

Train oneself in floristic mapping skills.

Contents:

Floristic mapping of plants with special emphasis on endangered species. Participant should agree with the Botanical Museum in advance. Field work in the provinces of Oulu and Lapland, including sample collection, identification, preparation of herbarium specimens in consultation with the responsible teacher.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Field excursions.

Target group:

-

Prerequisites and co-requisites:

Identification of plant species, extensive (756354A), Plant ecology field course (756343A) and Advanced identification of plant species (752608S) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

-

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

Grading:

Pass / Fail.

Person responsible:

Doc. Anna Liisa Ruotsalainen.

Working life cooperation:

No.

Other information:

-

755624S: Functional animal ecology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Seppo Rytkönen

Opintokohteen kielet: Finnish

Leikkaavuudet:

751678S Functional animal ecology 6.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Lectures in Finnish, exercises in Finnish / English.

Timing:

B.Sc. 2 nd spring or M.Sc. 1 st spring. NNE.

Learning outcomes:

The aim of the course is to understand the relationship between morphology and function by the means of general ecomorphological model. The student will get both theoretical and practical basics for ecomorphological (and. general scientific) research procedures: scientific hypothesizing, sampling, data analysis and reporting and interpreting the results.

Contents:

The course focuses on the relationship between phenotype and function, especially the correlation between animal morphology and behaviour. The course consists of two parts: A) Lectures in Finnish. However, articles about each subject are available for foreign students, including ecomorphological models and correlations, measurement error, allometry, fluctuating asymmetry and phylogenetic analyses. B) Exercises consisting of miniature studies, field and laboratory work, and seminar. The results of the mini studies, in form of PowerPoint presentations, are presented in the seminar. Before the exercises, students write a home essay (or take an exam).

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

12 h lectures, 40 h exercises, seminar and essay (or exam).

Target group:

Recommended for ecology students.

Prerequisites and co-requisites:

Recommended Evolution, systematics and morphology of animals, practicals (750374A), Introduction to statistics 5 cr (806118P) and A second course in statistics 5 cr (806119P).

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Doc. Seppo Rytkönen.

Working life cooperation:

No.

Other information:

-

755608S: Bird ecology and conservation, 2 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Seppo Rytkönen, Kari Koivula
Opintokohteen kielet: Finnish

ECTS Credits:

2 ECTS credits / 53 hours of work.

Language of instruction:

English

Timing:

M.Sc. degree. Every second year (arranged if resources allow).

Learning outcomes:

Student gets current scientific research knowledge in animal reproductive ecology and behaviour.

Contents:

Introduction to sexual reproduction and parental care in animals. Birds are used as a taxonomic reference group, but the concepts and theories are discussed in the general evolutionary ecological framework. Topics: e.g. habitat selection, territoriality, mating systems and brood parasitism.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

24 h lectures, exam.

Target group:

-

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Doc. Seppo Rytkönen and Doc. Kari Koivula.

Working life cooperation:

No.

Other information:

-

754628S: Stream ecology, 5 op

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

Leikkaavuudet:

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

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 3 rd year / M.Sc. 1st or 2nd year. Arranged if resources allow.

Learning outcomes:

Basic principles of the structure and function of aquatic ecosystems.

Contents:

Interspecific competition, predation and environmental disturbance as factors regulating aquatic communities. Prey choice mechanisms of aquatic predators and avoidance behaviour of prey species. Trophic interactions in aquatic ecosystems. Biomanipulation as a management tool in water protection.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

26 h lectures, home essays.

Target group:

ECOz, optional.

Prerequisites and co-requisites:

Introduction to hydrobiology (754322A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

Handouts and Allan, J. D. & Castillo, M. M. (2007). Stream Ecology: Structure and Function of Running Waters. Springer Verlagen.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

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

Grading:

1-5 / hylätty.

Person responsible:

Prof. Timo Muotka.

Working life cooperation:

No.

Other information:

-

754627S: Special course in aquatic invertebrates, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Muotka, Timo Tapani

Opintokohteen kielet: Finnish

Leikkaavuudet:

751648S Special course in aquatic invertebrates 2.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 1 st or 2 nd year. Every third year.

Learning outcomes:

After the course, the student will have basic knowledge on quantitative sampling of benthic invertebrates in various inland waters (mainly streams) and species level identification of benthic invertebrates.

Contents:

Field sampling and identification practices in the laboratory.

Mode of delivery:

Blended teaching.

Learning activities and teaching methods:

40 h demonstrations, lectures and exercises.

Target group:

ECOz, elective.

Prerequisites and co-requisites:

Aquatic animals field course (755321A) and Introduction to hydrobiology (754322A).

Recommended optional programme components:

-

Recommended or required reading:

Course material.

Assessment methods and criteria:

-

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

Grading:

Pass / Fail.

Person responsible:

Prof. Timo Muotka.

Working life cooperation:

No.

Other information:

-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Muotka, Timo Tapani, Heikki Mykrä

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 3 rd or M.Sc. 1 st autumn, arranged if resources allow.

Learning outcomes:

The aim of this course is to give basic knowledge on the methods of typology, ecological status assessment, classification and biomonitoring of rivers and lakes.

Contents:

Theoretical and practical methods for setting environmental objectives and quality standards for surface waters will get acquainted.

Mode of delivery:

Blended teaching.

Learning activities and teaching methods:

20 h lectures, literature, learning assignment, final exam.

Target group:

ECOz, ECOb.

Prerequisites and co-requisites:

Aquatic animals field course (755321A) and Basic course in hydrobiology (754322A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

Handouts, Internet material.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Prof. Timo Muotka.

Working life cooperation:

No.

Other information:

-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Koivula, Jouni Aspi

Opintokohteen kielet: Finnish

Leikkaavuudet:

751668S Wildlife management and game animal ecology 6.0 op

ECTS Credits:

5 cr / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. 3rd autumn or M.Sc. 1st autumn (arranged if resources allow).

Learning outcomes:

After carrying out the study module the student will be able to recognize special ecological traits of the game animals and relate them to the general ecological framework. The student will be also to appraise the basics of durable hunting of game animals. The student will be also able to appraise the basics of durable hunting of game animals and critically judge different wildlife management methods from the scientific starting point.

Contents:

The ecology of game species, their life histories, population dynamics and predator-prey relationships. Hunting ecology: man as predator, management and hunting of the game species. The impact of forestry on the game species' populations. Students are also introduced to wildlife management in practice and to the social aspect of wildlife-human relationship.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

24 h lectures, one-day excursion to a game breeding area, seminar with written reports and exam.

Target group:

-

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

Seminar with report and exam.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Prof. Jouni Aspi ja Doc. Kari Koivula.

Working life cooperation:

Yes.

Other information:

-

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

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola, Seppo Rytkönen

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

M.Sc. degree, (arranged if resources allow).

Learning outcomes:

After finishing the course student get acquainted to inventory approaches of natural ecosystems and is able to apply knowledge to environmental impact assessments. Student has skills to fulfill environmental impact assessments based on different types of case studies. Additionally, student knows the legal procedure to act as responsible person for EIA.

Contents:

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

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

24 h lectures, 18 h seminars.

Target group:

-

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

http://ec.europa.eu/environment/eia/eia-support.htm

Assessment methods and criteria:

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

Grading:

1-5 / Failed.

Person responsible:

Doc. Annamari Markkola and Seppo Rytkönen.

Working life cooperation:

No.

Other information:

-

750616S: Legislation in environmental protection, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen oppimateriaali:
Hollo, Erkki J. , , 2001
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 2nd or 3rd autumn or M.Sc. 1 st autumn. Arranged if resources allow.

Learning outcomes:

To familiarise students with environmental legislation in European Union with regard to environmental protection and natural resources. Student is able to apply his knowledge to different environmental questions and analyze the needed means. Student knows the environmental administration and organisations in environmental protection and natural resources.

Contents:

Environmental protection and natural resources legislation in Finland and in Europe. Environmental administration and organisations, use and protection of natural resources, prevention of environmental destruction, assessment of environmental effect as well as principles of environmental legislation and main international conventions, environmental issues in UNEP and OECD are covered.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

24 h lectures, 18 h exercises including demonstrations.

Target group:

Compulsory to students who are doing the environmental protection 25 cr. study module.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

Compulsory to students who are doing the environmental protection 25 cr. study module.

Recommended or required reading:

Erkki J. Hollo 2001: Ympäristönsuojeluoikeus, WSOY, 592 s, Kokkonen, Tuomas (toim.): Ympäristölainsäädäntö 2011. 1269 s Talentum.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Exam or learning diary.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Doc. Kari Taulavuori.

Working life cooperation:

No.

Other information:

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

755632S: Restoration ecology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola, Tolvanen, Anne Kristiina

Opintokohteen kielet: Finnish

Leikkaavuudet:

756607S	Restoration ecology	2.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. degree.

Learning outcomes:

Lectures: the student understands the ecological principles of restoration and remembers the basics of restoration options in different ecosystems. Exercises and excursion: the student is able to evaluate the need for restoration and possibilities of an ecosystem to regenerate, and apply the restoration techniques in practical restoration planning.

Contents:

Land-use impacts and ecosystem malfunctions caused by humans, ecological principles of restoration, prevention and restoration of manmade damage in the ecosystems. Examples from restoration options and practical techniques in terrestrial and aquatic ecosystems, and cultural landscapes.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

24 h lectures, exercises and an excursion.

Target group:

ECO.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Andre Clewell, James Aronson 2008: Ecological Restoration, Principles, Values, and Structure of an Emerging Profession, Island Press, 230 p. and articles in the Restoration Ecology journal.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

-

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

Grading:

1-5 / Fail.

Person responsible:

Prof. Anne Tolvanen.

Working life cooperation:

No.

Other information:

-

750677S: Winter ecology and physiology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

Leikkaavuudet:

750625S	Winter ecology and physiology	3.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

English.

Timing:

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

Learning outcomes:

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

Contents:

Two independent units: 1) Winter ecology and physiology course (7 h lectures and 13 h laboratory practicals and 4 h seminar in Oulu, and 4 day long field excursion to the Oulanka Research Station (total about 50 h, 3 cr); 2) Book exam on a common exam day 2 cr: Marchand, P. J. 1996: Life in the cold. An introduction to winter ecology.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures, exercises, report and seminar presentation.

Target group:

Biology students.

Prerequisites and co-requisites:

Courses Basics of ecology (750124P), Cell biology (750121P), Terrestrial animals field course (755322A), Aquatic ecology field course (755321A), Plant ecology field course (756343A), and Basics of plant biology, lectures (756346A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

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

Assessment methods and criteria:

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

Grading:

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

Person responsible:

Doc. Kari Taulavuori.

Working life cooperation:

No.

Other information:

-

756604S: Plant ecophysiology in changing environments, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen oppimateriaali:
Lambers, Hans , , 1998
Prasad, M.N.V (ed.), , 1997
Hall, D.O. et al., , 1993
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

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

Learning outcomes:

After finishing the course student understands interactions between plant and environment, and has become acquainted to most important experimental methods in physiological plant ecology and student can apply research parameters. Student can apply the knowledge to plant production and environmental protection issues.

Contents:

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

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

20 h lectures and demonstrations, 35 h exercises, exam and report.

Target group:

ECOb, BSb, Ph.D. students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

Course is related both to plant ecology and plant physiology basic studies.

Recommended or required reading:

Hans Lambers, F.Stuart Chapin III, Thijs L. Pons 2008: Plant Physiological Ecology. Springer Verlag. 540 s. Second edition.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Doc. Kari Taulavuori.

Working life cooperation:

No.

Other information:

-

756649S: Symbiosis, 5 op

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

750346A	Symbiosis	4.0 op
750646S	Symbiosis	4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. degree 3rd spring, M.Sc. 1. or 2nd spring, arranged if resources allow.

Learning outcomes:

The student knows the concept of symbiosis, understands the extent of diversity of symbiotic interactions both at the community and molecular level.

Contents:

Lately new forms of symbiosis have been discovered, extending the diversity of symbiotic interactions. Therefore the significance of symbiosis in biotechnology and for example in human health has increased. Various forms of symbiosis, their importance for the host and interaction at the molecular level are covered.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

30 h Lectures / laboratory work / demonstrations, seminar, essay, lecture diary.

Target group:

BS and ecophysiology students.

Prerequisites and co-requisites:

Studies in bioscience.

Recommended optional programme components:

-

Recommended or required reading:

Lecture notes.

Assessment methods and criteria:

Seminar, essay, lecture diary.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Doc. Anna Maria Pirttilä.

Working life cooperation:

No.

Other information:

-

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

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

ECTS Credits:
1-4 credits
Language of instruction:
Finnish
Timing:
1st-5th year

300002M: Advanced Information Skills, 1 op

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

ECTS Credits:
1 ECTS credit / 27 hours of work
Language of instruction:
Finnish
Timing:
The course is held once in the autumn semester, during period II and in the spring semester, during period IV.
Intended for degree students working on their diploma/master's thesis.
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
- understands the principles of scientific publishing
- can use the 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 RefWorks reference management tool.
Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Lectures 10 h, self-study 17 h
Target group:
Optional
Recommended or required reading:
Web learning material:
http://libguides.oulu.fi/tieteellinentiedonhankinta
http://libguides.oulu.fi/julkaisujenarviointi
Assessment methods and criteria:
Passing the course requires participation in the lectures and successful completion of the course assignments.
Grading:
pass/fail
Person responsible:
Ursula Heinikoski

790101P: GIS-basics and Cartography, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Harri Antikainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
5 ECTS
Language of instruction:
Finnish, partly in English. English speaking students are asked to contact prof. Rusanen before the course.
Timing:
1 year, 2nd semester
Learning outcomes:
Course gives basic information about Geographical Information System and about the theory of cartography. After the course the student can use ArcGIS program and he/she is able to produce cartographic presentations.
Contents:
Basics of GIS, theories of cartography and statistical graphics and use of ArcGIS program.
Mode of delivery:
Face-to-face learning.
Learning activities and teaching methods:
16 h lectures, 56 h practicals.
Target group:
Common course to all 1st year students of Geography.
Prerequisites and co-requisites:
-
Recommended optional programme components:
Course is part of the minor studies of GIS.
Recommended or required reading:
Paul A Longley, Michael G Goodchild, David J. Maguire & David W. Rhind (2005). Geographic Information Systems and Science. 2 nd edition. 516 p
Assessment methods and criteria:
Exam on exam day.
Read more about assessment criteria at the University of Oulu webpage.
Grading:

1–5.
Person responsible:
Harri Antikainen
Working life cooperation:
No
Other information:
English speaking students are asked to contact Harri Antikainen before the course.

750033Y: Tutorial for new students, 1 op

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Vanhatalo, Minna-Liisa, Annamari Markkola

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
1 ECTS credit / 27 hours of work
Language of instruction:
Finnish.
Timing:
B.Sc. 3 rd autumn / M.Sc. 1 st autumn.
Learning outcomes:
Course develops students' skills to guide, make presentations, work in group and organize. It also advances planning, arrangement and guidance abilities as well as responsibility.
Contents:
The student guides a group of new students during the orientation course introducing them to the university, academic learning environment, the department, curriculum and other students with the help of small group meetings and presentations.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Tutorials and presentations. Minimum 15 hours. In addition indenpendent work includes the preparation of the tutorials.
Target group:
Second and third year biology students.
Prerequisites and co-requisites:
Course 750031Y.
Recommended optional programme components:
-
Recommended or required reading:
Study guide and training material.
Assessment methods and criteria:
Tutoring report.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Doc. annamari Markkola 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 on the Common European Framework of Reference scale.
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
•Department of Chemistry
Oulu Mining School
•Geosciences degree programme

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 English skills should have been acquired otherwise.
ECTS Credits:
2 ECTS / 54 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

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

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:
Contact teaching and independent study
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. A more detailed course description and list of homework tasks will be provided by the teacher.
Target group:
Faculty of Natural Sciences: Biology, Mathematical & Physical Sciences
Faculty of Technology: Chemistry
Oulu Mining School: Geosciences
Prerequisites and co-requisites:
-
Recommended optional programme components:
Students are also required to take English 2 902004Y, or English 4 902005Y, AFTER completion of this course.
Recommended or required reading:
Course materials will be provided in electronic form or will be accessible from the university library.

Assessment methods and criteria:
Student work is monitored by continuous assessment, and students are required to participate regularly and actively in all contact teaching provided. During the course, there will be three monthly tests on material covered so far. The assessment of the course is based on the learning outcomes listed above.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass/Fail
Person responsible:
Karen Niskanen
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. Please contact your own 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 on the Common European Framework of Reference scale.
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 & Physical Sciences

Faculty of Technology:
Chemistry
Oulu Mining School:
Geoscience degree programme

Note: Information Processing Science students who began their studies in autumn 2017 or later will take English 4 instead.
Please consult your faculty's study guide to establish the language requirements of your own degree programme.
Required proficiency level:
Students taking this course must have had English as the A1 or A2 language at school or have equivalent skills. The course English 1 (902002Y) is a pre-requisite, unless exempted.
ECTS Credits:
2 ECTS credits / 54 hours 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
- **prepare and present scientific subjects** to your classmates, using appropriate field-related vocabulary.

Contents:
Skills in listening, speaking, and presenting academic topics are practised in the classroom, where there is an emphasis on working in pairs and small groups. Homework is given to support the classroom learning.
Mode of delivery:
Contact teaching
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.
Individual learning methods: autonomous learning tasks, practice in lecture listening and written tasks in preparation for classroom lessons
Group work: Preparation of presentations in groups

Target group:
2nd year students of Biology, Chemistry, Geoscience
1st year students of Mathematical and Physical Sciences (new programme)

Prerequisites and co-requisites:
Pre-requisite course: 902002Y Englannin kieli 1
Recommended optional programme components:
-
Recommended or required reading:
-
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.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / fail.
Person responsible:
Karen Niskanen
Working life cooperation:
-
Other information:
-

750031Y: Orientation course for new students, 1 op

Voimassaolo: - 31.07.2017

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Vanhatalo, Minna-Liisa

Opintokohteen kielet: Finnish

Leikkaavuudet:

750032Y	Orientation course for new students	2.0 op

ECTS Credits:
1 ECTS credit / 27 hours of work
Language of instruction:
Finnish.
Timing:
B.Sc. 1 st autumn - spring.
Learning outcomes:
The aim of the course is to introduce new biology students to the university, academic studies, the department and the studies of biology, give knowledge of the social relevance of the degree programme and student is able to set own goals for the studies.

Contents:
Students orientate themselves with the help of group meetings, presentations and seminar to the academic studies. During the course students make their first personal study plan (HOPS) for the first study year.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Tutorials, presentations and seminar of major subjects, independent studying, total 30 h.
Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Study guide.
Assessment methods and criteria:
Participation to the tutorials, presentations, seminar and doing the personal study plan for the first year.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Ph.Lic. Minna Vanhatalo.
Working life cooperation:
No.
Other information:
-

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

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

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

Voimassaolo: 01.01.2010 -

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Faculty of Science

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
1-4 credits
Language of instruction:
Finnish
Timing:
1st-5th year

750033Y: Tutorial for new students, 1 op

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Vanhatalo, Minna-Liisa, Annamari Markkola

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

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

-

750124P: Basics of ecology, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari-Heikki Oksanen

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

750121P: Cell biology, 5 op

Voimassaolo: - 31.07.2020

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jaana Jurvansuu, Häggman, Hely Margaretha, Henrika Honkanen

Opintokohteen oppimateriaali:
Heino, Jyrki (2) , , 2004
Alberts, B. ym., , 2008
Lodish et al., , 2003
Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 1 st autumn.
Learning outcomes:
The student is familiar with cellular structure and functioning in plant and animal cells, understands the social structures in multicellular species and knows why and how the genetic organizations (in nucleus, chloroplast and mitochondria) are co-operating, maintaining and regulating the cellular metabolism. Student understands the common origin and evolution of life on planet Earth, and understands the material basis and mechanisms of this continuity.
Contents:
During the recent years especially the development of molecular and microscopic and imaging techniques has increased our knowledge on cells and their social interactions. The structural and functional characteristics of plant and animal cells will be covered as well as the genetic organization maintaining and regulating the system.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
48 h lectures, 87 h independent work including deepening the upper secondary school knowledge in biology and chemistry as home work and book reading. Part of the home assignments is oblicatory.
Target group:
Compulsory to the biology and biochemistry students.
Prerequisites and co-requisites:
Good basics in biology and especially in chemistry from upper elementary school contributes learning.
Recommended optional programme components:
Cell biology is prerequisite for the following courses: Developmental biology-histology (755320A), Animal physiology (755323A), Plant biology lectures (756346A), Concepts of genetics (757109P). Course also gives readiness for studies in molecular biology and biochemistry.
Recommended or required reading:
Suitable parts of Reece ym. 2014: Campbell Biology: a global approach (10e), Pearson, 1350 s. 978-1-292-00865-3, Alberts, B. ym. 2015: Molecular Biology of the Cell (6e), Garland Science Publishing, London, 1464 s. ISBN: 9780815345244, Heino J. & Vuento M. 2014: Biokemian ja solubiologian perusteet (3. painos) WSOY Pro Oy, Helsinki, Jones R. ym. 2013: The molecular life of plants. Wiley-Blackwell, 742 s. ISBN : 978-0-470-87012-9.
The availability of the literature can be checked from this link.

[HK1]linkkiä en osannut uudistaa
Assessment methods and criteria:
Three subexams. After each lecture section is subexam. The only way to do the course is to pass all the three subexams (no credits to Oodi are given from subexams). No final exam. The subexams are ment to be done within one academic year.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail. Final grade is average value of the three exams.
Person responsible:
Dr. Jaana Jurvansuu, Doc. Helmi Kuittinen and Prof. Hely Häggman.
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

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 ideas of quantitative and population genetics. Part 2. Molecular genetics: replication, transcription, translation, genetic code, mutations, repair of DNA. Part 3. Selected topics on developmental genetics, and genetics of health and diseases.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
50 h lectures and seminars, 83 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:
Cell biology (750121P) or equivalent knowledge.
Recommended optional programme components:
This course is prerequisite to all other genetics courses.
Recommended or required reading:
Materials are in Optima. Klug et al. 2012. Concepts of Genetics (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:
1-5 / Fail.
Person responsible:
Prof. Outi Savolainen.
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

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:
After passing the course students have elementary knowledge of basic phenomena of genetics, important working methods and laboratory organisms. Student has the basic ability to understand, apply and analyse simple genetical works and phenomena.
Contents:
Investigation of Mendelian inheritance, gene mapping and nonadditive effects of genes using cross-breeding; basics of population genetics; investigation of promoter regulation and microbial recombination; investigation of mitosis and meiosis using cytogenetical methods; basic methods of DNA techniques (isolating DNA, digesting DNA using restriction enzymes, PCR and electrophoresis).
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
14 h demonstrations, 35 h exercises, 82 h independent work including home essay 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:
1-5 / Fail.
Person responsible:
Doc. Helmi Kuittinen
Working life cooperation:
No.
Other information:
-

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

Opettajat: Henrika Honkanen

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:
1-5 / Fail.
Person responsible:
M.Sc. Henrika Honkanen.
Working life cooperation:
No.
Other information:
-

750366A: Bachelor of Science final examination, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 3 rd year.
Learning outcomes:
Student will understand basic methods, results and theories in ecology, physiology or genetics.
Contents:
Examinations on books related to B.Sc. thesis subject. List of books are presented on WebOodi. All the books are recommended to be are done on the same exam 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 (4 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:

BSz:

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

BSg

- Klug, W. S., Cummings, M. R., Spencer, C.A ja Palladino M.A.: Concepts of Genetics (11. ed.). Pearson & Prentice Hall, 2015

- responsible teacher doc. 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 Scrinking 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 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. Annamari Markkola

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:

1-5 / Fail.

