Courses in English for exchange students, Biochemistry (2014 - 2015)

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This Course Catalogue lists courses taught in English for exchange students at the Faculty of Biochemistry and Molecular medicine during the academic year 2014-2015.

The Faculty of Biochemistry and Molecular Medicine was formed on 1st January 2014 by a merger between of the Department of Biochemistry (Faculty of Science) and the Department of Medical Biochemistry and Molecular Biology (Faculty of Medicine). The physical merger will occur in summer 2014 and the faculty will be located on the Kontinkangas campus.

When planning your exchange studies and the required learning agreement please use the information provided under the Courses tab in this catalogoue. Please read carefully the information of each course you wish to take (language of instruction, target group, course content, TIMING (autumn or spring term), preceding studies, other information containing LOCATION OF INSTRUCTION).

The first year and the autumn term of the second year biochemistry courses (lecture parts) of the BSc will be taught at the LINNANMAA CAMPUS, with the remaining education and all laboratory parts provided at the KONTINKANGAS CAMPUS.

All exchange students must submit their exchange application through SoleMOVE, learning agreement is attached to the on-line application.

Accepted exchange students are required to register to all courses. Course registration takes place once you have arrived in Oulu and received your University of Oulu login information. More information on registration will be provided during orientation. When registering you will be able to find detailed information on teaching and schedule under Instruction tab.

Individual course codes include information on the level of course.

xxxxxP, xxxxXY = basic, introductory level courses
xxxxxA = for 2-3 year students, Bachelor level courses
xxxxxS = for 4-5 year students, Master level courses

In order to participate courses You should have enough backgound (especially for laboratory parts).

If You are going to have internship period in research laboratory please contact directly group leaders in the faculty and ask a position (http://www.oulu.fi/fbmm/). You will be given 1.5 ECTS credits for each full week (40 hr) in the laboratory (see 746606S Project work in biochemistry).

Any general questions about courses in English at the Faculty of Biochemistry and Molecular Medicine should be addressed to:
Further information on application process for incoming exchange students:
http://www.oulu.fi/english/studentexchange
international.office(at)oulu.fi

Tutkintorakenteisiin kuulumattomat opintokokonaisuudet ja -jaksot

747605S: Basic aspects of protein crystallographic methods, 3 op
740144P: Biochemical Methodologies I, 8 op
747608S: Biochemical methodologies II, 8 op
743659S: Biochemistry of cell organelles, 3 op
747611S: Biochemistry of protein folding, 3 op
747603S: Bioinformatics, 2.5 op
740148P: Biomolecules, 5 op
740143P: Biomolecules for Biochemists, 8 op
743658S: Cell cycle, DNA replication and repair, 2.5 op
740366A: Cellular Communication, 6 op
747604S: Introduction to biocomputing, 3 op
740379A: Introduction to immunology, 3 op
747612S: Introduction to structure-based drug discovery, 4 op
740363A: Microbiology, 6 op
740374A: Microbiology, 3 op
744621S: Molecular biology II, 3 op
743655S: Neurobiology, 4 op
740145P: Physical Biochemistry, 6 op
740371A: Physiological Biochemistry, 4 op
746606S: Project work in Biochemistry, 1.5 op
740364A: Protein Chemistry I, 8 op
744620S: Protein chemistry II, 3 op
747601S: Protein production and analysis, 8 op
747606S: Structural enzymology, 3 op
744619S: Systems biology, 4 op
743657S: Tumor cell biology, 3 op
740380A: Virology, 3 op
744623S: Yeast genetics, 6 op

Opintojaksojen kuvaukset

Tutkintorakenteisiin kuulumattomien opintokokonaisuuksien ja -jaksojen kuvaukset

747605S: Basic aspects of protein crystallographic methods, 3 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Faculty of Biochemistry and Molecular Medicine
Arvostelu: 1 - 5, pass, fail
ECTS Credits: 3 credits
Language of instruction: English
Timing: M.Sc. yr1-yr2 autumn
Learning outcomes: Upon successful completion students are able to:
- describe the key aspects of the protein crystallization methods
- describe the importance of crystals for obtaining the structure of a protein
- describe the importance of the Fourier transform method in the structure determination method
- describe the phase problem
- describe the importance of the anomalous differences

Contents: The course will describe the principles of x-ray diffraction theory. It will focus on aspects used in the field of protein crystallography including following topics: Crystallisation of proteins, symmetry properties of crystals, X-ray sources and detectors, the diffraction pattern and the reciprocal lattice, the phase problem, isomorphous differences and the MIR-method, anomalous differences and the MAD-method.