Person responsible:

M.Sc. Henrika Honkanen, Prof. Hely Häggman, doc. Annamari Markkola, doc. Heikki Helanterä 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 Noppa. Four pages long essay exam. One teacher examine the maturity exam and Pro gradu working group accepts it. 4 h exam.

Target group:
Compulsory to the biology students. Exam is taken after completion of the thesis.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Four pages long essay. Done in Examinarium.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Hely Häggman, Prof. Jari Oksanen, Prof. Timo Muotka or Prof. Outi Savolainen.
Working life cooperation:
No.
Other information:
-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

750396A	Bachelor of Science seminar	3.0 op

ECTS Credits:
10 ECTS credits / 267 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 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. The dean will order the examiners by the proposal of the professor. Pro gradu working group accepts and grades the thesis on the basis of the examiners' opinions.
List of the actual B.Sc. thesis topics is on Noppa.

Mode of delivery:
Face-to-face teaching.

Learning activities and teaching methods:
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 spring, subject teacher students have seminar workshop in the 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 Rytkönen coordinator., computer classes Dr. Phillip Watts, peer groups Prof. Timo Muotka (autumn) and Prof. Jari Oksanen (spring).
B.Sc. thesis: Prof. Hely Häggman, Prof. Jari Oksanen, Prof. Timo Muotka or Prof. Outi Savolainen.

Working life cooperation:
No.

Other information:
-

750373A: Biogeography, 5 op

Voimassaolo: 01.08.2015 - 31.07.2019

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari-Heikki Oksanen, Kvist, Laura Irmeli

Opintokohteen kielet: Finnish

Leikkaavuudet:

750173P	Biogeography	5.0 op
750363A	Biogeography	4.0 op

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

Language of instruction:
Finnish.

Timing:
B.Sc. 1st autumn.

Learning outcomes:
The course introduces students to basic concepts of biogeography, patterns of distribution and historical and present factors affecting the distribution. Plant biogeography introduces students to modern and historical factors controlling the plant cover, and to the special methods of vegetation science.

Contents:

The course consists of general part and optional part on plant biogeography and vegetation science. The general part introduces basic models and theories of distribution of organisms in the environment. Historical, evolutionary, geographical, climatic and ecological explanations. Research methods used in biogeography. The part on plant biogeography and vegetation science introduces methods on factors controlling the structure and composition of vegetation, and describes major vegetation types in Finland and principal biomes in the World. Methods of vegetation science are briefly surveyed.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

General biogeography: 24 h lectures, independent work (3 cr), **Plant biogeography**: 24 h lectures (2 cr); two exams.

Target group:

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), Evolution, systematics and morphology of organisms, practicals (750374A), Biodiversity in human changed environments (755631S).

Recommended or required reading:

Cox, C.B. & Moore, P.D. 2005: Biogeography. An ecological and evolutionary approach (7 ed.), Blackwell Publishing Ltd, or Cox, C.B. & Moore, P.D. 2010: Biogeography. An ecological and evolutionary approach (8 ed.), John Wiley & Sons Inc.

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

Assessment methods and criteria:

Two exams.

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

Grading:

1-5 / Fail. Final grade is average value of the two exams.

Person responsible:

Doc. Laura Kvist and Prof. Jari Oksanen.

Working life cooperation:

No.

Other information:

-

750372A: Evolution and systematics of organisms, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari-Heikki Oksanen, Marko Mutanen, Annamari Markkola

Opintokohteen kielet: Finnish

Leikkaavuudet:

750307A	Evolution and systematics of organisms	4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 2nd autumn.

Learning outcomes:

Students will learn a general picture of the diversity of life-forms as to understand the evolutionary history of organisms.

Contents:

The course provides an insight into the biological evolution and evolutionary processes reflected by the systematic classification of the organisms. Also basic principles and concepts of systematics and classification are presented.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
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. 2 nd ed. Cambridge University Press., Willis, K.J. & McElwain, J.C. 2002: The evolution of plants. Oxford University Press. Hickman, C. P. et al. 2009. Animal Diversity, 5th edition, McGraw Hill New York.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Lecture exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Arja Kaitala, Prof. Jari Oksanen and Doc. Annamari Markkola.
Working life cooperation:
No.
Other information:
-

755333A: Identification of animals, 6 op

Voimassaolo: 01.08.2016 - 31.07.2019

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Koivula

Opintokohteen kielet: Finnish

Leikkaavuudet:

755334A	Identification of animals, vertebrates	4.0 op

ECTS Credits:
6 ECTS credits / 162 hours of work.
Language of instruction:
Finnish / English
Timing:
B.Sc. degree 1st autumn and spring.
Learning outcomes:
Main point of the course is to learn to indentify Finnish animal species (vertebrate) and families (invertebrate) from museum samples. Basics of species' ecology and classification of organisms.
Contents:
During the autumn semester (9 h lectures in Finnish, 16 h exercises, exam), the Finnish vertebrate fauna is studied using stuffed museum samples. In the spring semester (9 h lectures in Finnish, 16 h exercises, exam) the invertebrate taxons (mostly family- or genus-level) common in Finland are studied using museum samples.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
18 h lectures in Finnish, 32 h exercises, independent studying, 2 exams.
Target group:
Biology students: compulsory.

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:
Course handouts, Itämies J. ja Viro P. 1995: Eläinten lajintuntemus, selkärangattomat, 73 p.; Putaala, A., Marjakangas, A. & Rytkönen, S. 2001: Eläinten lajintuntemus, selkärankaiset, 42 p.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Two species exams.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
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: Annamari Markkola

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
BSc 1st autumn.
Learning outcomes:
Student is able to identify most common boreal plant species in herbarium specimens.
Contents:
Demonstrations and/or independent stud of ca. 350 vascular plants, mosses and lichens in the boreal vegetation zone. In the identification exam student has to know specimens scientific name and family in latin.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
16 h demonstrations and learning from the herbarium samples. 350 plant species. In the identification exam student has to know specimens scientific name and family in latin.
Target group:
BSc degree: ECO and TEA 5 cr compulsory.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
Course done as 5 cr (756654S) is prerequisite for the Plant ecology field course (756643S) and for the advanced plant species identification courses (752608S and 752625S).
Recommended or required reading:
Booklet Hanhela, P. & Halonen, P. 1995: Plant Identification.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Two species identification subexams (756354A-01 and 756354A-02). 5 cr without the course handout.
Read more about assessment criteria at the University of Oulu webpage.

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

756346A: Plant biology lectures, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha, Anna-Maria Pirttilä

Opintokohteen kielet: Finnish

Leikkaavuudet:

752345A	Basics of functional plant biology, lectures	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 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) and exams.
Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
Cell biology (750121P) or equivalent knowledge helps in following this course. This course is a prerequisite for course Plant biology practicals (756341A) and Advanced course in plant biology (752682S).
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.
Read more about assessment criteria at the University of Oulu webpage.

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

756343A: Plant ecology field course, 5 op

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

752304A	Field course in ecological botany	5.0 op

ECTS Credits:
5 cr / 133 h of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 1st summer. ECOGEN 1st summer.
Learning outcomes:
Student is able to identify most common boreal plant species in the field, to plan and conduct ecological field experiments and use basic methods in vegetation analyses.
Contents:
Vegetation in the coast of Bothnian Bay in Hailuoto and/or Oulu (3 days). Basics of boreal forest and mire vegetation classification and types at Oulanka Research Station (7 days). Vegetation research and basic methods of stock estimation. Mire vegetation development and ecological biodiversity.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures 10 h, field demonstrations and laboratory exercises, excursions 84 hours in Oulu and/or Hailuoto and Oulanka Research Station. Field exams for plant identification and mire ecology, report.
Target group:
B.Sc. Compulsory to ECO 5 cr and TEA 5 cp, TEA: at least 10 cr compulsory, two field courses, one ecological botany field course (756343A) and other animal field course (either 755321 or 755322A).
Prerequisites and co-requisites:
Identification of plant species (756354A) 5 cr or equivalent knowledge.
Recommended optional programme components:
Course has capacity for 32 or 40 students. Possible elimination of the candidates is done by study success and Plant identification (756354A) grade. This course is a prerequisite for courses Plant ecology (752600S), Mire ecology (752692S) and Field course in Arctic-Alpine ecology and vegetation (752642S).
Recommended or required reading:
Laitinen et al. 2012: Field course in ecological botany; Hanhela, P. & Halonen, P. 1995: Plant identification; Huttunen, A: 1995: Introduction to forest types; Eurola, S., Hicks, S. and Kaakinen, H. 1994: Key to Finnish mire types, pp. 12-117 in: Moore, P. D. (ed.), 1994 European mires, London Academic Press, London, 367 p.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Field exams, report.
Read more about assessment criteria at the University of Oulu webpage.

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

757313A: Basics in population genetics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Lumi Viljakainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

753314A	Basics in population genetics	8.0 op

ECTS Credits:
5 cr / 133 hours of work.
Language of instruction:
English.
Timing:
B.Sc. 2nd spring BSg, M.Sc. 1st spring, ECOGENgen 1st spring, genetics: compulsory in M.Sc. degree.
Learning outcomes:
Student can explain the fundamental population genetics concepts and models and basics in phylogenetics, and is able to apply these in analysis of data.
Contents:
Fundamentals of population genetics (genetic variation, inbreeding, genetic drift, effective population size, mutation, selection, population structure, gene flow), phylogenetic methods and phylogeography.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
22 h lectures, 4 h seminars, 16 h exercises (problem solving, and computer exercises), take-home exam.
Target group:
B.Sc. 2nd spring BSg, M.Sc. 1st spring, ECOGENgen 1st spring, genetics: compulsory in M.Sc. degree.
Prerequisites and co-requisites:
Concepts of genetics (757109P) and Experimental course in general genetics (757110P) or equivalent knowledge and Molecular evolution (757312A).
Recommended optional programme components:
Compulsory prequisite for courses Experimental course in evolutionary genomics (757621S), Advanced course in bioinformatics (757619S) and DNA analysis in population genetics (757618S). Recommended prerequisite for course Quantitative genetics (805338A).
Recommended or required reading:
Hamilton, M. B. 2009: Population genetics, Wiley-Blackwell.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Take-home exam, problem solving, laboratory and computer exercises, seminar.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Lumi Viljakainen.
Working life cooperation:
No.
Other information:
Note that in population genetics and Introduction to Molecular ecology courses are alternative; students cannot get credits from both.

757314A: Basics of bioinformatics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Lumi Viljakainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

750340A Basics of bioinformatics 3.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. studies, 3rd autumn.
Learning outcomes:
After the course the student can explain and is able to use the basic methods for handling nucleotide and protein sequences. Student learns how to use various databases, can explain the background and principles of the analytic methods, is able to take up a critical attitude towards the used methods and gets a good background for applying new methods that are developed continuously.
Contents:
Searching 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, 2 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:
1-5 / Fail.
Person responsible:
Doc. Lumi Viljakainen.
Working life cooperation:
No.
Other information:
-

752388A: Basics of tissue culture, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha, Anna-Maria Pirttilä

Opintokohteen 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. 2 nd or M.Sc. 1 st autumn.
Learning outcomes:
The course aims to help students learn to basic plant tissue culture concepts, to establish tissue culture systems and to understand totipotency.
Contents:
Preparation of culture media and establishment of sterile cultures starting from different plant organs and tissues. Students are able to understand how plant hormones affect differentiation of tissues.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
8 h lectures, 35 h demonstrations and exercises, essay, seminar.
Target group:
B.Sc. degree BS: optional, M.Sc. degree BSb: compulsory.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
Course gives ability to further studies in molecular biology.
Recommended or required reading:
Course handout the book: 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.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Hely Häggman and Doc. Anna Mari Pirttilä.
Working life cooperation:
No.
Other information:
-

755320A: Developmental biology-histology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Henrika Honkanen

Opintokohteen kielet: Finnish

Leikkaavuudet:

751367A	Developmental biology-histology, lectures	4.0 op

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

(gastrulation), embryonic induction, signal
molecules and the differentiation of the most important tissues and organs (organogenesis). Histology will first cover various tissue types, their cell types and matrix composition. Thereafter, the microscopic structure and tissue composition of various organs and organ systems will be covered. In both parts, practical exercises on drawing from microscopic slides (see 755317A) will support lectures.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
6x2h lectures (developmental biology), 24 h exercises (histology). Drawing exercises on microscopical and virtual microscopic preparates, independent working on microscope and virtual microscope, identification of different tissue types on histologic preparates.
Target group:
BS compulsory. ECO and TEA optional.
Prerequisites and co-requisites:
Cell biology (750121P) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Exercise handout, lecture notes, lecture handouts. Recommended reading: Sariola, Frilander ym., Solusta yksilöksi: Kehitysbiologia, Duodecim, Helsinki 2003; Gilbert: Developmental Biology, Sinauer Press, 6.ed. 2000, or newer; Young & Heath: Wheater's Functional Histology, Churchill Livingstone, 4. ed. 2000, or newer.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
2 lecture exams.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail.
Person responsible:
M.Sc. Henrika Honkanen.
Working life cooperation:
No.
Other information:
-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. degree 2nd autumn. ECO compulsory. BS and TEA optional.
Learning outcomes:
Main aim of the course is to learn evolutionary history of organisms and basics of systematics: how the life has evolved and which evolutionary processes have affected the development. Students will get an idea, how and why different or similar morphological traits and functions have evolved in different taxonomic groups.
Contents:
Morphology and anatomy of macro- and microscopic specimens of different taxonomic groups are studied by the students in systematic order from microbes to plants and invertebrate and vertebrate animals. Demonstrations

connect the morphological traits of studied specimens and organism groups to a wider evolutionary context and illustrate the importance of different structures for the organisms in their living environment.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
36 h compulsory exercises and demonstrations, exercise exam.
Target group:
BSc: ECO: compulsory, BT and TEA: optional.
Prerequisites and co-requisites:
Evolution and systematics of organisms (750372A).
Recommended optional programme components:
-
Recommended or required reading:
Course handouts can be bought form the teachers before the course starts. Net material and books Bell, P.R. & Hemsley, A.R. 2000. Green plants. Their origin and diversity. 2 nd edn. Cambridge University Press. Willis, K.J. & McElwain, J.C. 2002: The evolution of plants. Oxford University Press. Rikkinen, J. 1999: Leviä, sieniä ja leväsieniä, johdatus levien ja sienten monimuotoisuuteen. Yliopistopaino, Helsinki. 194 s. Hickman, C, P. et al. 2009. Animal Diversity, 5. painos, McGraw Hill New York.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Exam.
Read more about assessment criteria at the University of Oulu webpage.

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

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

ECTS Credits:
2-10 ECTS credits / 53-267 hours of work.
Language of instruction:
Depends on the book.
Timing:
B.Sc. degree 2.-3. year or M.Sc. degree 1.-2. year.
Learning outcomes:
Student independently concerns him/herself to special issues in animal physiology or animal ecology.
Contents:
Examinations on books, which are not compulsory in any other course unit.
Mode of delivery:
Independent studying: book exam.
Learning activities and teaching methods:
Book exan in Examinarium.
Target group:

-
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Literature chosen in agreement with the responsible teacher.
Assessment methods and criteria:
Book exan in Examinarium.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail.
Person responsible:
Prof. Jari Oksanen (ECOb), Prof. Timo Muotka (ECOa), Doc. Kari Taulavuori (ECOb), Doc. Seppo Rytkönen (ECOa), Doc. Annamari Markkola (ECOb), Prof. Outi Savolainen (BSg) and Prof. Hely Häggman (BSb).
Working life cooperation:
-
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: Kuittinen, Helmi Helena

Opintokohteen kielet: Finnish

Leikkaavuudet:

753327A	Molecular evolution	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English. Lectures are in Finnish, but non-speakers can make an exam based on literature.
Timing:
B.Sc. 2nd autumn.
Learning outcomes:
After the course the student knows some basic methods that are used to study the history of living organisms and their evolutionary mechanisms. The student knows the main concepts in the field and can read scientific articles in molecular evolution.
Contents:
Basic methods of estimation of nucleotide substitution rates, building of phylogenetic trees with distance based methods and parsimony. Evolution of the genome structure and size. Scientific articles.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
24 h lectures, 16 h exercises/seminar, 90 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:
Additional 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:
1-5 / Fail.
Person responsible:
Doc. Helmi Kuittinen.
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 from different organisms, 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 her results and optimize the methods to some degree.
Contents:
Isolation of genomic DNA, amplification of DNA by PCR, primer design, DNA sequencing, basic analysis of DNA-sequence and writing basic scientific reports.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
48 h exercises including demonstrations, 50 h independent work including homework and writing reports.
Target group:
Compulsory to BS and ECOGEN, suitable for ECO students who are interested in population and evolutionary ecology.
Prerequisites and co-requisites:
Consepts of genetics (757110P) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Reports.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
Pass / 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:
Cell biology (750121P) and Basics in functional plant biology, lectures (756346A).
Recommended optional programme components:
Basics in plant biology is prerequisite to Advanced course in plant biology (752682S).
Recommended or required reading:
Terävä, E. & Kanervo, E. 2008: Kasvianatomia or equivalent knowledge, Taiz, L. & Zeigler, E. 2010: Plant Physiology (parts), Sinauer Ass., Sunderland Mass.; Hohtola ym.: Harjoitustyömoniste.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Laboratory exercises, reports.
Read more about assessment criteria at the University of Oulu webpage.

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

756353A: Plant developmental biology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha

Opintokohteen kielet: Finnish

Leikkaavuudet:

756332A	Plant developmental biology	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 3rd spring.
Learning outcomes:
The student has a comprehensive view on plant development and show knowledge of the recent methods used in the research of plant developmental biology.
Contents:
Modern methods in plant biology and especially the mutant or genetically modified plants have been in a key role to understand factors, mechanisms and regulation affecting plant development. The lectures include cell level information (cell division, growth and differentiation), embryo development, meristem formation and maintenance, organ development and cell death as a role of normal plant development. Moreover, the role of environmental factors in plant development will be covered.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Developmental biology 20 h lectures, home essay / seminar and final exam.
Target group:
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. Timmermans, M.C.P.: Plant Development. 2010. Elsevier.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Hely Häggman.
Working life cooperation:
No.
Other information:
-

756304A: Plant ecophysiology in changing environments, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen oppimateriaali:
Lambers, Hans , , 1998
Prasad, M.N.V (ed.), , 1997
Hall, D.O. et al., , 1993
Opintokohteen kielet: Finnish

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

Contents:
The aim of the course is to initiate the students into the basics of plant ecophysiology in changing environments. The physical, chemical (abiotic) and biotic factors in the environment affects plant's growth and survival. Plant ecophysiology is an experimental science, which studies the physiological functions and adjustments underlining the ecological observations from the viewpoint of growth and survival. Different environmental stresses restrict the plant growth. Plant ecophysiology is experimental science which studies the physiological functions and regulation mechanisms on growth, survival, abundance and distribution. Effects of abiotic and biotic factors are studied. How elevated temperature, CO2, drought stress, nutrient imbalance, air pollutants, metals, UV radiation and plant pathogens affect on plants' gas exchange, primary metabolism, carbon allocation and growth. The exercises can also focus on the effects of environmental factors on photosynthesis, respiration, transport of photosynthetic products, water economy, energy economy and nutrient economy. Special features of ecophysiology of boreal plants are also dealt with.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
20 h lectures and demonstrations, 35 h exercises, exam, report, seminar.
Target group:
ECOb, BSb, Ph.D. students (if not in the undergraduate degree).
Prerequisites and co-requisites:
-
Recommended optional programme components:
Course is related both to plant ecology and plant physiology basic studies.
Recommended or required reading:
Hans Lambers, F.Stuart Chapin III, Thijs L. Pons 2008: Plant Physiological Ecology. Springer Verlag. 540 s. Second edition.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Seminar and report.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Kari Taulavuori.
Working life cooperation:
No.
Other information:
-

750313A: Research training, 2 - 15 op

Opiskelumuoto: Intermediate Studies

Laji: Practical training

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
1-15 ECTS credits / 27-405 hours of work.
Language of instruction:

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

750318A: Thursday seminar in biology, 2 op

Voimassaolo: 01.08.2011 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
2 ECTS credits / 53 hours of work.
Language of instruction:
English.
Timing:
B.Sc., M.Sc. or Ph.D. degree.
Learning outcomes:
Students get knowledge about the current results and theories in biology.
Contents:
Lectures in English on current topics in biology given by guest lecturers from Finland or abroad.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Guest lectures on Thursdays 12 am-1 pm. See seminar programme: https://noppa.oulu.fi/noppa/kurssi/750616S/etusivu
Target group:
Undergraduate and postgraduate students interested in biology.

Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
10 participations and 10 one page long reports. You can combine lectures from different academic terms to make the needed 10 essays.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Doc. Helmi Kuittinen.
Working life cooperation:
No.
Other information:
-

750377A: Winter ecology and physiology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

Leikkaavuudet:

750325A	Winter ecology and physiology	3.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English.
Timing:
B.Sc. 3 rd or M.Sc. 1 st spring. NNE.
Learning outcomes:
Student obtains basic knowledge of animal and plant acclimations and adaptations to winter, and can evaluate the effects of cold temperatures and snow on overwintering, and learns central methodology in winter ecology and physiology.
Contents:
Two independent units: 1) Winter ecology and physiology course (7 h lectures and 13 h laboratory practicals and 4 h seminar in Oulu, and 4 day long field excursion to the Oulanka Research Station (total about 50 h, 3 cr); 2) Book exam on a common exam day 2 cr: Marchand, P. J. 1996: Life in the cold. An introduction to winter ecology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures, exercises, report and seminar presentation.
Target group:
Biology students.
Prerequisites and co-requisites:
Courses Basics of ecology (750124P), Cell biology (750121P), Terrestrial animals field course (755322A), Aquatic ecology field course (755321A), Plant ecology field course (756343A) and Basics of plant biology, lectures (756346A) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Marchand, P. J. 1996: Life in the cold. An introduction to winter ecology. (3rd edition). University Press of New England. 304 p.