Mode of delivery: Face to face teaching
Learning activities and teaching methods: 20 h lectures and seminars
Target group: M.Sc. in Protein Science and biotechnology
Prerequisites and co-requisites: Biomolecules and Protein chemistry I or Protein production and analysis or equivalent
Recommended optional programme components: -

Recommended or required reading:

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

Grading: pass/fail
Person responsible: Rik Wierenga
Working life cooperation: No
Other information: Location of instruction: Kontinkangs campus
ECTS Credits: 8 credits
Language of instruction: Finnish
Timing: B.Sc. yr 1 autumn (lectures), yr 1 spring (laboratory practicals)

Learning outcomes:
Upon successful 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:
Major students, Biology BSC-BS

Prerequisites and co-requisites:
Biomolecules, Biomolecules for Biochemists tai Biomolecules for Bioscientists

Recommended optional programme components:
-

Recommended or required reading:
-

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:
Jari Heikkinen

Working life cooperation:
No

Other information:
Location of instruction: lectures (in Finnish) at Linnanmaa campus, laboratory practicals at Kontinkangas campus.

747608S: Biochemical methodologies II, 8 op

Voimassaolo: 01.08.2009 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Faculty of Biochemistry and Molecular Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Ulrich Bergmann
Opintokohteen kielet: English
LEIKKAUVUDET:
740365A  Biochemical Methodologies II  8.0 op

ECTS Credits:
8 credits

Language of instruction:
English

Timing:
MSc 1st autumn

Learning outcomes:
Upon successful completion students are able to:
- describe the theoretical basis of the main biochemical analysis methods for proteins
- identify and use the different instruments
- describe the potential of the different analytical techniques and develop strategies for addressing specific
  questions in protein & proteome-analysis
- integrate data from multiple sources and evaluate it critically

Contents:
During this module students will analyze their own protein samples. The course will cover principles and practical
applications of some of the more advanced methodologies used in practical biochemistry, including fluorescence
spectroscopy, stopped flow analysis of enzymatic reactions, circular dichroism, surface plasmon resonance,
micro-calorimetry, mass spectrometry, and proteomics based on 2D electrophoresis. For assessment each
student has to write a research report in the style of a scientific publication. Attendance is compulsory.

Mode of delivery:
Face to face teaching

Learning activities and teaching methods:
120 h lab., including pre-lab lectures plus exercises

Target group:
Obligatory for M.Sc. in Protein Science and biotechnology

Prerequisites and co-requisites:
Protein production and analysis (747601S) or Protein chemistry I (740364A)

Recommended optional programme components:
-

Recommended or required reading:
-

Assessment methods and criteria:
Report written in style of a scientific publication
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5/fail

Person responsible:
Ulrich Bergmann

Working life cooperation:
No

Other information:
Location of instruction: Kontinkangas campus

743659S: Biochemistry of cell organelles, 3 op

Voimassaolo: 01.08.2010 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Faculty of Biochemistry and Molecular Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Vasily Antonenkov
Opintokohteen kielet: English
Leikkaavuudet:
743656S  Biochemistry of cell organelles  2.5 op

ECTS Credits:
3 credits
Language of instruction: English
Timing: M.Sc. yr1-yr2 autumn
Learning outcomes:
Upon successful completion students are able to:
- Describe structure and function of the key cell organelles
- Discuss role of organelles in pathology
- Characterize metabolites transfer and action of channels and transporters
- Assess basic principles of biogenesis of cell organelles

Contents:
The course covers basic aspects of cell and membrane biology providing knowledge on structure and function of mitochondria, endoplasmic reticulum (ER) and peroxisomes. More detailed discussion will be on aspects of mitochondrial inheritance, function in health and diseases, mitophagy, role of organelles in aging, lipid synthesis in ER, intra- and extracellular transfer of lipids, structural and functional properties of membrane channels and transporters, soluble metabolite-transfer proteins, integration of different functions in peroxisomes. In addition to lectures (16 h) the course involves two seminars (4 h) where the students should present reports of cellular lipid traffic and isolation of cellular organelles.

Mode of delivery:
Face to face teaching

Learning activities and teaching methods:
20 h lectures and student presentations in seminars

Target group:
Major students/Molecular and cellular biology

Prerequisites and co-requisites:
B.Sc. in biochemistry or biology or otherwise adequate knowledge on basic biochemistry, cellular and molecular biology

Recommended optional programme components:
-

Recommended or required reading:
-

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

Grading:
1-5/fail

Person responsible:
Vasily Antonenkov

Working life cooperation:
No

Other information:
Location of instruction: Kontinkangas

747611S: Biochemistry of protein folding, 3 op

Voimassaolo: 01.06.2011 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Faculty of Biochemistry and Molecular Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Lloyd Ruddock
Opintokohteen kielet: English
Leikkaavuudet:
747602S Biochemistry of protein folding 2.5 op

ECTS Credits:
3 credits
Language of instruction:
Timing:
M.Sc., yr1-yr2 spring

Learning outcomes:
Upon successful completion students are able to:

- present and discuss issues presented in the primary literature on a variety of aspects of protein folding.
- display an understanding of the theoretical and practical implications of *in vivo, in vitro* and *in silico* studies on protein folding and the integration of results.
- demonstrate the ability to interpret a wide range of data from multiple sources, to critically evaluate and contextualise this data and to solve problems relating to interpretation.

Contents:
This module provides an introduction to protein folding in vivo. Topics covered include protein folding and quality control in the endoplasmic reticulum, mechanisms regulating protein folding including the unfolded protein response, the catalysis of native disulphide bond formation, the biochemistry of molecular chaperones and the role of molecular chaperones and protein folding catalysts in other cellular events.

Mode of delivery:
Face to face teaching

Learning activities and teaching methods:
16 contact hours of lectures and seminars

Target group:
M.Sc. in Protein science and biotechnology

Prerequisites and co-requisites:
Protein chemistry I (740364A) or Protein production and analysis (747601S) or equivalent

Recommended optional programme components:

Recommended or required reading:

Assessment methods and criteria:
The module is assessed based on a report prepared on individual topics and on participation in the seminars. Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5/fail

Person responsible:
Lloyd Ruddock

Working life cooperation:
No

Other information:
Location of instruction: Kontinkangas

747603S: Bioinformatics, 2,5 op

Opiskelumuoto: Advanced Studies
Laji: Course

Vastuuyksikkö: Faculty of Biochemistry and Molecular Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: Ari-Pekka Kvist

Opintokohteen kielet: English

ECTS Credits:
2.5 credits

Language of instruction:
English

Timing:
M.Sc. yr1-yr2 spring

Learning outcomes:
Upon successful completion student are able to:

- use web-based bioinformatics tools.
- process the information and find solutions to various problems
- analyse and present the findings in the form of a report

Contents:
This course introduces basic concepts and methodology in bioinformatic research. Basic computational methods of DNA and protein handling and database searches are introduced. Other methods may include joining database and proteomic searches and evolutionary views of biocomputing. After this course a student has insight of basic methodology of bioinformatics.

**Mode of delivery:**
Face to face teaching

**Learning activities and teaching methods:**
8 hr lectures, 30 h practicals. Attendance at practicals is obligatory.

**Target group:**
Major students

**Prerequisites and co-requisites:**
Basic course in statistics eg. Introduction to statistics (806113P, 5 credits) or Basic methods in statistics (806109P, 9 credits) is highly recommended.