The availability of the literature can be checked from this link.
Assessment methods and criteria:
Seminar presentation and book exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Course + seminar: Pass / Fail, book exam: 1-5 / Fail.
Person responsible:
Doc. Kari Taulavuori.
Working life cooperation:
No.
Other information:
-

750380A: Working knowledge, 1 - 5 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
1-5 ECTS credit / 27-133 hours of work
Language of instruction:
Finnish / English.
Timing:
B.Sc. 1st spring - 3rd spring.
Learning outcomes:
During the course student will get work experience and develop common working life skills as communication and organization skills and get to know work community and it's dynamics.
Contents:
Independent work for example in the summer job.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Student will keep diary of her/his tasks and hours which will be added to the report that the student will do. Report includes self assesment.
Target group:
B.Sc. students.
Prerequisites and co-requisites:
-
Recommended optional programme components:
Before Practical training (750615S).
Recommended or required reading:
-
Assessment methods and criteria:
Report and diary.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail
Person responsible:
Prof. Hely Häggman, Dr. Heikki Helanterä, Prof. Timo Muotka and Doc. Annamari Markkola.
Working life cooperation:
Yes. Training in suitable tasks will develop student's working life skills.
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 Päkkilä

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 Päkkilä
Working life cooperation:
No
Other information:
-

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 credits/134 hours of work
Language of instruction:
Finnish
Timing:
1st autumn
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. Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail.
Person responsible:
Lecturer Minna Tiainen
Working life cooperation:
No
Other information:
No

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 credits / 27 hours of work
Language of instruction:
Finnish
Timing:
Architecture 3. spring semester, period I; Biochemistry 3. autumn semester; Biology 3. autumn semester, period I; Chemistry 3. autumn semester, period II; Computer Science and Engineering 2. spring semester, period IV; Electronics and Communications Engineering 3. spring semester; Geosciences 2. spring semester, period IV; Geography 1. and 3. spring semester, period III; Industrial Engineering and Management 3. year (Master's degree students in Industrial Engineering and Management 1st year.); I

nformation Processing Sciences 1. 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.

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 RefWorks 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.

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Web learning material Tieteellisen tiedonhankinnan opas http://libguides.oulu.fi/tieteellinentiedonhankinta (in Finnish)

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

Working life cooperation:

-

Other information:

-

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 Päkkilä

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 Päkkilä
Working life cooperation:
No
Other information:
-

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
Timing:
3. year, 4. period
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
- idfentify 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

Timing:
3. year, 4. period
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 Sääskilahti
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

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

ECTS Credits:
5 ECTS
Language of instruction:
Finnish. English for the ITE students
Timing:
1st year
Learning outcomes:

- Describe the main paradigms and define the basic concepts of educational sciences
- Identify some of the most influential, past and contemporary educational theorists
- Consider the role of practical and theoretical knowledge in teacher's profession
- Apply the acquired knowledge in classroom discussions on international and multicultural learning and teaching contexts
- Is able to read academic texts on education and write a short academic essay

Contents:

- Theories and concepts of mainstream educational sciences and intercultural education
- Formal education, informal and non-formal education
- Epistemology: forms of knowledge and knowledge production, cultural impact on knowledge construction
- Teacher's professional development and teacher's identity formation
- Basics of academic writing

Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Lectures 20h, seminars 10h, and independent study 105h
Target group:
ITE, LO, Taika, Tekno, Vaka, Kako, AO, Avoin, AMOK
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:
Sari Harmoinen

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
Language of instruction:
Finnish
Timing:
1st year
Learning outcomes:

- Identify the most prominent paradigms and their representatives 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

Contents:

- The most prominent paradigms and their representatives of psychology
- Age- and culture-specific issues of developmental psychology
- The impact of educational psychology in intercultural and inclusive education

Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Lectures 20h, seminars 10h, and independent study 105h
Target group:
ITE, LO, Taika, Tekno, Vaka, Kako, AO, Avoin, AMOK
Prerequisites and co-requisites:
No
Recommended optional programme components:
The course is part of Basic Studies in Education
Recommended or required reading:
Theories of Development: concepts and applications. 6 th ed. 2011.
Assessment methods and criteria:
Active participation,
Essay
Grading:
Pass/Fail
Working life cooperation:
Seminar phase of the course work includes observation task on field.

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

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 studets 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:
ITE, LO, Taika, Tekno, Vaka, Kako, AO, Avoin, AMOK
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.

790101P: GIS-basics and Cartography, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Harri Antikainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
5 ECTS
Language of instruction:
Finnish, partly in English. English speaking students are asked to contact prof. Rusanen before the course.
Timing:
1 year, 2nd semester
Learning outcomes:
Course gives basic information about Geographical Information System and about the theory of cartography. After the course the student can use ArcGIS program and he/she is able to produce cartographic presentations.
Contents:
Basics of GIS, theories of cartography and statistical graphics and use of ArcGIS program.
Mode of delivery:
Face-to-face learning.
Learning activities and teaching methods:
16 h lectures, 56 h practicals.
Target group:
Common course to all 1st year students of Geography.
Prerequisites and co-requisites:
-
Recommended optional programme components:
Course is part of the minor studies of GIS.

Recommended or required reading:
Paul A Longley, Michael G Goodchild, David J. Maguire & David W. Rhind (2005). Geographic Information Systems and Science. 2 nd edition. 516 p
Assessment methods and criteria:
Exam on exam day.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1–5.
Person responsible:
Harri Antikainen
Working life cooperation:
No
Other information:
English speaking students are asked to contact Harri Antikainen before the course.

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

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay790141P	Introduction to planning geography (OPEN UNI)	5.0 op

ECTS Credits:
5 ECTS
Language of instruction:
Finnish.
Timing:
1st year, 1st semester.
Learning outcomes:
The student is able to apply the most essential concepts of regional development and regional policy. He/she can tell the historical progress of regional development, regional policy and regional planning of Finland and its relationship to contemporary development of European Union.
Contents:
Regional development and regional policy from conceptual and empirical aspects; Theories and mechanisms of RD and RP; Local, national and international development based on regional planning.
Mode of delivery:
Face-to-face learning.
Learning activities and teaching methods:
20 hrs lectures, literature and written exam.

Target group:
Common course to all 1st year students of Geography.
Prerequisites and co-requisites:
-
Recommended optional programme components:
Course is part of minor studies in Geography and minor studies of Regional Development and regioanl planning.
Recommended or required reading:
Moisio, Sami (2012). Valtio, alue, politiikka. Suomen tilasuhteiden sääntely toisesta maailmansodasta nykypäivään. Vastapaino, Tampere.

Assessment methods and criteria:
Exam on exam day.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5.
Person responsible:
Toni Ahlqvist
Working life cooperation:

No.

790160P: Introduction to Tourism Geography, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Saarinen, Jarkko Juhani

Opintokohteen kielet: Finnish

Leikkaavuudet:

790160A	Introduction to tourism geography	5.0 op

ECTS Credits:
5 ECTS
Language of instruction:
Finnish
Timing:
1st year, 1st semester.
Learning outcomes:
Student will learn about the toursim phenomenon and its regional and development characteristics and impacts. After the course the student can define and interpret different aspects of the tourism geography and its subject matters.
Contents:
Basic concepts of the tourism phenomena, spatial characteristics of tourism and its development aspects.
Mode of delivery:
Face-to-face learning.
Learning activities and teaching methods:
16 h lectures, exam.
Target group:
Common course to all 1st year students of Geography.
Prerequisites and co-requisites:
-
Recommended optional programme components:
Course is part of the minor studies of Tourism studies.
Recommended or required reading:

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

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

790104P: Introduction to systematic Human Geography, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Juha Ridanpää

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay790104P	Introduction to systematic humangeography (OPEN UNI)	5.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
5 ECTS
Language of instruction:
Finnish
Timing:
1st year, 2nd semester.
Learning outcomes:
The purpose of the course is to initiate the development of human geography and topical research themes. Upon completion of the course, the student will be able to comprehend different fields of study and systematic approaches in human geography.
Contents:
Cultural phenomena and their geographical examination: including economics, industrialization, politics, religion, urban geography, demography, ethnicity, postcolonialism, languages, globalization, popular culture.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures 20 h. and exercises 56 h. (including small group teaching, self-study and a practical work). The work at exercises focus on concreate human geographical problems with the use of empirical material. The course includes an exam, based on the content of lectures. The grading bases on both lecture exam and the work in exercises (50 /50).
Target group:
The course is aimed at all first year students in geography.
Prerequisites and co-requisites:
-
Recommended optional programme components:
Course is part of the minor studies of Geography.
Recommended or required reading:
Will be announced later.
Assessment methods and criteria:
Exam on exam day.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5.
Person responsible:
Juha Ridanpää (lectures) and Tuomo Alhojärvi (practicals).
Working life cooperation:
No.

790152P: Introduction to the discipline of Geography, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Jan Hjort

Opintokohteen oppimateriaali:
Goudie, Andrew , , 1997
Opintokohteen kielet: Finnish

Leikkaavuudet:

ay790152P	Introduction to the discipline of geography (OPEN UNI)	5.0 op

ECTS Credits:
5 ECTS
Language of instruction:
Only in Finnish.
Timing:
BSc, 1st year, 1st semester
Learning outcomes:

With this course the students can analyse the history of Geography and contents of its different fields, concepts and research aspects.

Contents:

Lectures will give a general overview of Geography as an independent discipline. It will be completed by considering history, concepts and research aspects of Geography.

Mode of delivery:

Face-to-face learning.

Learning activities and teaching methods:

20 hours lectures, literature and written exam.

Target group:

Obligatory for all the 1st year students of Geography.

Prerequisites and co-requisites:

-

Recommended optional programme components:

Course is part of the minor studies of Geography.

Recommended or required reading:

- International Encyclopedia of Human Geography (toim. Rob Kitchin & Nigel Thrift), chapters: Metaconcepts: Landscape, Place, Scale, Space I, Space-Time, Space II, Territory and Territoriality Philosophy and Geography: Regional Geography I Political Geography: Regionalism Social & cultural geography: Citizenship, Cultural Geography, Sense of Place.
- Lecture slides and three articles (Harrison 2009, Rhoads 2009, Alahuhta ym. 2013) can be found from the Noppa Study Portal (under the heading “Yhteinen lisämateriaali”).

Assessment methods and criteria:

Exam on exam day.

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

Grading:

1-5.

Person responsible:

Jan Hjort, Juha Ridanpää

Working life cooperation:

No.

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

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Geography

Arvostelu: 1 - 5, pass, fail

Opettajat: Jan Hjort

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

5 ECTS cr

Language of instruction:

Finnish and English (Lectures are only in Finnish, but this course can be completed also in English with some extra readings. Practicals are also organized in English.)

Timing:

1 year, 2nd semester

Learning outcomes:

This introductory course will give information about systematic fields of Physical Geography and its contemporary research. After the course, the student recognizes the most essential phenomena of geosphere (geomorphology), hydrosphere (hydrogeography), biosphere (biogeography), atmosphere (climatology), and he/she is able to do conclusions about the factors that influence those phenomena. The aim of the practical’s is that the student can use basic methods of the research of Physical Geography.

Contents:

Geomorphology, climatology, hydrogeography, biogeography; and geosphere, atmosphere, hydrosphere and biosphere. The students will learn how nature works and how to resolve multiple environmental questions. Practical's are focused to the importance of the material compilation and its technical use.
Mode of delivery:
Face-to-face learning.
Learning activities and teaching methods:
20 h lectures, 56 h practicals.
Target group:
Common course to all 1st year students of Geography.
Prerequisites and co-requisites:
-
Recommended optional programme components:
Course is part of the minor studies of Geography.
Recommended or required reading:

- Strahler, Alan (2013). Introducing Physical Geography.
- More material from the practicals.

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

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 on the Common European Framework of Reference scale.
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
•Department of Chemistry
Oulu Mining School
•Geosciences degree programme

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 English skills should have been acquired otherwise.
ECTS Credits:
2 ECTS / 54 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

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

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:
Contact teaching and independent study
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. A more detailed course description and list of homework tasks will be provided by the teacher.
Target group:
Faculty of Natural Sciences: Biology, Mathematical & Physical Sciences
Faculty of Technology: Chemistry
Oulu Mining School: Geosciences
Prerequisites and co-requisites:
-
Recommended optional programme components:
Students are also required to take English 2 902004Y, or English 4 902005Y, AFTER completion of this course.
Recommended or required reading:
Course materials will be provided in electronic form or will be accessible from the university library.
Assessment methods and criteria:
Student work is monitored by continuous assessment, and students are required to participate regularly and actively in all contact teaching provided. During the course, there will be three monthly tests on material covered so far. The assessment of the course is based on the learning outcomes listed above.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass/Fail
Person responsible:
Karen Niskanen
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. Please contact your own 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 on the Common European Framework of Reference scale.

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 & Physical Sciences

Faculty of Technology:
Chemistry
Oulu Mining School:
Geoscience degree programme

Note: Information Processing Science students who began their studies in autumn 2017 or later will take English 4 instead.
Please consult your faculty's study guide to establish the language requirements of your own degree programme.
Required proficiency level:
Students taking this course must have had English as the A1 or A2 language at school or have equivalent skills. The course English 1 (902002Y) is a pre-requisite, unless exempted.
ECTS Credits:
2 ECTS credits / 54 hours 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
- **prepare and present scientific subjects** to your classmates, using appropriate field-related vocabulary.

Contents:
Skills in listening, speaking, and presenting academic topics are practised in the classroom, where there is an emphasis on working in pairs and small groups. Homework is given to support the classroom learning.
Mode of delivery:
Contact teaching
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.
Individual learning methods: autonomous learning tasks, practice in lecture listening and written tasks in preparation for classroom lessons
Group work: Preparation of presentations in groups

Target group:
2nd year students of Biology, Chemistry, Geoscience
1st year students of Mathematical and Physical Sciences (new programme)

Prerequisites and co-requisites:
Pre-requisite course: 902002Y Englannin kieli 1
Recommended optional programme components:
-
Recommended or required reading:
-
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.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / fail.

Person responsible:
Karen Niskanen
Working life cooperation:
-
Other information:
-

750031Y: Orientation course for new students, 1 op

Voimassaolo: - 31.07.2017

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Vanhatalo, Minna-Liisa

Opintokohteen kielet: Finnish

Leikkaavuudet:

750032Y	Orientation course for new students	2.0 op

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

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

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

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

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

ECTS Credits:
1-4 credits
Language of instruction:
Finnish
Timing:
1st-5th year

750033Y: Tutorial for new students, 1 op

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

ECTS Credits:
1 ECTS credit / 27 hours of work
Language of instruction:

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

750124P: Basics of ecology, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari-Heikki Oksanen

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. 1 st spring.
Learning outcomes:
After completion of the course both biology and minor studies students understand better function of nature and the ecological phenomena in individual, population, community and ecosystem level.
Contents:
The course gives a student a basic idea about ecological interactions in individual-, population-, community- and ecosystem levels. In individual level the focus is on environmental demands of plants and animals. In population level the birth- and death rate of age groups and their effect on population growth is focused. In interactions between different species the emphasis is on how the competition between species leads to differentiation of niches. Predation is viewed as the regulatory effect on the population dynamics of prey populations. In community level the

biodiversity and the patterns of succession are the main questions. In ecosystem level the emphasis is on energy flows and nutrient cycling. Evolution and adaptation are important in different fields of ecology.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

The course is divided into three parts which follow the course book Krebs, C. J. 2009: Ecology (6 th edition). 1 st part: 24 hours of lectures based mainly on parts 1-2 of the course book. 2 nd part: 24 hours of lectures are based on part 3 of the course book. 3 rd part: students read the part 4 from the course book. In the course exam, there will be three questions, one from each part and all the questions have to be passed.

Target group:

Compulsory biology students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Krebs, C. J. 2009: Ecology (6 th edition). Part I.

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

Assessment methods and criteria:

Exam.

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

Grading:

1-5 / Fail.

Person responsible:

Doc. Kari Koivula and Prof. Jari Oksanen.

Working life cooperation:

No.

Other information:

-

750121P: Cell biology, 5 op

Voimassaolo: - 31.07.2020

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jaana Jurvansuu, Häggman, Hely Margaretha, Henrika Honkanen

Opintokohteen oppimateriaali:

Heino, Jyrki (2) , , 2004
Alberts, B. ym., , 2008
Lodish et al., , 2003

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish.

Timing:

B.Sc. 1 st autumn.

Learning outcomes:

The student is familiar with cellular structure and functioning in plant and animal cells, understands the social structures in multicellular species and knows why and how the genetic organizations (in nucleus, chloroplast and mitochondria) are co-operating, maintaining and regulating the cellular metabolism. Student understands the common origin and evolution of life on planet Earth, and understands the material basis and mechanisms of this continuity.

Contents:

During the recent years especially the development of molecular and microscopic and imaging techniques has increased our knowledge on cells and their social interactions. The structural and functional characteristics of plant and animal cells will be covered as well as the genetic organization maintaining and regulating the system.

Mode of delivery:

Face-to-face teaching.
Learning activities and teaching methods:
48 h lectures, 87 h independent work including deepening the upper secondary school knowledge in biology and chemistry as home work and book reading. Part of the home assignments is oblicatory.
Target group:
Compulsory to the biology and biochemistry students.
Prerequisites and co-requisites:
Good basics in biology and especially in chemistry from upper elementary school contributes learning.
Recommended optional programme components:
Cell biology is prerequisite for the following courses: Developmental biology-histology (755320A), Animal physiology (755323A), Plant biology lectures (756346A), Concepts of genetics (757109P). Course also gives readiness for studies in molecular biology and biochemistry.
Recommended or required reading:
Suitable parts of Reece ym. 2014: Campbell Biology: a global approach (10e), Pearson, 1350 s. 978-1-292-00865-3, Alberts, B. ym. 2015: Molecular Biology of the Cell (6e), Garland Science Publishing, London, 1464 s. ISBN: 9780815345244, Heino J. & Vuento M. 2014: Biokemian ja solubiologian perusteet (3. painos) WSOY Pro Oy, Helsinki, Jones R. ym. 2013: The molecular life of plants. Wiley-Blackwell, 742 s. ISBN : 978-0-470-87012-9.
The availability of the literature can be checked from this link.

[HK1]linkkiä en osannut uudistaa
Assessment methods and criteria:
Three subexams. After each lecture section is subexam. The only way to do the course is to pass all the three subexams (no credits to Oodi are given from subexams). No final exam. The subexams are ment to be done within one academic year.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail. Final grade is average value of the three exams.
Person responsible:
Dr. Jaana Jurvansuu, Doc. Helmi Kuittinen and Prof. Hely Häggman.
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

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 ideas of quantitative and population genetics. Part 2. Molecular genetics: replication, transcription, translation, genetic code, mutations, repair of DNA. Part 3. Selected topics on developmental genetics, and genetics of health and diseases.
Mode of delivery:
Face-to-face teaching.

Learning activities and teaching methods:
50 h lectures and seminars, 83 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:
Cell biology (750121P) or equivalent knowledge.
Recommended optional programme components:
This course is prerequisite to all other genetics courses.
Recommended or required reading:
Materials are in Optima. Klug et al. 2012. Concepts of Genetics (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:
1-5 / Fail.
Person responsible:
Prof. Outi Savolainen.
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

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:
After passing the course students have elementary knowledge of basic phenomena of genetics, important working methods and laboratory organisms. Student has the basic ability to understand, apply and analyse simple genetical works and phenomena.
Contents:
Investigation of Mendelian inheritance, gene mapping and nonadditive effects of genes using cross-breeding; basics of population genetics; investigation of promoter regulation and microbial recombination; investigation of mitosis and meiosis using cytogenetical methods; basic methods of DNA techniques (isolating DNA, digesting DNA using restriction enzymes, PCR and electrophoresis).
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
14 h demonstrations, 35 h exercises, 82 h independent work including home essay 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:
1-5 / Fail.
Person responsible:
Doc. Helmi Kuittinen
Working life cooperation:
No.
Other information:
-

750366A: Bachelor of Science final examination, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 3 rd year.
Learning outcomes:
Student will understand basic methods, results and theories in ecology, physiology or genetics.
Contents:
Examinations on books related to B.Sc. thesis subject. List of books are presented on WebOodi. All the books are recommended to be are done on the same exam 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 (4 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:
BSz:

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

BSg

- Klug, W. S., Cummings, M. R., Spencer, C.A ja Palladino M.A.: Concepts of Genetics (11. ed.). Pearson & Prentice Hall, 2015

- responsible teacher doc. 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 Scrinking 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 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. Annamari Markkola

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:
1-5 / Fail.
Person responsible:
M.Sc. Henrika Honkanen, Prof. Hely Häggman, doc. Annamari Markkola, doc. Heikki Helanterä 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 Noppa. Four pages long essay exam. One teacher examine the maturity exam and Pro gradu working group accepts it. 4 h exam.

Target group:
Compulsory to the biology students. Exam is taken after completion of the thesis.
Prerequisites and co-requisites:
No.

Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Four pages long essay. Done in Examinarium.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Hely Häggman, Prof. Jari Oksanen, Prof. Timo Muotka or Prof. Outi Savolainen.
Working life cooperation:
No.
Other information:
-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

750396A	Bachelor of Science seminar	3.0 op

ECTS Credits:
10 ECTS credits / 267 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 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. The dean will order the examiners by the proposal of the professor. Pro gradu working group accepts and grades the thesis on the basis of the examiners' opinions.
List of the actual B.Sc. thesis topics is on Noppa.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
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 spring, subject teacher students have seminar workshop in the 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 Rytkönen coordinator., computer classes Dr. Phillip Watts, peer groups Prof. Timo Muotka (autumn) and Prof. Jari Oksanen (spring).
B.Sc. thesis: Prof. Hely Häggman, Prof. Jari Oksanen, Prof. Timo Muotka or Prof. Outi Savolainen.
Working life cooperation:
No.
Other information:
-

750373A: Biogeography, 5 op

Voimassaolo: 01.08.2015 - 31.07.2019

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari-Heikki Oksanen, Kvist, Laura Irmeli

Opintokohteen kielet: Finnish

Leikkaavuudet:

750173P	Biogeography	5.0 op
750363A	Biogeography	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 1st autumn.
Learning outcomes:
The course introduces students to basic concepts of biogeography, patterns of distribution and historical and present factors affecting the distribution. Plant biogeography introduces students to modern and historical factors controlling the plant cover, and to the special methods of vegetation science.
Contents:
The course consists of general part and optional part on plant biogeography and vegetation science. The general part introduces basic models and theories of distribution of organisms in the environment. Historical, evolutionary, geographical, climatic and ecological explanations. Research methods used in biogeography. The part on plant biogeography and vegetation science introduces methods on factors controlling the structure and composition of vegetation, and describes major vegetation types in Finland and principal biomes in the World. Methods of vegetation science are briefly surveyed.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
General biogeography: 24 h lectures, independent work (3 cr), **Plant biogeography**: 24 h lectures (2 cr); two exams.
Target group:
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), Evolution, systematics and morphology of organisms, practicals (750374A), Biodiversity in human changed environments (755631S).
Recommended or required reading:

Cox, C.B. & Moore, P.D. 2005: Biogeography. An ecological and evolutionary approach (7 ed.), Blackwell Publishing Ltd, or Cox, C.B. & Moore, P.D. 2010: Biogeography. An ecological and evolutionary approach (8 ed.), John Wiley & Sons Inc.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Two exams.
Read more about assessment criteria at the University of Oulu webpage.

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

750372A: Evolution and systematics of organisms, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari-Heikki Oksanen, Marko Mutanen, Annamari Markkola

Opintokohteen kielet: Finnish

Leikkaavuudet:

750307A	Evolution and systematics of organisms	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 2nd autumn.
Learning outcomes:
Students will learn a general picture of the diversity of life-forms as to understand the evolutionary history of organisms.
Contents:
The course provides an insight into the biological evolution and evolutionary processes reflected by the systematic classification of the organisms. Also basic principles and concepts of systematics and classification are presented.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
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. 2 nd ed. Cambridge University Press., Willis, K.J. & McElwain, J.C. 2002: The evolution of plants. Oxford University Press. Hickman, C. P. et al. 2009. Animal Diversity, 5th edition, McGraw Hill New York.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Lecture exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:

1-5 / Fail.
Person responsible:
Prof. Arja Kaitala, Prof. Jari Oksanen and Doc. Annamari Markkola.
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: Panu Välimäki

Opintokohteen kielet: Finnish

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

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

755333A: Identification of animals, 6 op

Voimassaolo: 01.08.2016 - 31.07.2019

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Koivula

Opintokohteen kielet: Finnish

Leikkaavuudet:

755334A Identification of animals, vertebrates 4.0 op

ECTS Credits:
6 ECTS credits / 162 hours of work.
Language of instruction:
Finnish / English
Timing:
B.Sc. degree 1st autumn and spring.
Learning outcomes:
Main point of the course is to learn to indentify Finnish animal species (vertebrate) and families (invertebrate) from museum samples. Basics of species' ecology and classification of organisms.
Contents:
During the autumn semester (9 h lectures in Finnish, 16 h exercises, exam), the Finnish vertebrate fauna is studied using stuffed museum samples. In the spring semester (9 h lectures in Finnish, 16 h exercises, exam) the invertebrate taxons (mostly family- or genus-level) common in Finland are studied using museum samples.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
18 h lectures in Finnish, 32 h exercises, independent studying, 2 exams.
Target group:
Biology students: compulsory.
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:
Course handouts, Itämies J. ja Viro P. 1995: Eläinten lajintuntemus, selkärangattomat, 73 p.; Putaala, A., Marjakangas, A. & Rytkönen, S. 2001: Eläinten lajintuntemus, selkärankaiset, 42 p.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Two species exams.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
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: Annamari Markkola

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
BSc 1st autumn.
Learning outcomes:
Student is able to identify most common boreal plant species in herbarium specimens.
Contents:
Demonstrations and/or independent stud of ca. 350 vascular plants, mosses and lichens in the boreal vegetation zone. In the identification exam student has to know specimens scientific name and family in latin.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
16 h demonstrations and learning from the herbarium samples. 350 plant species. In the identification exam student has to know specimens scientific name and family in latin.
Target group:
BSc degree: ECO and TEA 5 cr compulsory.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
Course done as 5 cr (756654S) is prerequisite for the Plant ecology field course (756643S) and for the advanced plant species identification courses (752608S and 752625S).
Recommended or required reading:
Booklet Hanhela, P. & Halonen, P. 1995: Plant Identification.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Two species identification subexams (756354A-01 and 756354A-02). 5 cr without the course handout.
Read more about assessment criteria at the University of Oulu webpage.

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

757312A: Molecular evolution, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kuittinen, Helmi Helena

Opintokohteen kielet: Finnish

Leikkaavuudet:

753327A	Molecular evolution	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English. Lectures are in Finnish, but non-speakers can make an exam based on literature.
Timing:
B.Sc. 2nd autumn.
Learning outcomes:

After the course the student knows some basic methods that are used to study the history of living organisms and their evolutionary mechanisms. The student knows the main concepts in the field and can read scientific articles in molecular evolution.
Contents:
Basic methods of estimation of nucleotide substitution rates, building of phylogenetic trees with distance based methods and parsimony. Evolution of the genome structure and size. Scientific articles.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
24 h lectures, 16 h exercises/seminar, 90 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:
Additional 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:
1-5 / Fail.
Person responsible:
Doc. Helmi Kuittinen.
Working life cooperation:
No.
Other information:
-

756346A: Plant biology lectures, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha, Anna-Maria Pirttilä

Opintokohteen kielet: Finnish

Leikkaavuudet:

752345A	Basics of functional plant biology, lectures	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 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) and exams.

Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
Cell biology (750121P) or equivalent knowledge helps in following this course. This course is a prerequisite for course Plant biology practicals (756341A) and Advanced course in plant biology (752682S).
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.
Read more about assessment criteria at the University of Oulu webpage.

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

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

Opettajat: Kaisa-Leena Huttunen, Muotka, Timo Tapani

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 animals 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 animals 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:

Basic identification of animals (755333A) or equivalent knowledge (if necessary, selection to the course 755321A can be based on success in course 755333A).
Recommended optional programme components:
This course is a prerequisite for the following: Winter ecology and physiology (750377A), Special course in aquatic invertebrates (754627S), Assessment and monitoring of the ecological status of water bodies (754625S), Field methods in freshwater biomonitoring (754626S).
Recommended or required reading:
Reading package, handouts and lectures given before / during the course.
Assessment methods and criteria:
On the final course day species identification exam on the species met during the course, practical exam on the sampling methods and
theoretical exam based on the literature and demonstration material.
Read more about assessment criteria at the University of Oulu webpage.

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

756351A: Basics in population ecology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kvist, Laura Irmeli

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.

Person responsible:
Doc. Laura Kvist
Working life cooperation:
No.
Other information:
-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. degree 2nd autumn. ECO compulsory. BS and TEA optional.
Learning outcomes:
Main aim of the course is to learn evolutionary history of organisms and basics of systematics: how the life has evolved and which evolutionary processes have affected the development. Students will get an idea, how and why different or similar morphological traits and functions have evolved in different taxonomic groups.
Contents:
Morphology and anatomy of macro- and microscopic specimens of different taxonomic groups are studied by the students in systematic order from microbes to plants and invertebrate and vertebrate animals. Demonstrations connect the morphological traits of studied specimens and organism groups to a wider evolutionary context and illustrate the importance of different structures for the organisms in their living environment.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
36 h compulsory exercises and demonstrations, exercise exam.
Target group:
BSc: ECO: compulsory, BT and TEA: optional.
Prerequisites and co-requisites:
Evolution and systematics of organisms (750372A).
Recommended optional programme components:
-
Recommended or required reading:
Course handouts can be bought form the teachers before the course starts. Net material and books Bell, P.R. & Hemsley, A.R. 2000. Green plants. Their origin and diversity. 2 nd edn. Cambridge University Press. Willis, K.J. & McElwain, J.C. 2002: The evolution of plants. Oxford University Press. Rikkinen, J. 1999: Leviä, sieniä ja leväsieniä, johdatus levien ja sienten monimuotoisuuteen. Yliopistopaino, Helsinki. 194 s. Hickman, C, P. et al. 2009. Animal Diversity, 5. painos, McGraw Hill New York.
The availability of the literature can be checked from this link.

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

Grading:
1-5 / Fail.
Person responsible:
Doc. Annamari Markkola.
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 Rytkönen

Opintokohteen kielet: Finnish

Leikkaavuudet:

750347A	Ecological methods I	6.0 op

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

Working life cooperation:
No.
Other information:
-

755329A: Methods in ecology II, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Seppo Rytkönen

Opintokohteen kielet: Finnish

Leikkaavuudet:

750647S	Methods in ecology II	7.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Lectures Finnish / English, exercises also in English.
Timing:
Finnish B.Sc. 3rd spring, ECOGEN ECO 1st spring.
Learning outcomes:
The aim of the course is to learn in practice how to apply scientific method in ecological research. The student learns how to select appropriate methods for different ecological problems, and a toolkit for study design and data analysis.
Contents:
Continuation to course Ecological methods I 5cr (755325A, 755625S). This course focuses on applying the scientific method in ecological research. The course consists mainly of computer exercises in the following subjects: sampling, sample size determination, experimental design and statistical analysis esp. analysis of variance, comparative methods (independent contrasts - analysis), multivariate methods (cluster analysis, ordination) and meta-analysis. Also other current issues can be included.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures 8 h, 40 h exercises, independent work and exam.
Target group:
ECOGEN ECO compulsory.
Prerequisites and co-requisites:
Course Ecological methods I 5 cr (755325A). Recommended: Introduction to Statistics 5 cr (806118P) and A second course in statistics 5 cr (806119P).
Recommended optional programme components:
-
Recommended or required reading:
Reading package at course wiki-pages.
Assessment methods and criteria:
Exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Seppo Rytkönen and Doc. Kari Koivula.
Working life cooperation:
No.
Other information:
-

756344A: Plant ecology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola, Kari Taulavuori

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)** 10 h seminars on the literature of plant ecology; **(3)** 30 h demonstrations and exercises in field and laboratory (basic methods in plant ecology and laboratory work) and 4 h final seminars. International students will compensate lectures by reading book Ridge, I. 2002: Plants, Oxford Univ. Press.
Target group:
Compulsory to ECO.
Prerequisites and co-requisites:
Basics of ecology (750124P) and Plant ecology field course (756343A) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Ridge, I. 2002: Plants, Oxford Univ. Press..
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Lecture Book exam (final grade), laboratory diary and seminar presentation (both accepted/rejected).
Read more about assessment criteria at the University of Oulu webpage.

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

756343A: Plant ecology field course, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola

Opintokohteen kielet: Finnish

Leikkaavuudet:

752304A Field course in ecological botany 5.0 op

ECTS Credits:
5 cr / 133 h of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 1st summer. ECOGEN 1st summer.
Learning outcomes:
Student is able to identify most common boreal plant species in the field, to plan and conduct ecological field experiments and use basic methods in vegetation analyses.
Contents:
Vegetation in the coast of Bothnian Bay in Hailuoto and/or Oulu (3 days). Basics of boreal forest and mire vegetation classification and types at Oulanka Research Station (7 days). Vegetation research and basic methods of stock estimation. Mire vegetation development and ecological biodiversity.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures 10 h, field demonstrations and laboratory exercises, excursions 84 hours in Oulu and/or Hailuoto and Oulanka Research Station. Field exams for plant identification and mire ecology, report.
Target group:
B.Sc. Compulsory to ECO 5 cr and TEA 5 cp, TEA: at least 10 cr compulsory, two field courses, one ecological botany field course (756343A) and other animal field course (either 755321 or 755322A).
Prerequisites and co-requisites:
Identification of plant species (756354A) 5 cr or equivalent knowledge.
Recommended optional programme components:
Course has capacity for 32 or 40 students. Possible elimination of the candidates is done by study success and Plant identification (756354A) grade. This course is a prerequisite for courses Plant ecology (752600S), Mire ecology (752692S) and Field course in Arctic-Alpine ecology and vegetation (752642S).
Recommended or required reading:
Laitinen et al. 2012: Field course in ecological botany; Hanhela, P. & Halonen, P. 1995: Plant identification; Huttunen, A: 1995: Introduction to forest types; Eurola, S., Hicks, S. and Kaakinen, H. 1994: Key to Finnish mire types, pp. 12-117 in: Moore, P. D. (ed.), 1994 European mires, London Academic Press, London, 367 p.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Field exams, report.
Read more about assessment criteria at the University of Oulu webpage.

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

755322A: Terrestrial animals field course, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Seppo Rytkönen

Opintokohteen kielet: Finnish

Leikkaavuudet:

751306A Field course in terrestrial animals 4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. - 1st summer. ECOGEN 1st summer.
Learning outcomes:
The aim of the course is to learn the basics of field identification and ecology of terrestrial animals in northern Finland. The student will understand that proper skills in species identification and knowledge of species' ecology are the basis of ecological research.
Contents:
The fauna in different kinds of terrestrial habitats is studied using several ecological sampling and research methods. The course is hold at the Oulanka Research Station, Kuusamo, and deals with identification and ecology of invertebrates, mammals (especially small mammals), gallinaceous birds and birds of prey. The exercises take place partly in the field and partly in the laboratory. Data gained during the course is analyzed. The results are reported (in PowerPoint) and presented in the final seminar in Kuusamo.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Part 1. (Oulu): 2 h demontration, independent studying. Part 2. (Oulanka): 49 h demonstrations and practicals, one species and theory exam, seminar.
Target group:
Compulsory (5 cr) to ECO. TEAeco: either Aquatic animals 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 animals 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:
Basic identification of animals (755333A) or equivalent knowledge.
Recommended optional programme components:
This course is a prerequisite to course Winter ecology and physiology (750377A).
Recommended or required reading:
Compulsory at Oulanka: 1) Rytkönen, S. ym. 2003: 751306 Maaeläimistön tuntemus ja ekologia. - Biologian laitoksen monisteita 3/2003. Oulun yliopisto, Oulu. 2) Pentinsaari, M. ym. 2015: Eläinten lajintuntemus, selkärangattomat. Oulun yliopisto, Oulu. Insect book recommended: Chinery, M. 1988 Pohjois-Euroopan hyönteisheimojen määritysopas, Tammi, Helsinki, 2. painos.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Theory exam, species identification exam, seminar presentation.
Read more about assessment criteria at the University of Oulu webpage.

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

751366A: Animal behaviour, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kaitala Arja

Opintokohteen oppimateriaali:

Krebs, John R. , , 1993

Viitala, Jussi , , 2005

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 3 rd spring or M.Sc. 1 st spring ECOz.
Learning outcomes:
To understand basic principles of animal behaviour in an evolutionary ecology contest.
Contents:
Student report learning diary of the lectures each week to optima. Besides lectures the course consists of an experimental part in which students make a group work on animal behavior. The results are reported in one seminar.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
30 h lectures, seminars, exam.
Target group:
B.Sc. degree optional to ECO, M.Sc. degree compulsory to ECOz.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Davis, NB, Krebs, JR, & West, SA N.B. (2012) An Introduction to Behavioural Ecology, 4th ed, Wiley-Blackwell.
The availability of the literature can be checked from this link
Assessment methods and criteria:
Evaluation: Learning diary; Exam (voluntary).
Grading:
1-5 / Fail.
Person responsible:
Prof. Arja Kaitala.
Working life cooperation:
No.
Other information:
-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

Ei opintojaksokuvauksia.

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

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

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

755313A: Field identification of birds, 1 - 5 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Seppo Rytkönen

Opintokohteen kielet: Finnish

ECTS Credits:

2 ECTS credits / 53 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 1 st summer.
Learning outcomes:
The aim of the course is to get a basic level of field identification of Finnish birds.
Contents:
The student will learn the basics of avian field identification by familiarizing him/herself with the local bird fauna in different biotopes. The method is self-learning with keeping a notebook of the field observations.
Learning activities and teaching methods:
Blended teaching.
Target group:
ECO optional.
Prerequisites and co-requisites:
Basic identification of animals (755333A) or equivalent knowledge.
Recommended optional programme components:
Optional addition to course Field course in terrestrial animals (755322A).
Recommended or required reading:
Additional information and material: wiki.oulu.fi à Animal ecology à Teaching à Field identification of birds.
Assessment methods and criteria:
Notebook of field observations.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Accepted / Failed.
Person responsible:
Doc. Seppo Rytkönen.
Working life cooperation:
No.
Other information:
-

755324A: Functional animal ecology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Seppo Rytkönen

Opintokohteen kielet: Finnish

Leikkaavuudet:

751378A	Functional animal ecology	6.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Lectures in Finnish, exercises in Finnish / English.
Timing:
B.Sc. 2nd spring or M.Sc. 1st spring. NNE.
Learning outcomes:
The aim of the course is to understand the relationship between morphology and function by the means of general ecomorphological model. The student will get both theoretical and practical basics for ecomorphological (and. general scientific) research procedures: scientific hypothesizing, sampling, data analysis and reporting and interpreting the results.
Contents:
The course focuses on the relationship between phenotype and function, especially the correlation between animal morphology and behaviour. The course consists of two parts: A) Lectures in Finnish. However, articles about each subject are available for foreign students, including ecomorphological models and correlations, measurement error, allometry, fluctuating asymmetry and phylogenetic analyses. B) Exercises consisting of miniature studies, field and

laboratory work, and seminar. The results of the mini studies, in form of PowerPoint presentations, are presented in the seminar. Before the exercises, students write a home essay (or take an exam).
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
12 h lectures, 40 h exercises, seminar and essay (or exam).
Target group:
Recommended for ecology students.
Prerequisites and co-requisites:
Recommended Evolution, systematics and morphology of animals, practicals (750374A), Introduction to statistics 5 cr (806118P) and A second course in statistics 5 cr (806119P).
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Essay or exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Seppo Rytkönen.
Working life cooperation:
No.
Other information:
-

754322A: Introduction to hydrobiology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Muotka, Timo Tapani

Opintokohteen kielet: Finnish

Leikkaavuudet:

754308A	Introduction to hydrobiology	3.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 3rd spring, M.Sc. 1st spring. Even numbered years.
Learning outcomes:
Basic knowledge of inland water ecosystems structure, function and organisms. Basic concepts of hydrobiology which are necessary for further hydrobiology studies.
Contents:
Hydrography and physical and chemical properties of lakes and streams. Structure and ecological interactions of aquatic ecosystems (bacters plant and animal plankton, water insects other invertebrates, fishes). Most important biological interactions (competition, predation, parasitism, mutualism), inland water food web structure and regulation. Biodiversity of inland waters. Human influence on inland water biodiversity and ecosystem functions.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
26 h lectures, final exam.
Target group:
ECO, TEA.
Prerequisites and co-requisites:

No.
Recommended optional programme components:
Lectures are compulsory to the students taking the hydrobiology study package.
Recommended or required reading:
Course material and book Brönmark, C. & Hansson, L. 2005: The Biology of Lakes and Ponds. Oxford University Press, 285 p.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Timo Muotka.
Working life cooperation:
No.
Other information:
-

756304A: Plant ecophysiology in changing environments, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen oppimateriaali:

Lambers, Hans , , 1998
Prasad, M.N.V (ed.), , 1997
Hall, D.O. et al., , 1993
Opintokohteen kielet: Finnish

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

Contents:
The aim of the course is to initiate the students into the basics of plant ecophysiology in changing environments. The physical, chemical (abiotic) and biotic factors in the environment affects plant's growth and survival. Plant ecophysiology is an experimental science, which studies the physiological functions and adjustments underlining the ecological observations from the viewpoint of growth and survival. Different environmental stresses restrict the plant growth. Plant ecophysiology is experimental science which studies the physiological functions and regulation mechanisms on growth, survival, abundance and distribution. Effects of abiotic and biotic factors are studied. How elevated temperature, CO2, drought stress, nutrient imbalance, air pollutants, metals, UV radiation and plant pathogens affect on plants' gas exchange, primary metabolism, carbon allocation and growth. The exercises can also focus on the effects of environmental factors on photosynthesis, respiration, transport of photosynthetic products, water economy, energy economy and nutrient economy. Special features of ecophysiology of boreal plants are also dealt with.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
20 h lectures and demonstrations, 35 h exercises, exam, report, seminar.
Target group:
ECOb, BSb, Ph.D. students (if not in the undergraduate degree).

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

750313A: Research training, 2 - 15 op

Opiskelumuoto: Intermediate Studies

Laji: Practical training

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
1-15 ECTS credits / 27-405 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. degree.
Learning outcomes:
Student applies the education given knowledge and skills in working life to gain hands-on experience.
Contents:
Work on special projects in the different biology research groups at the department or elsewhere or independent project work including field and/or laboratory work or work at the biological stations. The work is not included to other study modules in biology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
The topic and the study plan have to be agreed on in advance (registration form). The student has to keep diary and prepare a report on the work.
Target group:
-
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Report.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Doc. Seppo Rytkönen ja Doc. Annamari Markkola (ECO), Prof. Outi Savolainen and Prof. Hely Häggman (BS).

Working life cooperation:
Yes. Participating to biology project will give working life skills.
Other information:
-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Koivula, Jouni Aspi

Opintokohteen kielet: Finnish

Leikkaavuudet:

751368A	Wildlife management and game animal ecology	6.0 op

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

750377A: Winter ecology and physiology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

Leikkaavuudet:

750325A Winter ecology and physiology 3.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English.
Timing:
B.Sc. 3 rd or M.Sc. 1 st spring. NNE.
Learning outcomes:
Student obtains basic knowledge of animal and plant acclimations and adaptations to winter, and can evaluate the effects of cold temperatures and snow on overwintering, and learns central methodology in winter ecology and physiology.
Contents:
Two independent units: 1) Winter ecology and physiology course (7 h lectures and 13 h laboratory practicals and 4 h seminar in Oulu, and 4 day long field excursion to the Oulanka Research Station (total about 50 h, 3 cr); 2) Book exam on a common exam day 2 cr: Marchand, P. J. 1996: Life in the cold. An introduction to winter ecology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures, exercises, report and seminar presentation.
Target group:
Biology students.
Prerequisites and co-requisites:
Courses Basics of ecology (750124P), Cell biology (750121P), Terrestrial animals field course (755322A), Aquatic ecology field course (755321A), Plant ecology field course (756343A) and Basics of plant biology, lectures (756346A) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Marchand, P. J. 1996: Life in the cold. An introduction to winter ecology. (3rd edition). University Press of New England. 304 p.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Seminar presentation and book exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Course + seminar: Pass / Fail, book exam: 1-5 / Fail.
Person responsible:
Doc. Kari Taulavuori.
Working life cooperation:
No.
Other information:
-

750380A: Working knowledge, 1 - 5 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
1-5 ECTS credit / 27-133 hours of work
Language of instruction:
Finnish / English.
Timing:
B.Sc. 1st spring - 3rd spring.
Learning outcomes:
During the course student will get work experience and develop common working life skills as communication and organization skills and get to know work community and it's dynamics.
Contents:
Independent work for example in the summer job.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Student will keep diary of her/his tasks and hours which will be added to the report that the student will do. Report includes self assesment.
Target group:
B.Sc. students.
Prerequisites and co-requisites:
-
Recommended optional programme components:
Before Practical training (750615S).
Recommended or required reading:
-
Assessment methods and criteria:
Report and diary.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail
Person responsible:
Prof. Hely Häggman, Dr. Heikki Helanterä, Prof. Timo Muotka and Doc. Annamari Markkola.
Working life cooperation:
Yes. Training in suitable tasks will develop student's working life skills.
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 Päkkilä

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 Päkkilä
Working life cooperation:
No
Other information:
-

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 credits/134 hours of work
Language of instruction:
Finnish
Timing:
1st autumn
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. Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail.
Person responsible:
Lecturer Minna Tiainen
Working life cooperation:
No
Other information:
No

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 credits / 27 hours of work
Language of instruction:
Finnish
Timing:
Architecture 3. spring semester, period I; Biochemistry 3. autumn semester; Biology 3. autumn semester, period I; Chemistry 3. autumn semester, period II; Computer Science and Engineering 2. spring semester, period IV; Electronics and Communications Engineering 3. spring semester; Geosciences 2. spring semester, period IV; Geography 1. and 3. spring semester, period III; Industrial Engineering and Management 3. year (Master's degree students in Industrial Engineering and Management 1st year.); Information Processing Sciences 1. 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.
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 RefWorks 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.

Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
Web learning material Tieteellisen tiedonhankinnan opas http://libguides.oulu.fi/tieteellinentiedonhankinta (in Finnish)
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
Working life cooperation:
-
Other information:
-

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 Päkkilä

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 Päkkilä
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 on the Common European Framework of Reference scale.
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
•Department of Chemistry
Oulu Mining School
•Geosciences degree programme

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 English skills should have been acquired otherwise.
ECTS Credits:
2 ECTS / 54 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
- have acquired effective vocabulary-learning techniques
- be able to distinguish parts of words to infer meanings
- be able to utilise your knowledge of text structure and cohesion markers to understand academic texts
- to be able to extract information and learn content from English readings in scientific and professional contexts

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:

Contact teaching and independent study
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. A more detailed course description and list of homework tasks will be provided by the teacher.
Target group:
Faculty of Natural Sciences: Biology, Mathematical & Physical Sciences
Faculty of Technology: Chemistry
Oulu Mining School: Geosciences
Prerequisites and co-requisites:
-
Recommended optional programme components:
Students are also required to take English 2 902004Y, or English 4 902005Y, AFTER completion of this course.
Recommended or required reading:
Course materials will be provided in electronic form or will be accessible from the university library.
Assessment methods and criteria:
Student work is monitored by continuous assessment, and students are required to participate regularly and actively in all contact teaching provided. During the course, there will be three monthly tests on material covered so far. The assessment of the course is based on the learning outcomes listed above.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass/Fail
Person responsible:
Karen Niskanen
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. Please contact your own 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 on the Common European Framework of Reference scale.
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 & Physical Sciences

Faculty of Technology:
Chemistry
Oulu Mining School:
Geoscience degree programme

Note: Information Processing Science students who began their studies in autumn 2017 or later will take English 4 instead.
Please consult your faculty's study guide to establish the language requirements of your own degree programme.
Required proficiency level:

Students taking this course must have had English as the A1 or A2 language at school or have equivalent skills. The course English 1 (902002Y) is a pre-requisite, unless exempted.

ECTS Credits:

2 ECTS credits / 54 hours 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
- **prepare and present scientific subjects** to your classmates, using appropriate field-related vocabulary.

Contents:

Skills in listening, speaking, and presenting academic topics are practised in the classroom, where there is an emphasis on working in pairs and small groups. Homework is given to support the classroom learning.

Mode of delivery:

Contact teaching

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.
Individual learning methods: autonomous learning tasks, practice in lecture listening and written tasks in preparation for classroom lessons
Group work: Preparation of presentations in groups

Target group:

2nd year students of Biology, Chemistry, Geoscience
1st year students of Mathematical and Physical Sciences (new programme)

Prerequisites and co-requisites:

Pre-requisite course: 902002Y Englannin kieli 1

Recommended optional programme components:

-

Recommended or required reading:

-

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

Grading:

Pass / fail.

Person responsible:

Karen Niskanen

Working life cooperation:

-

Other information:

-

750031Y: Orientation course for new students, 1 op

Voimassaolo: - 31.07.2017

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Vanhatalo, Minna-Liisa

Opintokohteen kielet: Finnish

Leikkaavuudet:

750032Y Orientation course for new students 2.0 op

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

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

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

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

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

ECTS Credits:
1-4 credits
Language of instruction:
Finnish
Timing:
1st-5th year

750033Y: Tutorial for new students, 1 op

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

ECTS Credits:
1 ECTS credit / 27 hours of work
Language of instruction:
Finnish.
Timing:
B.Sc. 3 rd autumn / M.Sc. 1 st autumn.
Learning outcomes:
Course develops students' skills to guide, make presentations, work in group and organize. It also advances planning, arrangement and guidance abilities as well as responsibility.
Contents:
The student guides a group of new students during the orientation course introducing them to the university, academic learning environment, the department, curriculum and other students with the help of small group meetings and presentations.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Tutorials and presentations. Minimum 15 hours. In addition indenpendent work includes the preparation of the tutorials.

Target group:
Second and third year biology students.
Prerequisites and co-requisites:
Course 750031Y.
Recommended optional programme components:
-
Recommended or required reading:
Study guide and training material.
Assessment methods and criteria:
Tutoring report.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Doc. annamari Markkola and Ph.Lic. Minna Vanhatalo.
Working life cooperation:
No.
Other information:
-

750124P: Basics of ecology, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari-Heikki Oksanen

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

Recommended or required reading:
Krebs, C. J. 2009: Ecology (6 th edition). Part I.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Kari Koivula and Prof. Jari Oksanen.
Working life cooperation:
No.
Other information:
-

750121P: Cell biology, 5 op

Voimassaolo: - 31.07.2020

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jaana Jurvansuu, Häggman, Hely Margaretha, Henrika Honkanen

Opintokohteen oppimateriaali:
Heino, Jyrki (2) , , 2004
Alberts, B. ym., , 2008
Lodish et al., , 2003
Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 1 st autumn.
Learning outcomes:
The student is familiar with cellular structure and functioning in plant and animal cells, understands the social structures in multicellular species and knows why and how the genetic organizations (in nucleus, chloroplast and mitochondria) are co-operating, maintaining and regulating the cellular metabolism. Student understands the common origin and evolution of life on planet Earth, and understands the material basis and mechanisms of this continuity.
Contents:
During the recent years especially the development of molecular and microscopic and imaging techniques has increased our knowledge on cells and their social interactions. The structural and functional characteristics of plant and animal cells will be covered as well as the genetic organization maintaining and regulating the system.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
48 h lectures, 87 h independent work including deepening the upper secondary school knowledge in biology and chemistry as home work and book reading. Part of the home assignments is oblicatory.
Target group:
Compulsory to the biology and biochemistry students.
Prerequisites and co-requisites:
Good basics in biology and especially in chemistry from upper elementary school contributes learning.
Recommended optional programme components:
Cell biology is prerequisite for the following courses: Developmental biology-histology (755320A), Animal physiology (755323A), Plant biology lectures (756346A), Concepts of genetics (757109P). Course also gives readiness for studies in molecular biology and biochemistry.
Recommended or required reading:
Suitable parts of Reece ym. 2014: Campbell Biology: a global approach (10e), Pearson, 1350 s. 978-1-292-00865-3, Alberts, B. ym. 2015: Molecular Biology of the Cell (6e), Garland Science Publishing, London, 1464 s. ISBN:

9780815345244, Heino J. & Vuento M. 2014: Biokemian ja solubiologian perusteet (3. painos) WSOY Pro Oy, Helsinki, Jones R. ym. 2013: The molecular life of plants. Wiley-Blackwell, 742 s. ISBN : 978-0-470-87012-9.
The availability of the literature can be checked from this link.

[HK1]linkkiä en osannut uudistaa
Assessment methods and criteria:
Three subexams. After each lecture section is subexam. The only way to do the course is to pass all the three subexams (no credits to Oodi are given from subexams). No final exam. The subexams are ment to be done within one academic year.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail. Final grade is average value of the three exams.
Person responsible:
Dr. Jaana Jurvansuu, Doc. Helmi Kuittinen and Prof. Hely Häggman.
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

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 ideas of quantitative and population genetics. Part 2. Molecular genetics: replication, transcription, translation, genetic code, mutations, repair of DNA. Part 3. Selected topics on developmental genetics, and genetics of health and diseases.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
50 h lectures and seminars, 83 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:
Cell biology (750121P) or equivalent knowledge.
Recommended optional programme components:
This course is prerequisite to all other genetics courses.
Recommended or required reading:
Materials are in Optima. Klug et al. 2012. Concepts of Genetics (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:
1-5 / Fail.
Person responsible:
Prof. Outi Savolainen.
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

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:
After passing the course students have elementary knowledge of basic phenomena of genetics, important working methods and laboratory organisms. Student has the basic ability to understand, apply and analyse simple genetical works and phenomena.
Contents:
Investigation of Mendelian inheritance, gene mapping and nonadditive effects of genes using cross-breeding; basics of population genetics; investigation of promoter regulation and microbial recombination; investigation of mitosis and meiosis using cytogenetical methods; basic methods of DNA techniques (isolating DNA, digesting DNA using restriction enzymes, PCR and electrophoresis).
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
14 h demonstrations, 35 h exercises, 82 h independent work including home essay 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:
1-5 / Fail.
Person responsible:
Doc. Helmi Kuittinen
Working life cooperation:
No.
Other information:
-

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

Opettajat: Henrika Honkanen

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:
1-5 / Fail.
Person responsible:
M.Sc. Henrika Honkanen.
Working life cooperation:
No.
Other information:
-

750366A: Bachelor of Science final examination, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

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

Language of instruction:
Finnish / English.
Timing:
B.Sc. 3 rd year.
Learning outcomes:
Student will understand basic methods, results and theories in ecology, physiology or genetics.
Contents:
Examinations on books related to B.Sc. thesis subject. List of books are presented on WebOodi. All the books are recommended to be are done on the same exam 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 (4 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:
BSz:

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

BSg

- Klug, W. S., Cummings, M. R., Spencer, C.A ja Palladino M.A.: Concepts of Genetics (11. ed.). Pearson & Prentice Hall, 2015

- responsible teacher doc. 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 Scrinking 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 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. Annamari Markkola

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:
1-5 / Fail.
Person responsible:
M.Sc. Henrika Honkanen, Prof. Hely Häggman, doc. Annamari Markkola, doc. Heikki Helanterä 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 Noppa. Four pages long essay exam. One teacher examine the maturity exam and Pro gradu working group accepts it. 4 h exam.

Target group:
Compulsory to the biology students. Exam is taken after completion of the thesis.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Four pages long essay. Done in Examinarium.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Hely Häggman, Prof. Jari Oksanen, Prof. Timo Muotka or Prof. Outi Savolainen.
Working life cooperation:
No.
Other information:
-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

750396A Bachelor of Science seminar 3.0 op

ECTS Credits:
10 ECTS credits / 267 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 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. The dean will order the examiners by the proposal of the professor. Pro gradu working group accepts and grades the thesis on the basis of the examiners' opinions.
List of the actual B.Sc. thesis topics is on Noppa.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
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 spring, subject teacher students have seminar workshop in the 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 Rytkönen coordinator., computer classes Dr. Phillip Watts, peer groups Prof. Timo Muotka (autumn) and Prof. Jari Oksanen (spring).
B.Sc. thesis: Prof. Hely Häggman, Prof. Jari Oksanen, Prof. Timo Muotka or Prof. Outi Savolainen.
Working life cooperation:
No.
Other information:
-

750373A: Biogeography, 5 op

Voimassaolo: 01.08.2015 - 31.07.2019

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari-Heikki Oksanen, Kvist, Laura Irmeli

Opintokohteen kielet: Finnish

Leikkaavuudet:

750173P	Biogeography	5.0 op
750363A	Biogeography	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 1st autumn.
Learning outcomes:
The course introduces students to basic concepts of biogeography, patterns of distribution and historical and present factors affecting the distribution. Plant biogeography introduces students to modern and historical factors controlling the plant cover, and to the special methods of vegetation science.
Contents:
The course consists of general part and optional part on plant biogeography and vegetation science. The general part introduces basic models and theories of distribution of organisms in the environment. Historical, evolutionary, geographical, climatic and ecological explanations. Research methods used in biogeography. The part on plant biogeography and vegetation science introduces methods on factors controlling the structure and composition of vegetation, and describes major vegetation types in Finland and principal biomes in the World. Methods of vegetation science are briefly surveyed.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
General biogeography: 24 h lectures, independent work (3 cr), **Plant biogeography**: 24 h lectures (2 cr); two exams.
Target group:
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), Evolution, systematics and morphology of organisms, practicals (750374A), Biodiversity in human changed environments (755631S).
Recommended or required reading:
Cox, C.B. & Moore, P.D. 2005: Biogeography. An ecological and evolutionary approach (7 ed.), Blackwell Publishing Ltd, or Cox, C.B. & Moore, P.D. 2010: Biogeography. An ecological and evolutionary approach (8 ed.), John Wiley & Sons Inc.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Two exams.
Read more about assessment criteria at the University of Oulu webpage.

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

750372A: Evolution and systematics of organisms, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari-Heikki Oksanen, Marko Mutanen, Annamari Markkola

Opintokohteen kielet: Finnish

Leikkaavuudet:

750307A Evolution and systematics of organisms 4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 2nd autumn.
Learning outcomes:
Students will learn a general picture of the diversity of life-forms as to understand the evolutionary history of organisms.
Contents:
The course provides an insight into the biological evolution and evolutionary processes reflected by the systematic classification of the organisms. Also basic principles and concepts of systematics and classification are presented.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
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. 2 nd ed. Cambridge University Press., Willis, K.J. & McElwain, J.C. 2002: The evolution of plants. Oxford University Press. Hickman, C. P. et al. 2009. Animal Diversity, 5th edition, McGraw Hill New York.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Lecture exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Arja Kaitala, Prof. Jari Oksanen and Doc. Annamari Markkola.
Working life cooperation:
No.
Other information:
-

755333A: Identification of animals, 6 op

Voimassaolo: 01.08.2016 - 31.07.2019

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Koivula

Opintokohteen kielet: Finnish

Leikkaavuudet:

755334A Identification of animals, vertebrates 4.0 op

ECTS Credits:
6 ECTS credits / 162 hours of work.
Language of instruction:

Finnish / English
Timing:
B.Sc. degree 1st autumn and spring.
Learning outcomes:
Main point of the course is to learn to indentify Finnish animal species (vertebrate) and families (invertebrate) from museum samples. Basics of species' ecology and classification of organisms.
Contents:
During the autumn semester (9 h lectures in Finnish, 16 h exercises, exam), the Finnish vertebrate fauna is studied using stuffed museum samples. In the spring semester (9 h lectures in Finnish, 16 h exercises, exam) the invertebrate taxons (mostly family- or genus-level) common in Finland are studied using museum samples.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
18 h lectures in Finnish, 32 h exercises, independent studying, 2 exams.
Target group:
Biology students: compulsory.
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:
Course handouts, Itämies J. ja Viro P. 1995: Eläinten lajintuntemus, selkärangattomat, 73 p.; Putaala, A., Marjakangas, A. & Rytkönen, S. 2001: Eläinten lajintuntemus, selkärankaiset, 42 p.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Two species exams.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
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: Annamari Markkola

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
BSc 1st autumn.
Learning outcomes:
Student is able to identify most common boreal plant species in herbarium specimens.
Contents:
Demonstrations and/or independent stud of ca. 350 vascular plants, mosses and lichens in the boreal vegetation zone. In the identification exam student has to know specimens scientific name and family in latin.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:

16 h demonstrations and learning from the herbarium samples. 350 plant species. In the identification exam student has to know specimens scientific name and family in latin.
Target group:
BSc degree: ECO and TEA 5 cr compulsory.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
Course done as 5 cr (756654S) is prerequisite for the Plant ecology field course (756643S) and for the advanced plant species identification courses (752608S and 752625S).
Recommended or required reading:
Booklet Hanhela, P. & Halonen, P. 1995: Plant Identification.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Two species identification subexams (756354A-01 and 756354A-02). 5 cr without the course handout.
Read more about assessment criteria at the University of Oulu webpage.

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

756346A: Plant biology lectures, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha, Anna-Maria Pirttilä

Opintokohteen kielet: Finnish

Leikkaavuudet:

752345A	Basics of functional plant biology, lectures	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 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) and exams.
Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
Cell biology (750121P) or equivalent knowledge helps in following this course. This course is a prerequisite for course Plant biology practicals (756341A) and Advanced course in plant biology (752682S).
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.
Read more about assessment criteria at the University of Oulu webpage.

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

756343A: Plant ecology field course, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola

Opintokohteen kielet: Finnish

Leikkaavuudet:

752304A	Field course in ecological botany	5.0 op

ECTS Credits:
5 cr / 133 h of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 1st summer. ECOGEN 1st summer.
Learning outcomes:
Student is able to identify most common boreal plant species in the field, to plan and conduct ecological field experiments and use basic methods in vegetation analyses.
Contents:
Vegetation in the coast of Bothnian Bay in Hailuoto and/or Oulu (3 days). Basics of boreal forest and mire vegetation classification and types at Oulanka Research Station (7 days). Vegetation research and basic methods of stock estimation. Mire vegetation development and ecological biodiversity.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures 10 h, field demonstrations and laboratory exercises, excursions 84 hours in Oulu and/or Hailuoto and Oulanka Research Station. Field exams for plant identification and mire ecology, report.
Target group:
B.Sc. Compulsory to ECO 5 cr and TEA 5 cp, TEA: at least 10 cr compulsory, two field courses, one ecological botany field course (756343A) and other animal field course (either 755321 or 755322A).
Prerequisites and co-requisites:
Identification of plant species (756354A) 5 cr or equivalent knowledge.
Recommended optional programme components:
Course has capacity for 32 or 40 students. Possible elimination of the candidates is done by study success and Plant identification (756354A) grade. This course is a prerequisite for courses Plant ecology (752600S), Mire ecology (752692S) and Field course in Arctic-Alpine ecology and vegetation (752642S).
Recommended or required reading:
Laitinen et al. 2012: Field course in ecological botany; Hanhela, P. & Halonen, P. 1995: Plant identification; Huttunen, A: 1995: Introduction to forest types; Eurola, S., Hicks, S. and Kaakinen, H. 1994: Key to Finnish mire types, pp. 12-117 in: Moore, P. D. (ed.), 1994 European mires, London Academic Press, London, 367 p.

The availability of the literature can be checked from this link.
Assessment methods and criteria:
Field exams, report.
Read more about assessment criteria at the University of Oulu webpage.

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

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

Opettajat: Kaisa-Leena Huttunen, Muotka, Timo Tapani

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 animals 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 animals 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:
Basic identification of animals (755333A) or equivalent knowledge (if necessary, selection to the course 755321A can be based on success in course 755333A).
Recommended optional programme components:
This course is a prerequisite for the following: Winter ecology and physiology (750377A), Special course in aquatic invertebrates (754627S), Assessment and monitoring of the ecological status of water bodies (754625S), Field methods in freshwater biomonitoring (754626S).
Recommended or required reading:
Reading package, handouts and lectures given before / during the course.
Assessment methods and criteria:
On the final course day species identification exam on the species met during the course, practical exam on the sampling methods and
theoretical exam based on the literature and demonstration material.

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

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

755322A: Terrestrial animals field course, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Seppo Rytkönen

Opintokohteen kielet: Finnish

Leikkaavuudet:

751306A	Field course in terrestrial animals	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. - 1st summer. ECOGEN 1st summer.
Learning outcomes:
The aim of the course is to learn the basics of field identification and ecology of terrestrial animals in northern Finland. The student will understand that proper skills in species identification and knowledge of species' ecology are the basis of ecological research.
Contents:
The fauna in different kinds of terrestrial habitats is studied using several ecological sampling and research methods. The course is hold at the Oulanka Research Station, Kuusamo, and deals with identification and ecology of invertebrates, mammals (especially small mammals), gallinaceous birds and birds of prey. The exercises take place partly in the field and partly in the laboratory. Data gained during the course is analyzed. The results are reported (in PowerPoint) and presented in the final seminar in Kuusamo.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Part 1. (Oulu): 2 h demontration, independent studying. Part 2. (Oulanka): 49 h demonstrations and practicals, one species and theory exam, seminar.
Target group:
Compulsory (5 cr) to ECO. TEAeco: either Aquatic animals 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 animals 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:
Basic identification of animals (755333A) or equivalent knowledge.
Recommended optional programme components:
This course is a prerequisite to course Winter ecology and physiology (750377A).
Recommended or required reading:
Compulsory at Oulanka: 1) Rytkönen, S. ym. 2003: 751306 Maaeläimistön tuntemus ja ekologia. - Biologian laitoksen monisteita 3/2003. Oulun yliopisto, Oulu. 2) Pentinsaari, M. ym. 2015: Eläinten lajintuntemus, selkärangattomat. Oulun yliopisto, Oulu. Insect book recommended: Chinery, M. 1988 Pohjois-Euroopan hyönteisheimojen määritysopas, Tammi, Helsinki, 2. painos.
The availability of the literature can be checked from this link.
Assessment methods and criteria:

Theory exam, species identification exam, seminar presentation.
Read more about assessment criteria at the University of Oulu webpage.

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

756343A: Plant ecology field course, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola

Opintokohteen kielet: Finnish

Leikkaavuudet:

752304A	Field course in ecological botany	5.0 op

ECTS Credits:
5 cr / 133 h of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 1st summer. ECOGEN 1st summer.
Learning outcomes:
Student is able to identify most common boreal plant species in the field, to plan and conduct ecological field experiments and use basic methods in vegetation analyses.
Contents:
Vegetation in the coast of Bothnian Bay in Hailuoto and/or Oulu (3 days). Basics of boreal forest and mire vegetation classification and types at Oulanka Research Station (7 days). Vegetation research and basic methods of stock estimation. Mire vegetation development and ecological biodiversity.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures 10 h, field demonstrations and laboratory exercises, excursions 84 hours in Oulu and/or Hailuoto and Oulanka Research Station. Field exams for plant identification and mire ecology, report.
Target group:
B.Sc. Compulsory to ECO 5 cr and TEA 5 cp, TEA: at least 10 cr compulsory, two field courses, one ecological botany field course (756343A) and other animal field course (either 755321 or 755322A).
Prerequisites and co-requisites:
Identification of plant species (756354A) 5 cr or equivalent knowledge.
Recommended optional programme components:
Course has capacity for 32 or 40 students. Possible elimination of the candidates is done by study success and Plant identification (756354A) grade. This course is a prerequisite for courses Plant ecology (752600S), Mire ecology (752692S) and Field course in Arctic-Alpine ecology and vegetation (752642S).
Recommended or required reading:
Laitinen et al. 2012: Field course in ecological botany; Hanhela, P. & Halonen, P. 1995: Plant identification; Huttunen, A: 1995: Introduction to forest types; Eurola, S., Hicks, S. and Kaakinen, H. 1994: Key to Finnish mire types, pp. 12-117 in: Moore, P. D. (ed.), 1994 European mires, London Academic Press, London, 367 p.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Field exams, report.
Read more about assessment criteria at the University of Oulu webpage.

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

756351A: Basics in population ecology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kvist, Laura Irmeli

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.

Person responsible:
Doc. Laura Kvist
Working life cooperation:
No.
Other information:

-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. degree 2nd autumn. ECO compulsory. BS and TEA optional.
Learning outcomes:
Main aim of the course is to learn evolutionary history of organisms and basics of systematics: how the life has evolved and which evolutionary processes have affected the development. Students will get an idea, how and why different or similar morphological traits and functions have evolved in different taxonomic groups.
Contents:
Morphology and anatomy of macro- and microscopic specimens of different taxonomic groups are studied by the students in systematic order from microbes to plants and invertebrate and vertebrate animals. Demonstrations connect the morphological traits of studied specimens and organism groups to a wider evolutionary context and illustrate the importance of different structures for the organisms in their living environment.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
36 h compulsory exercises and demonstrations, exercise exam.
Target group:
BSc: ECO: compulsory, BT and TEA: optional.
Prerequisites and co-requisites:
Evolution and systematics of organisms (750372A).
Recommended optional programme components:
-
Recommended or required reading:
Course handouts can be bought form the teachers before the course starts. Net material and books Bell, P.R. & Hemsley, A.R. 2000. Green plants. Their origin and diversity. 2 nd edn. Cambridge University Press. Willis, K.J. & McElwain, J.C. 2002: The evolution of plants. Oxford University Press. Rikkinen, J. 1999: Leviä, sieniä ja leväsieniä, johdatus levien ja sienten monimuotoisuuteen. Yliopistopaino, Helsinki. 194 s. Hickman, C, P. et al. 2009. Animal Diversity, 5. painos, McGraw Hill New York.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Exam.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail.
Person responsible:
Doc. Annamari Markkola.
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: Panu Välimäki

Opintokohteen kielet: Finnish

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

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

755313A: Field identification of birds, 1 - 5 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Seppo Rytkönen

Opintokohteen kielet: Finnish

ECTS Credits:

2 ECTS credits / 53 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 1 st summer.
Learning outcomes:
The aim of the course is to get a basic level of field identification of Finnish birds.
Contents:
The student will learn the basics of avian field identification by familiarizing him/herself with the local bird fauna in different biotopes. The method is self-learning with keeping a notebook of the field observations.
Learning activities and teaching methods:
Blended teaching.
Target group:
ECO optional.
Prerequisites and co-requisites:
Basic identification of animals (755333A) or equivalent knowledge.
Recommended optional programme components:
Optional addition to course Field course in terrestrial animals (755322A).
Recommended or required reading:
Additional information and material: wiki.oulu.fi à Animal ecology à Teaching à Field identification of birds.
Assessment methods and criteria:
Notebook of field observations.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Accepted / Failed.
Person responsible:
Doc. Seppo Rytkönen.
Working life cooperation:
No.
Other information:
-

752316A: Macro fungi, 3 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola

Opintokohteen oppimateriaali:

Salo, Pertti (1) , , 2006

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay752316A	Macro fungi (OPEN UNI)	3.0 op

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

Target group:
Optional.