**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:**
Ari-Pekka Kvist

**Working life cooperation:**
No

**Other information:**
Location of instruction: Kontinkangas

### 740148P: Biomolecules, 5 op

**Opiskelumuoto:** Basic Studies

**Laji:** Course

**Vastuuysikkö:** Faculty of Biochemistry and Molecular Medicine

**Arvostelu:** 1 - 5, pass, fail

**Opettajat:** Tuomo Glumoff

**Opintokohde:** 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
- 740147P Biomolecules for Bioscientists 8.0 op

**ECTS Credits:**
5 credits

**Language of instruction:**
English

**Timing:**
autumn-spring

**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 lipids and describe the forces that modulate their function.
- apply information in the right context and evaluate it critically

**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. 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, plus exercises

Target group:
Minor subject 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 except that it contains no practical component. Location of instruction: Linnanmaa campus

740143P: Biomolecules for Biochemists, 8 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuysikkö: Faculty of Biochemistry and Molecular Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: Tuomo Glumoff

Opintokohde

Leikkaavuudet:
ay740157P Basic biochemistry 1: Biomolecules (OPEN UNI) 4.0 op
ay740152P Basic biochemistry 1: Biomolecules (OPEN UNI) 5.0 op
740147P Biomolecules for Bioscientists 8.0 op
740148P Biomolecules 5.0 op

ECTS Credits:
8 credits

Language of instruction:
English

Timing:
B.Sc yr1 autumn-spring

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 lipids 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:**
- Major students

**Prerequisites and co-requisites:**
- 

**Recommended optional programme components:**
- 

**Recommended or required reading:**

**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:**
- Location of instruction: lectures and computing at Linnanmaa campus, wet labs at Kontinkangas campus

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**743658S: Cell cycle, DNA replication and repair, 2,5 op**

**Voimassaolo:** 01.08.2010 -
**Opiskelumuoto:** Advanced Studies
**Laji:** Course
**Vastuuysikkö:** Faculty of Biochemistry and Molecular Medicine
**Arvostelu:** 1 - 5, pass, fail
**Opettajat:** Pospiech, Helmut
**Opintokohteen kielet:** English

**ECTS Credits:**
- 3 credits

**Language of instruction:**
- English

**Timing:**
- MSc yr1-yr2 spring

**Learning outcomes:**
- Upon successful completion students are able to:
  - explain why maintenance of genomic stability is required and how is it achieved?
  - describe how DNA replication works and how is it studied
  - describe how DNA damage is repaired
  - summarize how DNA replication and repair is coordinated within the cell cycle, the DNA damage response and cell growth
  - predict how DNA replication and repair is associated with disease and cancer

**Contents:**
- The genetic information of all organisms is stored in the form of DNA. Since loss of DNA signifies loss of genetic information, DNA has to be maintained. This is in contrast to other biological macromolecules, which can be degraded and replaced by newly synthesised molecules. As a consequence, DNA has also to be copied faithfully during the process of DNA replication that precedes every cell division. Damage inflicted continuously to the DNA has to be repaired. Eucaryotic DNA replication, DNA repair and DNA damage response are tightly coordinated in the context of the cell cycles and the nuclear metabolism.

**Mode of delivery:**
- Face to face teaching
Learning activities and teaching methods:
16 h lectures

Target group:
MSc in molecular and cellular biology

Prerequisites and co-requisites:
B.Sc. in Biochemistry or Molecular Biology (or equivalent)

Recommended optional programme components:
-

Recommended or required reading:
Lecture handouts and review articles

Assessment methods and criteria:
Presence at the lectures compulsory, preparatory questions and homework
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:
Location of instruction: Kontinkangas campus

740366A: Cellular Communication, 6 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Faculty of Biochemistry and Molecular Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Thomas Kietzmann
Opintokohteen kielet: English

ECTS Credits:
6 credits

Language of instruction:
English

Timing:
B.Sc. yr3 autumn

Learning outcomes:
Upon successful completion students are able to:
- name, list and discuss the major intra- and intercellular signalling pathways
- present, describe and discuss characteristic features of signalling pathways
- describe how to study, examine and analyse signalling pathways

Contents:
The course covers basic aspects of the main cellular signalling pathways. The main emphasis will be made on the signalling pathways involved in the action of various hormones, growth factors, lipid-derived signaling molecules, and their cell surface and intracellular receptors, intracellular second messengers and protein kinases and phosphatases. The course involves a 40 h practical course (+written reports) in which cultured cells are used as targets to visualize certain hormone or drug-induced signaling molecules, their interactions, and how these regulate e.g. normal cell growth and/or cell death in culture. Attendance at practical course is obligatory.