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

Opintokohteen kielet: Finnish

Leikkaavuudet:

750347A	Ecological methods I	6.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 3rd autumn, ECOGEN 1st autumn.
Learning outcomes:
Students are familiar to scientific method and can separate scientific information from other contents of culture. Students have learned to assess the uncertainty of information and can evaluate the quality of information with respect to its applied value. Students also learn the build a valid theoretical or empirical strategy to solve scientific problems.
Contents:
The aim of the course is to introduce the students in scientific modes of argumentation and research methods in modern ecology. Both the empirical and theoretical methods and their relationship in theory formation are discussed. Hypothesis testing; observational method, experimental method and comparative method are the empirical methods introduced. Autumn period ends in a seminar where scientific publications are analysed.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures, seminar, exercises and exam.
Target group:
Compulsory to ECO.
Prerequisites and co-requisites:
No.
Recommended optional programme components:

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

756344A: Plant ecology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola, Kari Taulavuori

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)** 10 h seminars on the literature of plant ecology; **(3)** 30 h demonstrations and exercises in field and laboratory (basic methods in plant ecology and laboratory work) and 4 h final seminars. International students will compensate lectures by reading book Ridge, I. 2002: Plants, Oxford Univ. Press.
Target group:
Compulsory to ECO.
Prerequisites and co-requisites:
Basics of ecology (750124P) and Plant ecology field course (756343A) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Ridge, I. 2002: Plants, Oxford Univ. Press..
The availability of the literature can be checked from this link.

Assessment methods and criteria:
Lecture Book exam (final grade), laboratory diary and seminar presentation (both accepted/rejected).
Read more about assessment criteria at the University of Oulu webpage.

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

750313A: Research training, 2 - 15 op

Opiskelumuoto: Intermediate Studies

Laji: Practical training

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
1-15 ECTS credits / 27-405 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. degree.
Learning outcomes:
Student applies the education given knowledge and skills in working life to gain hands-on experience.
Contents:
Work on special projects in the different biology research groups at the department or elsewhere or independent project work including field and/or laboratory work or work at the biological stations. The work is not included to other study modules in biology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
The topic and the study plan have to be agreed on in advance (registration form). The student has to keep diary and prepare a report on the work.
Target group:
-
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Report.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Doc. Seppo Rytkönen ja Doc. Annamari Markkola (ECO), Prof. Outi Savolainen and Prof. Hely Häggman (BS).
Working life cooperation:
Yes. Participating to biology project will give working life skills.
Other information:
-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Koivula, Jouni Aspi

Opintokohteen kielet: Finnish

Leikkaavuudet:

751368A Wildlife management and game animal ecology 6.0 op

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

750377A: Winter ecology and physiology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

Leikkaavuudet:

750325A Winter ecology and physiology 3.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English.
Timing:
B.Sc. 3 rd or M.Sc. 1 st spring. NNE.
Learning outcomes:
Student obtains basic knowledge of animal and plant acclimations and adaptations to winter, and can evaluate the effects of cold temperatures and snow on overwintering, and learns central methodology in winter ecology and physiology.
Contents:
Two independent units: 1) Winter ecology and physiology course (7 h lectures and 13 h laboratory practicals and 4 h seminar in Oulu, and 4 day long field excursion to the Oulanka Research Station (total about 50 h, 3 cr); 2) Book exam on a common exam day 2 cr: Marchand, P. J. 1996: Life in the cold. An introduction to winter ecology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures, exercises, report and seminar presentation.
Target group:
Biology students.
Prerequisites and co-requisites:
Courses Basics of ecology (750124P), Cell biology (750121P), Terrestrial animals field course (755322A), Aquatic ecology field course (755321A), Plant ecology field course (756343A) and Basics of plant biology, lectures (756346A) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Marchand, P. J. 1996: Life in the cold. An introduction to winter ecology. (3rd edition). University Press of New England. 304 p.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Seminar presentation and book exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Course + seminar: Pass / Fail, book exam: 1-5 / Fail.
Person responsible:
Doc. Kari Taulavuori.
Working life cooperation:
No.
Other information:
-

750380A: Working knowledge, 1 - 5 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
1-5 ECTS credit / 27-133 hours of work
Language of instruction:
Finnish / English.
Timing:
B.Sc. 1st spring - 3rd spring.

Learning outcomes:
During the course student will get work experience and develop common working life skills as communication and organization skills and get to know work community and it's dynamics.
Contents:
Independent work for example in the summer job.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Student will keep diary of her/his tasks and hours which will be added to the report that the student will do. Report includes self assesment.
Target group:
B.Sc. students.
Prerequisites and co-requisites:
-
Recommended optional programme components:
Before Practical training (750615S).
Recommended or required reading:
-
Assessment methods and criteria:
Report and diary.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail
Person responsible:
Prof. Hely Häggman, Dr. Heikki Helanterä, Prof. Timo Muotka and Doc. Annamari Markkola.
Working life cooperation:
Yes. Training in suitable tasks will develop student's working life skills.
Other information:
-

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
Timing:
3. year, 4. period
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
- idfentify 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
Timing:
3. year, 4. period
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 Sääskilahti

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

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

ECTS Credits:
5 ECTS
Language of instruction:
Finnish. English for the ITE students
Timing:
1st year
Learning outcomes:

- Describe the main paradigms and define the basic concepts of educational sciences
- Identify some of the most influential, past and contemporary educational theorists
- Consider the role of practical and theoretical knowledge in teacher's profession
- Apply the acquired knowledge in classroom discussions on international and multicultural learning and teaching contexts
- Is able to read academic texts on education and write a short academic essay

Contents:

- Theories and concepts of mainstream educational sciences and intercultural education
- Formal education, informal and non-formal education
- Epistemology: forms of knowledge and knowledge production, cultural impact on knowledge construction
- Teacher's professional development and teacher's identity formation
- Basics of academic writing

Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Lectures 20h, seminars 10h, and independent study 105h
Target group:
ITE, LO, Taika, Tekno, Vaka, Kako, AO, Avoin, AMOK
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:
Sari Harmoinen

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
Language of instruction:
Finnish
Timing:

1st year
Learning outcomes:

- Identify the most prominent paradigms and their representatives 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

Contents:

- The most prominent paradigms and their representatives of psychology
- Age- and culture-specific issues of developmental psychology
- The impact of educational psychology in intercultural and inclusive education

Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Lectures 20h, seminars 10h, and independent study 105h
Target group:
ITE, LO, Taika, Tekno, Vaka, Kako, AO, Avoin, AMOK
Prerequisites and co-requisites:
No
Recommended optional programme components:
The course is part of Basic Studies in Education
Recommended or required reading:
Theories of Development: concepts and applications. 6 th ed. 2011.
Assessment methods and criteria:
Active participation,
Essay
Grading:
Pass/Fail
Working life cooperation:
Seminar phase of the course work includes observation task on field.

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

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 studets 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:
ITE, LO, Taika, Tekno, Vaka, Kako, AO, Avoin, AMOK
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.

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 Päkkilä

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 Päkkilä
Working life cooperation:
No
Other information:
-

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 credits/134 hours of work
Language of instruction:
Finnish
Timing:
1st autumn
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. Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail.
Person responsible:
Lecturer Minna Tiainen
Working life cooperation:
No
Other information:
No

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 credits / 27 hours of work
Language of instruction:
Finnish
Timing:
Architecture 3. spring semester, period I; Biochemistry 3. autumn semester; Biology 3. autumn semester, period I; Chemistry 3. autumn semester, period II; Computer Science and Engineering 2. spring semester, period IV; Electronics and Communications Engineering 3. spring semester; Geosciences 2. spring semester, period IV; Geography 1. and 3. spring semester, period III; Industrial Engineering and Management 3. year (Master's degree students in Industrial Engineering and Management 1st year.); Information Processing Sciences 1. 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.
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 RefWorks 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.

Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
Web learning material Tieteellisen tiedonhankinnan opas http://libguides.oulu.fi/tieteellinentiedonhankinta (in Finnish)
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
Working life cooperation:
-
Other information:
-

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 Päkkilä

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 Päkkilä
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 on the Common European Framework of Reference scale.
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
•Department of Chemistry
Oulu Mining School
•Geosciences degree programme

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 English skills should have been acquired otherwise.
ECTS Credits:
2 ECTS / 54 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

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

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:
Contact teaching and independent study
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. A more detailed course description and list of homework tasks will be provided by the teacher.
Target group:
Faculty of Natural Sciences: Biology, Mathematical & Physical Sciences
Faculty of Technology: Chemistry
Oulu Mining School: Geosciences
Prerequisites and co-requisites:
-
Recommended optional programme components:
Students are also required to take English 2 902004Y, or English 4 902005Y, AFTER completion of this course.
Recommended or required reading:
Course materials will be provided in electronic form or will be accessible from the university library.
Assessment methods and criteria:

Student work is monitored by continuous assessment, and students are required to participate regularly and actively in all contact teaching provided. During the course, there will be three monthly tests on material covered so far. The assessment of the course is based on the learning outcomes listed above.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass/Fail
Person responsible:
Karen Niskanen
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. Please contact your own 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 on the Common European Framework of Reference scale.
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 & Physical Sciences

Faculty of Technology:
Chemistry
Oulu Mining School:
Geoscience degree programme

Note: Information Processing Science students who began their studies in autumn 2017 or later will take English 4 instead.
Please consult your faculty's study guide to establish the language requirements of your own degree programme.
Required proficiency level:
Students taking this course must have had English as the A1 or A2 language at school or have equivalent skills. The course English 1 (902002Y) is a pre-requisite, unless exempted.
ECTS Credits:
2 ECTS credits / 54 hours 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
- **prepare and present scientific subjects** to your classmates, using appropriate field-related vocabulary.

Contents:

Skills in listening, speaking, and presenting academic topics are practised in the classroom, where there is an emphasis on working in pairs and small groups. Homework is given to support the classroom learning.
Mode of delivery:
Contact teaching
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.
Individual learning methods: autonomous learning tasks, practice in lecture listening and written tasks in preparation for classroom lessons
Group work: Preparation of presentations in groups

Target group:
2nd year students of Biology, Chemistry, Geoscience
1st year students of Mathematical and Physical Sciences (new programme)

Prerequisites and co-requisites:
Pre-requisite course: 902002Y Englannin kieli 1
Recommended optional programme components:
-
Recommended or required reading:
-
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.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / fail.
Person responsible:
Karen Niskanen
Working life cooperation:
-
Other information:
-

750031Y: Orientation course for new students, 1 op

Voimassaolo: - 31.07.2017

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Vanhatalo, Minna-Liisa

Opintokohteen kielet: Finnish

Leikkaavuudet:

750032Y	Orientation course for new students	2.0 op

ECTS Credits:
1 ECTS credit / 27 hours of work
Language of instruction:
Finnish.
Timing:
B.Sc. 1 st autumn - spring.
Learning outcomes:
The aim of the course is to introduce new biology students to the university, academic studies, the department and the studies of biology, give knowledge of the social relevance of the degree programme and student is able to set own goals for the studies.
Contents:

Students orientate themselves with the help of group meetings, presentations and seminar to the academic studies. During the course students make their first personal study plan (HOPS) for the first study year.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Tutorials, presentations and seminar of major subjects, independent studying, total 30 h.
Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Study guide.
Assessment methods and criteria:
Participation to the tutorials, presentations, seminar and doing the personal study plan for the first year.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Ph.Lic. Minna Vanhatalo.
Working life cooperation:
No.
Other information:
-

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

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

750124P: Basics of ecology, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari-Heikki Oksanen

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

750121P: Cell biology, 5 op

Voimassaolo: - 31.07.2020

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jaana Jurvansuu, Häggman, Hely Margaretha, Henrika Honkanen

Opintokohteen oppimateriaali:

Heino, Jyrki (2) , , 2004
Alberts, B. ym., , 2008
Lodish et al., , 2003

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 1 st autumn.
Learning outcomes:
The student is familiar with cellular structure and functioning in plant and animal cells, understands the social structures in multicellular species and knows why and how the genetic organizations (in nucleus, chloroplast and mitochondria) are co-operating, maintaining and regulating the cellular metabolism. Student understands the common origin and evolution of life on planet Earth, and understands the material basis and mechanisms of this continuity.
Contents:
During the recent years especially the development of molecular and microscopic and imaging techniques has increased our knowledge on cells and their social interactions. The structural and functional characteristics of plant and animal cells will be covered as well as the genetic organization maintaining and regulating the system.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
48 h lectures, 87 h independent work including deepening the upper secondary school knowledge in biology and chemistry as home work and book reading. Part of the home assignments is oblicatory.
Target group:
Compulsory to the biology and biochemistry students.
Prerequisites and co-requisites:
Good basics in biology and especially in chemistry from upper elementary school contributes learning.
Recommended optional programme components:
Cell biology is prerequisite for the following courses: Developmental biology-histology (755320A), Animal physiology (755323A), Plant biology lectures (756346A), Concepts of genetics (757109P). Course also gives readiness for studies in molecular biology and biochemistry.
Recommended or required reading:
Suitable parts of Reece ym. 2014: Campbell Biology: a global approach (10e), Pearson, 1350 s. 978-1-292-00865-3, Alberts, B. ym. 2015: Molecular Biology of the Cell (6e), Garland Science Publishing, London, 1464 s. ISBN: 9780815345244, Heino J. & Vuento M. 2014: Biokemian ja solubiologian perusteet (3. painos) WSOY Pro Oy, Helsinki, Jones R. ym. 2013: The molecular life of plants. Wiley-Blackwell, 742 s. ISBN : 978-0-470-87012-9.
The availability of the literature can be checked from this link.

[HK1]linkkiä en osannut uudistaa
Assessment methods and criteria:
Three subexams. After each lecture section is subexam. The only way to do the course is to pass all the three subexams (no credits to Oodi are given from subexams). No final exam. The subexams are ment to be done within one academic year.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail. Final grade is average value of the three exams.
Person responsible:
Dr. Jaana Jurvansuu, Doc. Helmi Kuittinen and Prof. Hely Häggman.
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

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 ideas of quantitative and population genetics. Part 2. Molecular genetics: replication, transcription, translation, genetic code, mutations, repair of DNA. Part 3. Selected topics on developmental genetics, and genetics of health and diseases.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
50 h lectures and seminars, 83 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:
Cell biology (750121P) or equivalent knowledge.
Recommended optional programme components:
This course is prerequisite to all other genetics courses.
Recommended or required reading:
Materials are in Optima. Klug et al. 2012. Concepts of Genetics (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:
1-5 / Fail.
Person responsible:
Prof. Outi Savolainen.
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

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:
After passing the course students have elementary knowledge of basic phenomena of genetics, important working methods and laboratory organisms. Student has the basic ability to understand, apply and analyse simple genetical works and phenomena.
Contents:
Investigation of Mendelian inheritance, gene mapping and nonadditive effects of genes using cross-breeding; basics of population genetics; investigation of promoter regulation and microbial recombination; investigation of mitosis and meiosis using cytogenetical methods; basic methods of DNA techniques (isolating DNA, digesting DNA using restriction enzymes, PCR and electrophoresis).
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
14 h demonstrations, 35 h exercises, 82 h independent work including home essay 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:
1-5 / Fail.
Person responsible:
Doc. Helmi Kuittinen
Working life cooperation:
No.
Other information:
-

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

Opettajat: Henrika Honkanen

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:
1-5 / Fail.
Person responsible:
M.Sc. Henrika Honkanen.
Working life cooperation:
No.
Other information:
-

750366A: Bachelor of Science final examination, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 3 rd year.
Learning outcomes:
Student will understand basic methods, results and theories in ecology, physiology or genetics.
Contents:
Examinations on books related to B.Sc. thesis subject. List of books are presented on WebOodi. All the books are recommended to be are done on the same exam 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 (4 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:
BSz:

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

BSg

- Klug, W. S., Cummings, M. R., Spencer, C.A ja Palladino M.A.: Concepts of Genetics (11. ed.). Pearson & Prentice Hall, 2015

- responsible teacher doc. 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 Scrinking 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 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. Annamari Markkola

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:

1-5 / Fail.

Person responsible:

M.Sc. Henrika Honkanen, Prof. Hely Häggman, doc. Annamari Markkola, doc. Heikki Helanterä 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 Noppa. Four pages long essay exam. One teacher examine the maturity exam and Pro gradu working group accepts it. 4 h exam.

Target group:
Compulsory to the biology students. Exam is taken after completion of the thesis.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Four pages long essay. Done in Examinarium.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Hely Häggman, Prof. Jari Oksanen, Prof. Timo Muotka or Prof. Outi Savolainen.
Working life cooperation:
No.
Other information:
-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

750396A	Bachelor of Science seminar	3.0 op

ECTS Credits:
10 ECTS credits / 267 hours of work.
Language of instruction:
Finnish / English.
Timing:
B.Sc. 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. The dean will order the examiners by the proposal of the professor. Pro gradu working group accepts and grades the thesis on the basis of the examiners' opinions.
List of the actual B.Sc. thesis topics is on Noppa.

Mode of delivery:
Face-to-face teaching.

Learning activities and teaching methods:
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 spring, subject teacher students have seminar workshop in the 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 Rytkönen coordinator., computer classes Dr. Phillip Watts, peer groups Prof. Timo Muotka (autumn) and Prof. Jari Oksanen (spring).
B.Sc. thesis: Prof. Hely Häggman, Prof. Jari Oksanen, Prof. Timo Muotka or Prof. Outi Savolainen.

Working life cooperation:
No.

Other information:
-

750373A: Biogeography, 5 op

Voimassaolo: 01.08.2015 - 31.07.2019

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari-Heikki Oksanen, Kvist, Laura Irmeli

Opintokohteen kielet: Finnish

Leikkaavuudet:

750173P	Biogeography	5.0 op
750363A	Biogeography	4.0 op

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

Language of instruction:
Finnish.

Timing:
B.Sc. 1st autumn.

Learning outcomes:
The course introduces students to basic concepts of biogeography, patterns of distribution and historical and present factors affecting the distribution. Plant biogeography introduces students to modern and historical factors controlling the plant cover, and to the special methods of vegetation science.

Contents:
The course consists of general part and optional part on plant biogeography and vegetation science. The general part introduces basic models and theories of distribution of organisms in the environment. Historical, evolutionary, geographical, climatic and ecological explanations. Research methods used in biogeography. The part on plant biogeography and vegetation science introduces methods on factors controlling the structure and

composition of vegetation, and describes major vegetation types in Finland and principal biomes in the World. Methods of vegetation science are briefly surveyed.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
General biogeography: 24 h lectures, independent work (3 cr), **Plant biogeography**: 24 h lectures (2 cr); two exams.
Target group:
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), Evolution, systematics and morphology of organisms, practicals (750374A), Biodiversity in human changed environments (755631S).
Recommended or required reading:
Cox, C.B. & Moore, P.D. 2005: Biogeography. An ecological and evolutionary approach (7 ed.), Blackwell Publishing Ltd, or Cox, C.B. & Moore, P.D. 2010: Biogeography. An ecological and evolutionary approach (8 ed.), John Wiley & Sons Inc.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Two exams.
Read more about assessment criteria at the University of Oulu webpage.

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

755320A: Developmental biology-histology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Henrika Honkanen

Opintokohteen kielet: Finnish

Leikkaavuudet:

751367A	Developmental biology-histology, lectures	4.0 op

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

(gastrulation), embryonic induction, signal
molecules and the differentiation of the most important tissues and organs (organogenesis). Histology will first cover various tissue types, their cell types and matrix composition. Thereafter, the microscopic structure and tissue composition of various organs and organ systems will be covered. In both parts, practical exercises on drawing from microscopic slides (see 755317A) will support lectures.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
6x2h lectures (developmental biology), 24 h exercises (histology). Drawing exercises on microscopical and virtual microscopic preparates, independent working on microscope and virtual microscope, identification of different tissue types on histologic preparates.
Target group:
BS compulsory. ECO and TEA optional.
Prerequisites and co-requisites:
Cell biology (750121P) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Exercise handout, lecture notes, lecture handouts. Recommended reading: Sariola, Frilander ym., Solusta yksilöksi: Kehitysbiologia, Duodecim, Helsinki 2003; Gilbert: Developmental Biology, Sinauer Press, 6.ed. 2000, or newer; Young & Heath: Wheater's Functional Histology, Churchill Livingstone, 4. ed. 2000, or newer.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
2 lecture exams.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail.
Person responsible:
M.Sc. Henrika Honkanen.
Working life cooperation:
No.
Other information:
-

750372A: Evolution and systematics of organisms, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari-Heikki Oksanen, Marko Mutanen, Annamari Markkola

Opintokohteen kielet: Finnish

Leikkaavuudet:

750307A	Evolution and systematics of organisms	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 2nd autumn.
Learning outcomes:
Students will learn a general picture of the diversity of life-forms as to understand the evolutionary history of organisms.
Contents:
The course provides an insight into the biological evolution and evolutionary processes reflected by the systematic classification of the organisms. Also basic principles and concepts of systematics and classification are presented.
Mode of delivery:

Face-to-face teaching.
Learning activities and teaching methods:
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. 2 nd ed. Cambridge University Press., Willis, K.J. & McElwain, J.C. 2002: The evolution of plants. Oxford University Press. Hickman, C. P. et al. 2009. Animal Diversity, 5th edition, McGraw Hill New York.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Lecture exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Arja Kaitala, Prof. Jari Oksanen and Doc. Annamari Markkola.
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: Panu Välimäki

Opintokohteen kielet: Finnish

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

Learning outcomes:
To understand main principles of evolution and the concepts of natural selection, fitness and adaptation. Learn basics of life-history adaptation, speciation processes and social evolution.
Contents:
The aim of the course is to introduce a student with lectures and seminars to the main topics of evolutionary ecology, for example basic concepts of natural selection and evolution, selection level, speciation, evolution of life cycles, interactions between and within species are included. Review to the latest research results.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
36 h lectures and compulsory seminars, exam.
Target group:
BS and ECO compulsory, TEAeco optional.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Lectures and seminars.

Assessment methods and criteria:
Seminar and exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Sami Aikio.
Working life cooperation:
No.
Other information:
Additional reading: Björklund, Mats 2009 Evoluutiobiologia. Gaudeamus, Sterans, S. and Hoekstra, R. F. 2005: Evolution, An Introduction. Oxford University Press, New York, 575 p.

755333A: Identification of animals, 6 op

Voimassaolo: 01.08.2016 - 31.07.2019

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Koivula

Opintokohteen kielet: Finnish

Leikkaavuudet:

755334A	Identification of animals, vertebrates	4.0 op

ECTS Credits:
6 ECTS credits / 162 hours of work.
Language of instruction:
Finnish / English
Timing:
B.Sc. degree 1st autumn and spring.
Learning outcomes:
Main point of the course is to learn to indentify Finnish animal species (vertebrate) and families (invertebrate) from museum samples. Basics of species' ecology and classification of organisms.
Contents:
During the autumn semester (9 h lectures in Finnish, 16 h exercises, exam), the Finnish vertebrate fauna is studied using stuffed museum samples. In the spring semester (9 h lectures in Finnish, 16 h exercises, exam) the invertebrate taxons (mostly family- or genus-level) common in Finland are studied using museum samples.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
18 h lectures in Finnish, 32 h exercises, independent studying, 2 exams.
Target group:
Biology students: compulsory.
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:
Course handouts, Itämies J. ja Viro P. 1995: Eläinten lajintuntemus, selkärangattomat, 73 p.; Putaala, A., Marjakangas, A. & Rytkönen, S. 2001: Eläinten lajintuntemus, selkärankaiset, 42 p.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Two species exams.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:

Doc. Kari Koivula.
Working life cooperation:
No.
Other information:
-

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

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Annamari Markkola

Opintokohteen kielet: Finnish

Leikkaavuudet:

756342A	Identification of plant species	3.0 op

ECTS Credits:
3 ECTS credits / 80 hours of work.
Language of instruction:
Finnish / English.
Timing:
BSc 1st autumn.
Learning outcomes:
Student is able to identify most common boreal plant species in herbarium specimens.
Contents:
Demonstrations and/or independent stud of ca. 350 vascular plants, mosses and lichens in the boreal vegetation zone. In the identification exam student has to know specimens scientific name and family in latin.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
16 h demonstrations and learning from the herbarium samples. 350 plant species. In the identification exam student has to know specimens scientific name and family in latin.
Target group:
BSc degree, BS: compulsory 3 cr.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Booklet Hanhela, P. & Halonen, P. 1995: Plant Identification.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Two species identification subexams (756355A-01 and 756355A-02) 3 cr with the help of handout.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Annamari Markkola
Working life cooperation:
No.
Other information:
-

Compulsory

756355A-01: Identification of plant species, monocotyledons, brief, 0 op

Voimassaolo: 01.08.2017 -

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

Ei opintojaksokuvauksia.

756355A-02: Identification of plant species, dicotyledons, brief, 0 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Annamari Markkola
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

757312A: Molecular evolution, 5 op

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

753327A	Molecular evolution	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English. Lectures are in Finnish, but non-speakers can make an exam based on literature.
Timing:
B.Sc. 2nd autumn.
Learning outcomes:
After the course the student knows some basic methods that are used to study the history of living organisms and their evolutionary mechanisms. The student knows the main concepts in the field and can read scientific articles in molecular evolution.
Contents:
Basic methods of estimation of nucleotide substitution rates, building of phylogenetic trees with distance based methods and parsimony. Evolution of the genome structure and size. Scientific articles.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
24 h lectures, 16 h exercises/seminar, 90 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:

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

756346A: Plant biology lectures, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha, Anna-Maria Pirttilä

Opintokohteen kielet: Finnish

Leikkaavuudet:

752345A	Basics of functional plant biology, lectures	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish.
Timing:
B.Sc. 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) and exams.
Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
Cell biology (750121P) or equivalent knowledge helps in following this course. This course is a prerequisite for course Plant biology practicals (756341A) and Advanced course in plant biology (752682S).
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.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

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

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. Timmermans, M.C.P.: Plant Development. 2010. Elsevier.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Hely Häggman.
Working life cooperation:
No.
Other information:
-

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:
Finnish / English.
Timing:
B.Sc. studies, 3rd autumn.
Learning outcomes:
After the course the student can explain and is able to use the basic methods for handling nucleotide and protein sequences. Student learns how to use various databases, can explain the background and principles of the analytic methods, is able to take up a critical attitude towards the used methods and gets a good background for applying new methods that are developed continuously.
Contents:
Searching 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, 2 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:
1-5 / 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 from different organisms, 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 her results and optimize the methods to some degree.
Contents:
Isolation of genomic DNA, amplification of DNA by PCR, primer design, DNA sequencing, basic analysis of DNA-sequence and writing basic scientific reports.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
48 h exercises including demonstrations, 50 h independent work including homework and writing reports.
Target group:
Compulsory to BS and ECOGEN, suitable for ECO students who are interested in population and evolutionary ecology.
Prerequisites and co-requisites:
Consepts of genetics (757110P) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Reports.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
Pass / 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:
Cell biology (750121P) and Basics in functional plant biology, lectures (756346A).
Recommended optional programme components:
Basics in plant biology is prerequisite to Advanced course in plant biology (752682S).
Recommended or required reading:
Terävä, E. & Kanervo, E. 2008: Kasvianatomia or equivalent knowledge, Taiz, L. & Zeigler, E. 2010: Plant Physiology (parts), Sinauer Ass., Sunderland Mass.; Hohtola ym.: Harjoitustyömoniste.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Laboratory exercises, reports.
Read more about assessment criteria at the University of Oulu webpage.

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

740144P: Biochemical Methodologies I, 8 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Biochemistry and Molecular Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: Sakari Kellokumpu

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay740153P	Basic biochemistry 2: Methods (OPEN UNI)	2.0 op
740151P	Biochemical methodologies I	10.0 op
740117P	Basic methods in biochemistry	4.0 op
740136P	Laboratory course in basic methods of biochemistry	3.0 op

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
8 credits
Language of instruction:
Finnish
Timing:
autumn (lectures), spring (laboratory practicals)
Learning outcomes:
Upon succesful completion students are able to:
- use basic methods used in biochemical research laboratory
- Use laboratory equipment and work safely

- Prepare solutions used in the lab
- document experiments in the laboratory

Contents:
This module covers the basic methodologies used in practical biochemistry. The following topics will be addressed: safety in the laboratory, qualitative and quantitative observations, the calculations of concentrations and dilution factors (includes a workshop), pipette cleaning and calibration, identification and quantification of biological molecules, principals and practice of the use of centrifuges, spectrophotometry, SDS-PAGE, agarose gel electrophoresis, thin-layer and paper chromatography, basics of protein purification, extraction of chromosomal DNA from bacteria, mini-prep extraction of plasmid DNA, extraction of RNA from mammalian tissue, extraction of lipids from nutmeg, sterile technique, basic microbial growth, dialysis, filtration and pH measurement.
Mode of delivery:
Face to face teaching
Learning activities and teaching methods:
18 h le, 2h exercises, 120 h lab. Laboratory work is compulsory. It is possible to complete lecture part only (3.5 ECTS).
Target group:
Biology BSC-BS
Prerequisites and co-requisites:
Biomolecules, Biomolecules for Biochemists tai Biomolecules for Bioscientists

Recommended optional programme components:
-
Recommended or required reading:
Recommended reading: Reed, Holmes, Weyers & Jones: Practical skills in biomolecular sciences, 4th edition, Pearson, 2013.

You can check the availability of the course books via this link
Assessment methods and criteria:
Continuous assessment (home works, lab reports), final exam
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5/fail
Person responsible:
Sakari Kellokumpu
Working life cooperation:
No
Other information:
Location of instruction: lectures (in Finnish) at Linnanmaa campus, laboratory practicals at Kontinkangas campus. In weboodi students register to course 740151 Biochemical methodologies I, 10 credits, only to those parts that do not belong only to biochemists.

740147P: Biomolecules for Bioscientists, 8 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Biochemistry and Molecular Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: Tuomo Glumoff

Opintokohteen kielet: English

Leikkaavuudet:

ay740157P	Basic biochemistry 1: Biomolecules (OPEN UNI)	4.0 op
ay740152P	Basic biochemistry 1: Biomolecules (OPEN UNI)	5.0 op
740143P	Biomolecules for Biochemists	8.0 op
740148P	Biomolecules	5.0 op

ECTS Credits:
8 credits
Language of instruction:
English and Finnish
Timing:

Course starts in autumn term and will continue to spring term

Learning outcomes:

Upon successful completion students are able to:

- tell the composition, structure and function of the major groups of biomolecules in cells; nucleic acids, proteins, carbohydrates and lipds and describe the forces that modulate their function.
- apply information in the right context and evaluate it critically
- In addition, students on the 8op versions are able to work in the biochemical laboratory, are able to solve calculations and problems and are able to interpret the scientific data they generate

Contents:

This module provides an overview of biochemistry, outlining the forces involved in biomolecule structure and the chemical structures and properties of polynucleic acids, proteins, carbohydrates and lipids. There will also be an introduction to prebiotic evolution and a student debate on this subject. The module is arranged into lectures, workshops, a student debate and laboratory work. All of the exercises are in English. Both a final examination and continuous assessment will count towards the final mark and attendance of some parts is compulsory.

Mode of delivery:

Face to face teaching

Learning activities and teaching methods:

30 h lectures, 48 h lab., plus exercises

Target group:

Minor subject students, exchange students

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Mathews, van Holde & Ahern: Biochemistry, (3rd edition), published by Addison Wesley Longman, Inc. or equivalent

Assessment methods and criteria:

Continuous assessment, final examination

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

Grading:

1-5/fail

Person responsible:

Tuomo Glumoff

Working life cooperation:

No

Other information:

This module is the same as Biomolecules for Biochemists. Location of instruction: Lectures: Linnanmaa, laboratory: Kontinkangas

740149P: Metabolism I, 4 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Biochemistry and Molecular Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: Tuomo Glumoff

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay740158P	Basic biochemistry 3: Metabolis (OPEN UNI)	4.0 op
ay740154P	Basic biochemistry 3: Metabolis (OPEN UNI)	3.0 op
740146P	Metabolism I	6.0 op

ECTS Credits:

4 credits

Language of instruction:

Finnish

Timing:

spring

Learning outcomes:

Students will be able to explain the main principles of how the metabolism is made up, will get a detailed picture of the energy metabolism, and will be able to organize part of the wholeness of metabolism, particularly how energy metabolism is networked to the synthesis and degradation of biomolecules.
Contents:
On this course the central concepts and mechanisms of metabolism, its regulation and the integration of metabolic pathways will be introduced, like anabolism and catabolism, linking of different pathways, and metabolic regulation. Especially the energy metabolism will be studied, concerning carbohydrates, lipids and the respiratory chain. Combined with the course Metabolism II the students will get a good overview on the principles of metabolism, metabolic integration and the methods to study metabolism.
Mode of delivery:
Face to face teaching
Learning activities and teaching methods:
Lectures (28 h), problem-based exercises (workshops) 6 h and final exam.
Target group:
Minor subject students
Prerequisites and co-requisites:
Biomolecules for Biochemists or Biomolecules for Bioscientists or Biomolecules
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Problem-based exercises and a final exam will count towards the final grade.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5/fail.
Person responsible:
Tuomo Glumoff
Working life cooperation:
-
Other information:
This module is the same as Metabolism I (740146P), except that it contains no laboratory component.
Location of instruction: Linnanmaa

740374A: Microbiology, 3 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Faculty of Biochemistry and Molecular Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: Pospiech, Helmut

Opintokohteen kielet: Finnish

Leikkaavuudet:

740363A	Microbiology	6.0 op
740322A	Microbiology	3.0 op

ECTS Credits:
3 credits
Language of instruction:
English
Timing:
spring
Learning outcomes:

Learning outcomes: Upon successful completion students are able to:

- define the typical features of bacteria, archaea, fungi and virus and explane the diversity of different groups of microorganisms
- explain the basic aspects of microbial metabolism
- understand the basics of microbial growth, enrichment, culture and growth control both in the environment and in contained culture

- explain the essential roles of microorganisms in our environment
- apply their knowledge for the growth and its control of standard laboratory microorganisms
- have a basic understanding of the industrial use of microorganisms or microbial compounds.

Contents:
This module is an introduction to general and applied microbiology and consists of lecture and laboratory exercises. In the lectures, the diversity and classification of micro organisms, especially bacteria will be introduced. Further topics are the structure and function of the prokaryotic cell, bacterial growth, metabolism and physiology, the importance of bacteria in different ecosystems as well as the industrial use of bacteria.
Mode of delivery:
Face to face teaching
Learning activities and teaching methods:
24 h lectures
Target group:
Minor subject students
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
M. Salkinoja-Salonen (toim.) (2002) Mikrobiologian perusteita, Helsingin yliopisto; M.T. Madigan, J. M. Martinko, J. Parker (2010) Brock biology of microorganisms, 13th ed. Prentice Hall International.
Assessment methods and criteria:
Continuous assessment (home works), final exam
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5/fail
Person responsible:
Helmut Pospiech
Working life cooperation:
No
Other information:
This module is the same as Microbiology (740363A) except that it contains no practical component. Location of instruction: Linnanmaa campus

740373A: Molecular Biology I, 4 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Faculty of Biochemistry and Molecular Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: Mirva Saaranen

Opintokohteen kielet: Finnish

Leikkaavuudet:

740361A	Molecular Biology I	8.0 op
740318A	Molecular Biology	4.0 op

ECTS Credits:
4 credits
Language of instruction:
Finnish
Timing:
autumn
Learning outcomes:
After this course students should understand modern molecular biology methods.
Contents:
The course covers gene structure, DNA replication, recombination, transcription and translation. The student will learn the most common recombinant DNA techniques, such as PCR, use of restriction endonucleases, preparation of recombinant plasmids and DNA sequencing.
Mode of delivery:
Face to face teaching

Learning activities and teaching methods:
20 h lectures, 4 h computer exercise and homeworks
Target group:
Minor subject students
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
Mathews, CK, van Holde KT, Applins DR, Anthony-Cahill SJ: Biochemistry (4th edition). Optional.
Assessment methods and criteria:
Homeworks 50%, final exam 50%
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5/fail.
Person responsible:
Mirva Saaranen and Aki Manninen
Working life cooperation:
no
Other information:
This course is the same as Molecular biology I (740361A) but without practical part.
Location of instruction: Linnanmaa

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 Päkkilä

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 Päkkilä
Working life cooperation:
No
Other information:
-

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 credits/134 hours of work
Language of instruction:
Finnish
Timing:
1st autumn
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. Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail.
Person responsible:
Lecturer Minna Tiainen
Working life cooperation:
No
Other information:

No

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 credits / 27 hours of work
Language of instruction:
Finnish
Timing:
Architecture 3. spring semester, period I; Biochemistry 3. autumn semester; Biology 3. autumn semester, period I; Chemistry 3. autumn semester, period II; Computer Science and Engineering 2. spring semester, period IV; Electronics and Communications Engineering 3. spring semester; Geosciences 2. spring semester, period IV; Geography 1. and 3. spring semester, period III; Industrial Engineering and Management 3. year (Master's degree students in Industrial Engineering and Management 1st year.); Information Processing Sciences 1. 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.
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 RefWorks 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.

Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
Web learning material Tieteellisen tiedonhankinnan opas http://libguides.oulu.fi/tieteellinentiedonhankinta (in Finnish)
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
Working life cooperation:
-

Other information:
-

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 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 compunds and explain their properties.
- can explain organic chemistry basic consepts.
- can deduce basic recation 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, Geograhpy, 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., Hart, D.J. and Craine, L.E.: Organic Chemistry: A Short Course, 10 th ed. or the newer edition, Houghton Mifflin Boston, 1999; Hart, H., Hart, D.J. and Craine, L.E.: Study Guide & Solutions Book, Organic Chemistry: A Short Course, 10th ed. or the newer edition, Houghton Mifflin Boston, 1999.
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
Other information:
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 Päkkilä

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 Päkkilä
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 professor in beforehand.
Mode of delivery:
Itsenäinen opiskelu: kirjatentti.
Learning activities and teaching methods:
Book exam (3 h). Exam is held in Examinarium, instructions: http://www.oulu.fi/english/studying/examinarium
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, doc. Kari Koivula February-April 2019):

- 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. Annamari Markkola):

- 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 (doc. Heikki Helanterä):

- Lewin Genes (XI) (or equal)

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

- Nielsen, R. ja Slatkin, M. 2013 An introduction to population genetics. Sinauer, 287 p.

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

Animal physiology orientation (Henrika Honkanen):

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

Plant physiologi orientation (prof. Hely Häggman)

- Beeckman 2009. Root Development. Annual Plant Reviews 37. - Wiley-Blackwell. ISBN 978-1-4051-6150-3
- Coruzzi Gutierrez 2009. Plant Systems Biology. Annual Plant Reviews 35. - Wiley-Blackwell. ISBN 978-1-4051-6283-8.
- Dickison, W.C. 2000. Integrative plant anatomy. 533 s. ISBN 0-12-215170-4
- Fahn, A. 1990. Plant anatomy. 4. rev. ed. 588 s. ISBN 0-08-037490
- Gan 2007. Senescence processes in plants. - Wiley-Blackwell. ISBN 978-0-8138-1963-1
- Hayat, Mori, Pichtel & Ahmad 2010. Nitric oxide in plant physiology. - Wiley-Blackwell. ISBN 978-3-527-32519-1
- Hvoslef-Eide, A.K. & Preil, W. 2005. Liquid culture systems for in vitro plant propagation. Springer ISBN 1-4020-3199-8
- Jenks & Wood 2009. Genes for Plant Abiotic Stress. - Wiley-Blackwell. ISBN 978-1-4051-3984-7
- Kinight, Perroud, Cove 2009. The Moss Physcomitrella- Annual Plant Reviews, volume 36 - Wiley-Blackwell. ISBN 978-1-4051-8189-1.
- Lambers, H., Chapin III, F.S., Pons, T.L. 2008. Plant physiological ecology. Springer. 610 p. ISBN 978-0-387-78340-6
- Osbourn, A.E. & Lanzotti, V. 2009. Plant-derived natural products: synthesis, function, and application. 587 s. Springer. (Printed or electronical book version in the library)
- Parker 2008. Molecular aspects of plant disease resistance. Annual Plant Reviews , volume 34. - Wiley-Blackwell. ISBN 978-1-4051-7532-6
- Reed, B.M. 2008. Plant Cryopreservation: A Practical Guide. Springer ISBN 978-0-387-72275-7
- Smith & Read 2008. Mycorrhizal symbiosis. 3. painos. Academic Press. 800 p.
- Taiz, L. et al. 2015. Plant Physiology and Development. Sixth Edition.761 p. Sinauer Associates, Inc. ISBN-9781605352558
- Wink 2010. Biochemistry of plant secondary metabolism. Annual Plant Reviews, volume 40. - Wiley-Blackwell. ISBN 978-1-4051-83970. Electronical book. Link can be found for example from OULA library cataloque. Dawsonera can be accessed with koivu/paju password. http://www.dawsonera.com/depp/reader/protected/external/AbstractView/S9781444320510
- Yeo & Flowers 2007. Plant Solute Transport. - Wiley-Blackwell. ISBN 978-1-4051-3995-3
- Yoshioka & Shinozaki 2009. Signal Crosstalk in Plant Stress Responses - Wiley-Blackwell. ISBN 978-0-8138-1963-1

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

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:

1-5 / Fail.

Person responsible:

M.Sc. Henrika Honkanen, Prof. Hely Häggman, Doc. Annamari Markkola, Prof. Timo Muotka or Doc. Heikki Helanterä.

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: 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 opponenting, eight research seminar and eight result seminar attendances. Research plan seminar and results seminar presentations cannot be given at same day. Topics and dates have to be agreed with the professor in beforehand. See degree programme notice board for the schedule and instructions.
Target group:
Compulsory to the biology students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Seminar presentations, attendance and opponenting. Detailed instructions on the 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 Master of Science Thesis, the student will give summary in Finnish, Swedish or English to show his/her familiarity with the topic of the thesis. If the international degree student has not done a maturity exam in her /his B.Sc. degree the student has to make a 4 pages long essay about the thesis subject in Examinarium.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Instructions at the Faculty of Science internet homepage. One teacher examine the maturity exam and Pro gradu working group accepts it.
Target group:
Compulsory to the biology students. After completing the thesis.

Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Summary form at the Faculty of Science internet homepage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Prof. Hely Häggman, Prof. Jari Oksanen, Prof. Markku Orell or Prof. Outi Savolainen.
Working life cooperation:
No.
Other information:
-

757617S: Molecular methods II, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Anna-Maria Pirttilä, Henrika Honkanen

Opintokohteen kielet: Finnish

Leikkaavuudet:

750365A	Molecular methods II	4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1st autumn.
Learning outcomes:
The student knows how to study gene expression at different levels (transcription, translation) and understands the benefits and limitations of each method used.
Contents:
The course consists of laboratory work elaborating principles of gene expression by molecular biology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
50 h exercises including demonstrations, 50 h independent work, work reports.
Target group:
Compulsory to BS.
Prerequisites and co-requisites:
Molecular methods I (757311A).
Recommended optional programme components:
-
Recommended or required reading:
Course handout.
Assessment methods and criteria:
Demonstrations, exercises, reports.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Anna Maria Pirttilä and Dr. Janne Koskimäki.

Working life cooperation:
No.
Other information:
-

750615S: Practical training, 10 - 15 op

Opiskelumuoto: Advanced Studies

Laji: Practical training

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

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

Target group:
Compulsory to BS and ECO in the M.Sc. degree.
Prerequisites and co-requisites:
About 80 credit amount of biology courses.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Journal and final report.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Contact person Minna Vanhatalo. The supervisors of the practical training are Prof. Timo Muotka (ECOz), Prof. Jari Oksanen (ECOb), Prof. Hely Häggman (BSb), M.Sc. Henrika Honkanen (BSz) and Prof. Outi Savolainen (BSg).
Working life cooperation:
Yes. Participating to biology project gives working life skills.
Other information:
The student has to contact the professor and discuss about the suitability of the internship place in beforehand.