Mode of delivery:
Face to face teaching

Learning activities and teaching methods:
20 h lectures, 32 h practicals

Target group:
Major students

Prerequisites and co-requisites:
Cellular biology

Recommended optional programme components:
-

Recommended or required reading:
-
Assessment methods and criteria:
Laboratory practicals, final exam
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5/fail

Person responsible:
Thomas Kietzmann

Working life cooperation:
No

Other information:
Location of instruction: Kontinkangas campus

747604S: Introduction to biocomputing, 3 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuysikkö: Faculty of Biochemistry and Molecular Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: André Juffer

Opintokohteen kielet: English

ECTS Credits:
3 credits

Language of instruction:
English

Timing:
M.Sc. yr1-yr2 autumn

Learning outcomes:
Upon successful completion students are able to:
- discuss several biocomputing techniques
- decide which method to use under what circumstances
- judge the quality of an analysis of a given problem by means of biocomputing techniques

Contents:
An overview is given of commonly employed techniques of biocomputing to study the structural, dynamical, functional and thermodynamical properties of proteins and membranes and their interaction with other molecules. This will include a overview of computer simulation techniques such as molecular dynamics, Monte Carlo and Langevin (stochastic, Brownian) dynamics, but also concepts of continuum electrostatics, statistical thermodynamics, protein modeling techniques, protein-ligand affinity calculations and the computer simulation of the protein folding process and enzyme action. In addition, some topics in the field of Bioinformatics are discussed as well and certain commonly employed protein modeling software is introduced.

Mode of delivery:
Face to face teaching

Learning activities and teaching methods:
20 h lectures, student tasks

Target group:
M.Sc. in Protein science and biotechnology

Prerequisites and co-requisites:
-

Recommended optional programme components:
-

Recommended or required reading:
Recommended books:

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

Grading:
pass/fail

Person responsible:
**740379A: Introduction to immunology, 3 op**

**Voimassaolo:** 01.08.2011 -

**Opiskelumuoto:** Intermediate Studies

**Laji:** Course

**Vastuuysikkö:** Faculty of Biochemistry and Molecular Medicine

**Arvostelu:** 1 - 5, pass, fail

**Opettajat:** Valerio Izzi

**Opintokohteen kielet:** Finnish

**Leikkaavuudet:**
- 743660S Introduction to immunology 3.0 op
- 740378A Basic immunobiology for biochemists 3.0 op
- 741661S Immunobiology 3.0 op
- 740369A Immunobiology 3.0 op

**ECTS Credits:**
3 credits

**Language of instruction:** English

**Timing:**
B.Sc. yr3 autumn or M.Sc yr1-yr2 autumn

**Learning outcomes:**
After the course students will be able to identify, analyze and apply essential cellular molecules, components and mechanisms related to immunology, and complete their previous knowledge of molecular and cellular biology and protein chemistry with immunobiology issues.

**Contents:**
The course handles both unspecific and specific immune response mechanisms, antibody structure and diversity, antibody-based immunodiagnostics, as well as basics of virus biochemistry.

**Mode of delivery:**
Face to face teaching

**Learning activities and teaching methods:**
Lectures (12 h), a written home exercise, and a final exam.

**Target group:**
Major and minor subject undergraduates

**Prerequisites and co-requisites:**
Preliminary required courses: Molekyylibiologia I, Protein chemistry I and Solun biologia, or equivalent basic molecular biology, protein chemistry and cell biology studies.

**Recommended optional programme components:**

**Recommended or required reading:**

**Assessment methods and criteria:**
Home exercise, final exam

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

**Grading:**
1-5/fail

**Person responsible:**
Valerio Izzi

**Working life cooperation:**
No

**Other information:**
This module is the same as 743660S Introduction to immunology. Location of instruction: Kontinkangas campus.
747612S: Introduction to structure-based drug discovery, 4 op

Voimassaolo: 01.01.2014 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Faculty of Biochemistry and Molecular Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Lari Lehtiö
Opintokohteen kielet: English
Leikkaavuudet:

ECTS Credits:
4 credits
Language of instruction:
English
Timing:
MSc yr1-yr2 spring
Learning outcomes:
After completion of this course student should be able to:
- Find and analyze a protein structure of interest from databases from the point of view of drug discovery
- Critically assess a quality of an experimental protein-small molecule complex structure
- Discuss the process of creating a virtual small molecule library
- Describe the commonly used computational methods for screening of small molecule libraries against a protein target
- Critically judge the results of the computational screening

Contents:
The course will consist of assignments, lectures and a project work carried out during the course in study groups. Groups will present their project plans and the results. All students will give feedback and share ideas during the discussions. The project carried out during the course will be supported by lectures and discussions. The final mark comprises marks from continuous assessment, active participation to the group work and oral exam. Attendance to some parts of the course is compulsory. The course has limited enrollment for 24 students.

Mode of delivery:
Face to face and web based teaching

Learning activities and teaching methods:
Seminar days, practicals, group work, student presentations and discussions

Target group:
MSc in Protein science and biotechnology

Prerequisites and co-requisites:
BSc in biochemistry or a related subject, Protein Chemistry I or Protein production and analysis

Recommended optional programme components:
-

Recommended or required reading:
-

Assessment methods and criteria:
Continuous assessment, presentations, oral exam
Grading:
pass/fail

Person responsible:
Lari Lehtiö

Working life cooperation:
No

Other information:
Location of instruction: Kontinkangas campus

740363A: Microbiology, 6 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Learning outcomes:
Upon successful completion, students are able to:
- define the typical features of bacteria, archaea, fungi and virus and explain 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 microorganisms, 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. The exercises introduce basic microbiological methods and techniques for the aseptic work. These include culture on solid and in liquid media, transfer of bacteria by streaking or spreading, the use of dilution and enrichment techniques, the inhibition of bacterial growth, measurement of bacterial growth and death, and finally the basics of transformation and bacteriophage infection and its use in molecular biology. Attendance at practical course is obligatory.

Mode of delivery:
Face to face teaching

Learning activities and teaching methods:
24 hours lecture and 60 hours laboratory exercises

Target group:
Major students

Prerequisites and co-requisites:
Biomolecules for Biochemists and Biochemical methodologies I

Recommended optional programme components:
-

Recommended or required reading:

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:
Helmut Pospiech

Working life cooperation:
No

Other information:
Location of instruction: Lectures: Linnanmaa, laboratory: Kontinkangas
Learning outcomes: Upon successful completion students are able to:
- define the typical features of bacteria, archaea, fungi and virus and explain 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 microorganisms, 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:

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
744621S: Molecular biology II, 3 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Faculty of Biochemistry and Molecular Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Elitsa Dimova
Opintokohteen kielet: English

ECTS Credits: 3 credits
Language of instruction: English
Timing: M.Sc. yr1 autumn
Learning outcomes:
After the course students are able to:
- discuss the general features of DNA manipulating/amplifying enzymes
- design (on paper or in silico) oligonucleotides for PCR amplification, set up restriction digests and ligation reactions in order to carry out basic and advanced cloning procedures
- use basic tools used in the genetic manipulation of mice

Contents:
This module provides a “real-life” approach to practical molecular biology, including DNA cloning strategies, site directed mutagenesis, generation of transgenic mice, etc. It comprises concept overview lectures, but it is primarily based on complex problem solving based exercises including written reports and group student presentations, but does not include a final examination. The final mark comprises marks from continuous assessment. Attendance of the course is required.