750658S: Pro gradu thesis in biology, 40 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Diploma thesis

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

ECTS Credits:
40 ECTS credits / 1067 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st or 2 nd year.
Learning outcomes:
Student knows the research methods in specific field of biology. She is conversant with her field of thesis and is able to scientific thinking, estimating the results, analysing, drawing conclusions and scientific communicating.
Contents:
Literary work which in general includes experimental research work. Student gets profoundly acquainted on certain special field in biology.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Independent research work on a scientific subject in agreement with the responsible professor and under the supervision of the Department. The supervisors may be professors of the department, docents and other teachers and researchers who have the docent's status. The student may
have several supervisors, the other supervisor may be from other department, university (also abroad) or from research institute. The subject must be agreed on with the professor in advance. The research work can contain fieldwork, laboratory work, theoretical work or work on collections in museum. The work always includes a literature survey. After having completed the thesis, the student writes the Maturity Exam. The programme director will order the final examiners by the proposal of the professor. Pro gradu working group accepts and grades the thesis on the basis of the final examiners' opinions.
Target group:
ECO and BS: compulsory 40 cr. TEA: 40 cr. optional. So called didactic pro gradu thesis cannot be 40 cr.
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:
1-5 / Fail.
Person responsible:
M.Sc. Henrika Honkanen, Prof. Hely Häggman, prof. Jari Oksanen, Prof. Timo Muotka or Prof. Outi Savolainen.
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 cr / 133 hours of work.
Language of instruction:
Finnish / 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. Usage of molecular methods for identification of species, sex and individuals, behavioral ecology (mating systems, cooperation, mating success) and conservation.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
22 h lectures, 24 h exercises (problem solving, laboratory and computer exercises), 4 h seminars, take-home exam.
Target group:
B.Sc. 2nd spring BSg, M.Sc. 1st spring, ECOGENgen 1st spring, genetics: compulsory in M.Sc. degree.
Prerequisites and co-requisites:
Concepts of genetics (757109P), Experimental course in general genetics (757110P) and Molecular evolution (757312A) or equivalent knowledge.
Recommended optional programme components:
Compulsory prequisite for courses Experimental course in evolutionary genomics (757621S), Advanced course in bioinformatics (757619S) and DNA analysis in population genetics (757618S). Recommended prerequisite for course Quantitative genetics (805338A).
Recommended or required reading:
Hamilton, M. B. 2009: Population genetics, Wiley-Blackwell.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Take-home exam, problem solving, laboratory and computer exercises, seminar.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5 / Fail.
Person responsible:
Doc. Lumi Viljakainen.
Working life cooperation:
No.
Other information:
Note that Introduction to 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: Tanja Pyhäjärvi

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

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.
Learning activities and teaching methods:
24 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:
1-5 / Fail.
Person responsible:
Doc. Tanja Pyhäjärvi.
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. 2 nd or M.Sc. 1 st autumn.
Learning outcomes:
The course aims to help students learn to basic plant tissue culture concepts, to establish tissue culture systems and to understand totipotency.
Contents:
Preparation of culture media and establishment of sterile cultures starting from different plant organs and tissues. Cytodifferentiation and viability tests are also included in the course. Students are able to follow how plant hormones determine the differentiation of tissues.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
8 h lectures, 35 h demonstrations and exercises, literature work, seminar, 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.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Prof. Hely Häggman and Doc. Anna Mari Pirttilä..
Working life cooperation:
No.
Other information:
-

751688S: Biotechnology and Molecular Biology of Plants, 10 op

Voimassaolo: 01.08.2019 - 31.07.2020

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Ei opintojaksokuvauksia.

756615S: Physiology of forest trees, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Häggman, Hely Margaretha

Opintokohteen kielet: Finnish

ECTS Credits:
4 ECTS credits / 107 hours of work.
Language of instruction:
Finnish / English.

Timing:
M.Sc. 1 st or 2 nd spring, (arranged if resources allow).
Learning outcomes:
The student is able to assess the specific features of forest tree physiology and from this basis can judge the effect of climate change to forestry.
Contents:
Trees are long-living, often wind-pollinated, tall organisms. The juvenile phase may be long and the adult phase is characterized by both reproductive and vegetative growth which causes competition on both carbohydrates and nutrients. Cold- and drought resistance, water relations, carbon allocation and mineral nutrition will be discussed. Partly due to forest tree's economic importance biotechnological applications have been developed e.g. for the production of health promoting substances or vegetative propagation. Forest trees are interesting from the point of molecular biology- what makes a tree tree? The course will cover these topics but the emphasis may vary during the years.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
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:
1-5 / 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:
4 ECTS credits / 107 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st or 2 nd spring, (arranged if resources allow).
Learning outcomes:
The students will assess the plant hormone action, understand hormone interactions and the significance of the hormone balance as well as the molecular mechanisms.
Contents:
Plant hormones are signalling molecules with profound effects on growth and development at trace quantities. Until quite recently plant development was considered to be regulated by auxins, gibberellins, cytokinins, ethylene and abscisic acid. New analytical and molecular methods have evidenced new plant hormone receptors and signalling

pathways. During the lectures the mode of action of the hormones and the latest literature is used to gain the most recent view of the topic.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
20 h and exam.
Target group:
Suitable for BSb and ecophysiologists.
Prerequisites and co-requisites:
Basics of functional plant biology lectures and exercises (752345A, 756341A).
Recommended optional programme components:
-
Recommended or required reading:
Chapters concerning plant hormones from Taiz, L. 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:
1-5 / 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.

Choose from

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

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

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

Voidaan suorittaa useasti: Kyllä

ECTS Credits:

2-5 ECTS credits / 53-133 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. or Ph.D. degree. Arranged if resources allow.

Learning outcomes:

Students will be acquainted to current issues in biology.

Contents:

Seminars on current issues in biology.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Course specific.

Target group:

Biology students.

Prerequisites and co-requisites:

Varying.

Recommended optional programme components:

-

Recommended or required reading:

Varying.

Assessment methods and criteria:

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

Grading:

1-5 / Fail or Pass / Fail.

Person responsible:

Prof. Timo Muotka, Prof. Jari Oksanen, Prof. Outi Savolainen and Prof. Hely Häggman.

Working life cooperation:

No.

Other information:

-

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

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

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

ECTS Credits:

2-5 ECTS credits / 53-133 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. or Ph.D. degree. Arranged if resourses allow

Learning outcomes:

Students will be acquainted to current issues in biology.

Contents:

Seminars on current issues in biology.

Mode of delivery:

Varying.

Learning activities and teaching methods:

Varying.

Target group:

Biology students.

Prerequisites and co-requisites:

Varying.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

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

Grading:

1-5 / Fail or Pass / Fail.

Person responsible:

Prof. Timo Muotka, Prof. Jari Oksanen, Prof. Outi Savolainen and Prof. Hely Häggman.

Working life cooperation:

No.

Other information:

-

757615S: Human genetics, 5 op

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

753607S	Human genetics	4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. or M.Sc. degree, autumn. Arranged if resources allow.

Learning outcomes:

To understand human evolution and man as a biological species.

Contents:

Human evolution in Africa, spread of different human species to other continents, research methods including population genetics and genomics, molecular human genetics: inherited diseases and susceptibilities.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures, home works.

Target group:

Arranged every second autumn. Course neccessary for students of genetics, not compulsory. Suitable also for biochemistry students and education students.

Prerequisites and co-requisites:

Concepts of genetics (757109P) or equivalent knowledge.

Recommended optional programme components:

Educational, voluntary.

Recommended or required reading:

Jobling et al. 2014: Human evolutionary genetics. 2nd ed. Garland Science, ISBN 9780815341482.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Learning diary, controlled exam and student activity.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Prof. Outi Savolainen.

Working life cooperation:

No.

Other information:

-

757619S: Advanced course in bioinformatics, 5 op

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

753629S	Advanced course in bioinformatics	4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

English.

Timing:

M.Sc. 2nd spring.

Learning outcomes:

The main objective of this course is to provide students with understanding and experience of the main techniques required to manipulate, analyse and interpret next generation sequence data. Students will understand different technologies; be capable of manipulating data files and assess data quality; assemble and map reads; identify genes and variants; complete some basic analyses of genome data.

Contents:

During the course, students will manipulate an example data set to provide a comprehensive experience of contemporary bioinformatics techniques required to identify genes and polymorphisms, as well as familiarity with the command terminal and basic LINUX commands. This course builds on Basics of bioinformatics (757314A) and complements the theory learnt in Introduction to population genetics (757313A), Introduction to molecular ecology (756650S) and Experimental course in evolutionary genomics (757621S). Lectures provide the core understanding of the main steps and principals behind data analyses, but the core content will be practical experience of handling and analysing large data sets.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Contact hours: 12 hrs lectures, 40 hrs computer exercises, 56 hr independent study. Continuous assessment (coursework) and a final exam.

Target group:

Bioscience and Ecology M.Sc.

Prerequisites and co-requisites:

Basics of bioinformatics (757314A) or equivalent knowledge, Introduction to population genetics (757313A), Molecular evolution (757312A).

Recommended optional programme components:

-

Recommended or required reading:

Good guide for much of this is the De Wit P. et al 2012: The simple fool's guide to population genomics via RNA-Seq: an introduction to high-throughput sequencing data analysis. Molecular Ecology Resourses. Molecular Ecology Resources. Volume 12, Issue 6, pages 1058–1067, November 2012 and other course material.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Continuous assessment, learning diary and project report.

Grading:

1-5 / Fail.

Person responsible:

Dr. Phillip Watts.

Working life cooperation:

No.

Other information:

-

757621S: Experimental course in evolutionary genomics, 5 op

Voimassaolo: 01.08.2015 - 31.07.2020

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Phillip Watts

Opintokohteen kielet: Finnish

Leikkaavuudet:

753624S Experimental course in evolutionary genomics 4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

English.

Timing:

M.Sc. 2nd spring.

Learning outcomes:

After the course the student will be able to analyze DNA sequence differences between species, applying the knowledge obtained during courses in bioinformatics and molecular evolution. The student will know how to retrieve information from public sequence databases, characterize sequences, estimate nucleotide substitutions, align sequences, build phylogenetic trees and estimate their confidence. The student will be capable of making a hypothesis related to molecular evolution and test it using sequence data.

Contents:

Sequence databases, methods and computer programs for handling and analysing sequences obtained from databases. Research appropriate scientific literature. Work is done mainly in the computer classroom.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

48 hr exercises including demonstrations and seminar, independent work including reports.

Target group:

BSg students.

Prerequisites and co-requisites:

Advanced course in bioinformatics (757619S) and Molecular evolution (757312A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

Reports, independent work and seminar.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Dr. Phillip Watts.

Working life cooperation:

No.

Other information:

-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Heikki Helanterä

Opintokohteen kielet: Finnish

Leikkaavuudet:

753612S Methods in genomics and genomics evolution 6.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 1st autumn.

Learning outcomes:

Student knows focal features of genome structure, evolution and research methods.

Contents:

Genome structure, composition, comparative genomics, recombination and evolutionary factors affecting genome composition. Theory and methods.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

24 h lectures, 24 h seminars, independent work 83 h, exam, reports.

Target group:

BSg.

Prerequisites and co-requisites:

Concepts of genetics 5 cr (757109P), Experimental course in general genetics 5 cr (757110P) and Basics in population genetics 5 cr (757313A).

Recommended optional programme components:

-

Recommended or required reading:

Recent review articles.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Prof. Outi Savolainen.

Working life cooperation:

No.

Other information:

-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Mikko Sillanpää

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

Ei opintojaksokuvauksia.

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:

4 ECTS credits / 107 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 1 st or 2 nd spring, (arranged if resources allow).

Learning outcomes:

The students will assess the plant hormone action, understand hormone interactions and the significance of the hormone balance as well as the molecular mechanisms.

Contents:

Plant hormones are signalling molecules with profound effects on growth and development at trace quantities. Until quite recently plant development was considered to be regulated by auxins, gibberellins, cytokinins, ethylene and abscisic acid. New analytical and molecular methods have evidenced new plant hormone receptors and signalling pathways. During the lectures the mode of action of the hormones and the latest literature is used to gain the most recent view of the topic.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

20 h and exam.

Target group:

Suitable for BSb and ecophysiologists.

Prerequisites and co-requisites:

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

Recommended optional programme components:

-

Recommended or required reading:

Chapters concerning plant hormones from Taiz, L. 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:

1-5 / Fail.

Person responsible:

Prof. Hely Häggman and Doc. Anna Maria 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:

4 ECTS credits / 107 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 1 st or 2 nd spring, (arranged if resources allow).

Learning outcomes:

The student is able to assess the specific features of forest tree physiology and from this basis can judge the effect of climate change to forestry.

Contents:

Trees are long-living, often wind-pollinated, tall organisms. The juvenile phase may be long and the adult phase is characterized by both reproductive and vegetative growth which causes competition on both carbohydrates and nutrients. Cold- and drought resistance, water relations, carbon allocation and mineral nutrition will be discussed. Partly due to forest tree's economic importance biotechnological applications have been developed e.g. for the production of health promoting substances or vegetative propagation. Forest trees are interesting from the point of molecular biology- what makes a tree tree? The course will cover these topics but the emphasis may vary during the years.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

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:

1-5 / Fail.

Person responsible:

Prof. Hely Häggman and Doc. Anna Maria Pirttilä.

Working life cooperation:

No.

Other information:

-

756604S: Plant ecophysiology in changing environments, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Kari Taulavuori
Opintokohteen oppimateriaali:
Lambers, Hans , , 1998
Prasad, M.N.V (ed.), , 1997
Hall, D.O. et al., , 1993
Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

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

Learning outcomes:

After finishing the course student understands interactions between plant and environment, and has become acquainted to most important experimental methods in physiological plant ecology and student can apply research parameters. Student can apply the knowledge to plant production and environmental protection issues.

Contents:

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

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

20 h lectures and demonstrations, 35 h exercises, exam and report.

Target group:

ECObb, BSb, Ph.D. students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

Course is related both to plant ecology and plant physiology basic studies.

Recommended or required reading:

Hans Lambers, F.Stuart Chapin III, Thijs L. Pons 2008: Plant Physiological Ecology. Springer Verlag. 540 s. Second edition.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

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

Grading:

1-5 / Fail.

Person responsible:

Doc. Kari Taulavuori.

Working life cooperation:

No.

Other information:

-

756626S: Stress physiology of plants, 4 op

Voimassaolo: - 31.07.2020
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Häggman, Hely Margaretha, Anna-Maria Pirttilä
Opintokohteen kielet: Finnish

ECTS Credits:

4 ECTS credits / 107 hours of work.

Language of instruction:

Finnish / English.

Timing:

M.Sc. 1 st or 2 nd spring, (arranged if resources allow).

Learning outcomes:

The student will assess the effect of abiotic and biotic stresses on plant metabolism and the means of plants to cope with them.

Contents:

The course will cover all the stresses affecting plant metabolism at biochemical or molecular level. The signal transduction caused by the stresses will be followed as well as plant defense reactions. Plant pathogen biocontrol methods are introduced.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

20 h lectures, independent exercises or seminar and exam.

Target group:

Mainly for BS but also suitable for ECO.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Lecture handouts and literature given during the course.

Assessment methods and criteria:

Exam, essay/seminar.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Prof. Hely Häggman and Doc. Anna Maria Pirttilä.

Working life cooperation:

No.

Other information:

-

756649S: Symbiosis, 5 op

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

750346A	Symbiosis	4.0 op
750646S	Symbiosis	4.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

Finnish / English.

Timing:

B.Sc. degree 3rd spring, M.Sc. 1. or 2nd spring, arranged if resources allow.

Learning outcomes:

The student knows the concept of symbiosis, understands the extent of diversity of symbiotic interactions both at the community and molecular level.

Contents:

Lately new forms of symbiosis have been discovered, extending the diversity of symbiotic interactions. Therefore the significance of symbiosis in biotechnology and for example in human health has increased. Various forms of symbiosis, their importance for the host and interaction at the molecular level are covered.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

30 h Lectures / laboratory work / demonstrations, seminar, essay, lecture diary.

Target group:

BS and ecophysiology students.

Prerequisites and co-requisites:

Studies in bioscience.

Recommended optional programme components:

-

Recommended or required reading:

Lecture notes.

Assessment methods and criteria:

Seminar, essay, lecture diary.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail.

Person responsible:

Doc. Anna Maria Pirttilä.

Working life cooperation:

No.

Other information:

-

750677S: Winter ecology and physiology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

Leikkaavuudet:

750625S	Winter ecology and physiology	3.0 op

ECTS Credits:

5 ECTS credits / 133 hours of work.

Language of instruction:

English.

Timing:

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

Learning outcomes:

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

Contents:

Two independent units: 1) Winter ecology and physiology course (7 h lectures and 13 h laboratory practicals and 4 h seminar in Oulu, and 4 day long field excursion to the Oulanka Research Station (total about 50 h, 3 cr); 2) Book exam on a common exam day 2 cr: Marchand, P. J. 1996: Life in the cold. An introduction to winter ecology.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures, exercises, report and seminar presentation.

Target group:

Biology students.

Prerequisites and co-requisites:

Courses Basics of ecology (750124P), Cell biology (750121P), Terrestrial animals field course (755322A), Aquatic ecology field course (755321A), Plant ecology field course (756343A), and Basics of plant biology, lectures (756346A) or equivalent knowledge.

Recommended optional programme components:

-

Recommended or required reading:

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

Assessment methods and criteria:

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

Grading:

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

Person responsible:

Doc. Kari Taulavuori.

Working life cooperation:

No.

Other information:

-

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

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Biology

Arvostelu: 1 - 5, pass, fail

Opettajat: Kari Taulavuori

Opintokohteen kielet: Finnish

Leikkaavuudet:

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

ECTS Credits:

5 (- 8) cr / 133 (- 240) hours of work.

Language of instruction:

Finnish / English.

Timing:

B. Sc. / M. Sc. / Ph.D., (excursion arranged if resources alow).

Learning outcomes:

Student can identify the ecological and environmental effects of climate change and air pollution in the subarctic area. In addition, the student may learn basic research methods related to topic, and how to use the facilities provided by the subarctic research stations in the research.

Contents:

Lectures deal the ecological responses of global change and air pollution. The content is focused on the environmental effects and their ecological significance in the northern areas. During excursion the student familiarizes with the special features of northern areas and explores the action and research carried out in the northern research stations.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

1) 24 h lectures with exam, and 15 h independent studies (assay and seminar work) (5 cr); **(2)** 4 days summer excursion and closing seminar (3 cr); participation in excursion necessitates accepted credits in the first part (lectures, independent studies).

Target group:

Ecology students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

-ACIA (2005) Arctic Climate Impact Assessment, Cambridge University Press, 1042 p. -AMAP Assessment 2006: Acidifying Pollutants, Arctic Haze, and Acidification in the Arctic. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. Xii + 112pp. Bell JNB & Trehow M (eds.) 2002. Air pollution and plant life. Wiley. 2nd edition. 480 pages.
The availability of the literature can be checked from this link.

Assessment methods and criteria:

Lectures, assay and seminar, excursion, closing report and seminar.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

1-5 / Fail
Read more about assessment criteria at the University of Oulu webpage.

Person responsible:

Doc. Kari Taulavuori.

Working life cooperation:

Possible excursion will include tours to the norther research stations.

Other information:

Field excursion is arranged if resources allow.

750629S: Kaamos symposium, 2 - 4 op

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

ECTS Credits:

2-4 ECTS credits / 53-107 hours of work.

Language of instruction:

English.

Timing:

M.Sc. and Ph.D. autumn.

Learning outcomes:

Students get acquainted to preparing, presenting and evaluating a scientific oral presentation.

Contents:

The Kaamos Symposium consisting of presenting current research projects is held every year at the end of autumn period. Through presenting their research work and projects and obtaining feedback from the audience (students and the staff of the department) post graduate students gain experience in holding a scientific presentation.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Own presentation and the whole symposium 2 cr (postgraduate students). Summary of five presentations and symposium 2 cr (undergraduate students). Poster 0,5 cr (postgraduate students).

Target group:

Undergraduate biology students (2 cr) and postgraduate biology students (2-4 cr).

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

Abstract book.

Assessment methods and criteria:

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

Grading:

Pass / Fail.

Person responsible:

Prof. Timo Muotka.

Working life cooperation:

No.

Other information:

-

750618S: Thursday seminar in biology, 2 op

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

ECTS Credits:

2 ECTS credits / 53 hours of work.

Language of instruction:

English.

Timing:

M.Sc. or Ph.D. degree.

Learning outcomes:

Students get knowledge about the current results and theories in biology.

Contents:

Lectures in English on current topics in biology given by guest lecturers from Finland and abroad.

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Guest lectures on Thursdays 12 am-1 pm. See seminar programme: https://noppa.oulu.fi/noppa/kurssi/750618s/etusivu

Target group:

Undergraduate and postgraduate students.

Prerequisites and co-requisites:

No.

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

10 participations and 10 one page long reports. You can combine lectures from different academic terms to make the needed 10 essays.
Read more about assessment criteria at the University of Oulu webpage.

Grading:

Pass / Fail.

Person responsible:

Doc. Helmi Kuittinen.

Working life cooperation:

No.

Other information:

-

300002M: Advanced Information Skills, 1 op

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

ECTS Credits:
1 ECTS credit / 27 hours of work
Language of instruction:
Finnish
Timing:
The course is held once in the autumn semester, during period II and in the spring semester, during period IV. Intended for degree students working on their diploma/master's thesis.
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
- understands the principles of scientific publishing
- can use the 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 RefWorks reference management tool.
Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Lectures 10 h, self-study 17 h
Target group:
Optional
Recommended or required reading:
Web learning material:
http://libguides.oulu.fi/tieteellinentiedonhankinta
http://libguides.oulu.fi/julkaisujenarviointi
Assessment methods and criteria:
Passing the course requires participation in the lectures and successful completion of the course assignments.
Grading:

pass/fail
Person responsible:
Ursula Heinikoski

Tutkintorakenteisiin kuulumattomien opintokokonaisuuksien ja -jaksojen kuvaukset

752662S: Botanical collection and digital herbarium, 2 - 6 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Anna Ruotsalainen
Opintokohteen oppimateriaali:
Hämet-Ahti, L., Suominen, J., Ulvinen, T. & Uotila, P., , 1998
Opintokohteen kielet: Finnish
Voidaan suorittaa useasti: Kyllä

ECTS Credits:
2-6 ECTS / 53-160 hours of work, 100 species = 2 cr.
Language of instruction:
Finnish / English.
Timing:
B.Sc. or M.Sc. degree.
Learning outcomes:
Preparation (including labels and coordinates) and identification of self-collected botanical specimen.
Contents:
The collection may contain solely vascular plants or together with moss and lichen specimens, for instance.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Vascular plants have to be pressed and dried. The samples have to be in folded paper or small box including the name and place tag. Before starting the collection work student has to consult the teacher.
Target group:
-
Prerequisites and co-requisites:
Identification of plant species (756342A) or equivalent knowledge.
Recommended optional programme components:
-
Recommended or required reading:
Hämet-Ahti et al. 1998: Retkeilykasvio (Field Flora of Finland), Ed. 4. Finnish Museum of Natural History, Helsinki. 656 pp., and other field floras.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Collection is delivered to the person in responsible.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / Fail.
Person responsible:
Doc. Anna Liisa Ruotsalainen.
Working life cooperation:
No.
Other information:
Contact the responsible teacher on details latest in the beginning of the summer.

756612S: Soil ecology, 3 - 5 op

Voimassaolo: - 31.07.2019
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Field of Biology
Arvostelu: 1 - 5, pass, fail
Opettajat: Annamari Markkola
Opintokohteen oppimateriaali:
Smith, Sally E. , , 1997
Van der Hejden, M.G.A. & Sanders. I.R., , 2003
Bardgett, Richard D. , , 2005
Opintokohteen kielet: Finnish

ECTS Credits:
3-5 ECTS credits / 80-133 hours of work.
Language of instruction:
Finnish / English.
Timing:
M.Sc. 1 st or 2 nd year spring, (arranged if resources allow).
Learning outcomes:
Student will learn common basics of soil organisms and their interactions.
Contents:
Current soil ecological research and methods, planning and conducting experiments.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures, exercises, seminars, exam.
Target group:
-
Prerequisites and co-requisites:
No.
Recommended optional programme components:
-
Recommended or required reading:
Additional reading Smith, S.E. & Read, D.J. 1997. Mycorrhizal symbiosis. Academic Press, San Diego and London. 605 p.; Van der Hejden, M.G.A. & Sanders, I.R. (eds) 2002. Mycorrhizal ecology. Springer, Berlin. 469 p.; Bardgett, R. D. 2005. The biology of soil: a community and ecosystem approach. Biology of Habitats series. Oxford University Press, Oxford, UK. 256 p.
The availability of the literature can be checked from this link.
Assessment methods and criteria:
Exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5 / Fail.
Person responsible:
Doc. Annamari Markkola.
Working life cooperation:
No.
Other information:
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