Mode of delivery:
Face to face teaching
Learning activities and teaching methods:
12 h seminars, plus student presentations
Target group:
Major students
Prerequisites and co-requisites:
The course is designed for students familiar with DNA organization, gene structure & genetic concepts (ORF, codon, heterologous and homologous recombination).
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Written report, student presentation
Read more about assessment criteria at the University of Oulu webpage.
Grading:
pass/fail
Person responsible:
Elitsa Dimova
Working life cooperation:
No
Other information:
Location of instruction: Kontinkangas

743655S: Neurobiology, 4 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Faculty of Biochemistry and Molecular Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Heape Martin
Opintokohteen kielet: English

ECTS Credits:
4 credits

Language of instruction:
English

Timing:
M.Sc. yr1-yr2 spring

Learning outcomes:
The course is intended for students with little, or no prior education in the Neurosciences. At the end of the course, the students are able to:
- describe and define the general structural and functional organisation of the mammalian nervous system, and of the developmental and functional differentiation, and the roles of its cellular components.
- identify the selected areas of the neurosciences in which major research drives are currently undertaken.
- summarize a background knowledge of Neurobiology sufficiently to feel comfortable in undertaking a postgraduate research project in diverse fields of the Neurosciences.

Contents:
The course will focus mainly on the cell biology and biochemistry of cellular differentiation and function in the mammalian nervous system. Lectures cover: Embryology and structure of the mammalian nervous system - Cells and the extracellular environment in nervous tissues - Neuronal structure and function - Glial cells of the CNS and PNS - Functional and structural relationships between neurons and glia - Myelin synthesis, maintenance and function in the CNS and PNS - Cellular biochemistry of the transmission of the nervous impulse. The module includes an article analysis in small groups and presentation. Active participation and performance in article analysis exercises will contribute to the final mark.

Mode of delivery:
Face to face teaching

Learning activities and teaching methods:
8-10 h lectures and 5-7 h group work (depending on number of students: maximum = 30 students).

Target group:
M.Sc./ Molecular and cellular biology

Prerequisites and co-requisites:
Biomolecules for Biochemists, Cellular Biology (740362A) or equivalent. In addition, the “Cellular communication” course (740366A) is a strong advantage, but not required.

Recommended optional programme components:

Recommended or required reading:

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

Grading:
1-5/fail

Person responsible:
Anthony Heape

Working life cooperation:
No

Other information:
Location of instruction: Kontinkangas campus

740145P: Physical Biochemistry, 6 op

Opiskelumuoto: Basic Studies
Laji: Course
Vastuuysikkö: Faculty of Biochemistry and Molecular Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: André Juffer
Opintokohteen kielet: English

ECTS Credits:
6 credits
Language of instruction: English
Timing: B.Sc. yr2 spring
Learning outcomes: Upon successful completion students are able to:
- define the relevance of theoretical concepts to the biosciences
- tell where various equations of physical biochemistry come from
- discuss the link between theory and experiment
- perform simple but realistic calculations

Contents:
This module will cover the concepts of thermodynamics and their application to biochemical systems plus chemical and enzymatic kinetics. Topics covered will include:

*Applications of thermodynamics*: Chemical reactions, Protein-ligand association, Acids, bases and pH regulation, Acid-dissociation constants, introduction to thermodynamics of protein folding.
*Chemical kinetics*: Basic chemical reactions and single step reactions, Applications of chemical kinetics to multistep reactions, Catalysis and enzyme kinetics.

Attendance of some parts of the course is compulsory.

Mode of delivery:
Face to face teaching

Learning activities and teaching methods:
36 h le and exercises

Target group:
Major students

Prerequisites and co-requisites:
-

Recommended optional programme components:
-

Recommended or required reading:
Recommended books:

Assessment methods and criteria:
Homeworks, workshops, no exam

Grading:
1-5/fail

Person responsible:
André Juffer

Working life cooperation:
No

Other information:
Location of instruction: Kontinkangas campus

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740371A: Physiological Biochemistry, 4 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Faculty of Biochemistry and Molecular Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Vasily Antonenkov
Opintokohteen oppimateriaali:
Murray, R.K., , 2006
Opintokohteen kielet: English
Leikkaavuudet:
742627S  Physiological biochemistry  4.0 op
ECTS Credits: 4 credits
Language of instruction: English
Timing: B.Sc. yr3 spring
Learning outcomes: Aim of the course is to get students familiar with:
- Specific aspects of human biochemistry
- Structure, tasks and function of different organs
- Systemic and intracellular regulation of metabolism
- Functional and regulatory relations of different organs

Contents: Lectures include information about morphology, function and role in metabolism of adipose tissue, kidney, muscle tissue and cytoskeleton, alimentary system and liver. They also focus on structure of biomembranes, composition and function of endocrine system, hormone synthesis and signal transduction. Mechanisms of action of hormones (especially steroid hormones), their cell surface and intracellular receptors, second messengers and other regulatory molecules will be discussed.

Mode of delivery: Face to face teaching

Learning activities and teaching methods: 18 h lectures, 4 h seminars, and 10 h laboratory work. Seminars and laboratory work are compulsory.

Target group: Major students

Prerequisites and co-requisites: Basic biochemistry, cellular and molecular biology

Recommended optional programme components: Alternative course: 751388A Animal physiology, lectures 4 op

Recommended or required reading: Murray et al. Harpers’ Illustrated Biochemistry (28 or 29th edition)

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

Grading: 1-5/fail

Person responsible: Vasily Antonenkov

Working life cooperation: No

Other information: Recommended optional course. Location of instruction: Kontinkangas

746606S: Project work in Biochemistry, 1,5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Faculty of Biochemistry and Molecular Medicine
Arvostelu: 1-5, pass, fail
Opettajat: Lloyd Ruddock
Opintokohteen kielet: English

ECTS Credits: 1,5 credits
Language of instruction: English
Learning outcomes: Upon successful completion students are able to:
- apply scientific knowledge and methods to undertake scientific research with supervision

Contents:
Research work done in the Faculty of Biochemistry and Molecular Medicine or elsewhere which is not compensated in other courses. 40 hours of work gives 1.5 ECTS. The project work must be accepted beforehand and a report must be written and approved.

Mode of delivery:
Face to face teaching

Target group:
This module is meant for exchange students only

Prerequisites and co-requisites:
-

Recommended optional programme components:
-

Recommended or required reading:
-

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

Grading:
pass/fail

Person responsible:
Lloyd Ruddock

Working life cooperation:
Yes

Other information:
-

740364A: Protein Chemistry I, 8 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuysikkö: Faculty of Biochemistry and Molecular Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: Martti Koski

Opintokohteen kielet: English

ECTS Credits:
8 credits

Language of instruction:
English

Timing:
B.Sc. yr2 autumn

Learning outcomes:
Upon successful completion students are able to:
- tell the relevance of protein structure, including post-translational modification, to protein function
- describe the techniques available to purify proteins and to study protein function and have an appreciation of the applications and limitations of these techniques
- analyze a wide range of biochemical data and solve problems relating to the interpretation of data concerning protein function and basic structural characterization

Contents:
This module provides more detailed information on the chemistry of proteins. Topics covered include protein purification, reversible and irreversible covalent modifications of proteins, protein translocation, protein degradation, an introduction to the protein folding problem, protein structure analysis, basic enzyme catalysis mechanisms and co-enzymes. The module includes lectures, continuous assessments, group works, student presentations, and laboratory exercises. Final examination, lecture attendance/ continuous assessments, presentations and laboratory reports will all count towards the final mark. Attendance at laboratory exercises is obligatory.

Mode of delivery:
Face to face teaching

Learning activities and teaching methods:
30 h lectures, 80 h lab, exercises

Target group:
Major students
Prerequisites and co-requisites:
Biomolecules for Biochemists, Biochemical methodologies I

Recommended optional programme components:
-

Recommended or required reading:

Assessment methods and criteria:
Presentation, lab reports, final exam, attendance / continuous assessment
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5/fail

Person responsible:
Kristian Koski

Working life cooperation:
No

Other information:
Location of instruction: Lectures at Linnanmaa campus, laboratory exercises at Kontinkangas campus.

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744620S: Protein chemistry II, 3 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Faculty of Biochemistry and Molecular Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Lari Lehtiö
Opintokohteen kielet: English

ECTS Credits:
3 credits

Language of instruction:
English

Timing:
M.Sc. yr1 autumn

Learning outcomes:
After the course, the students are able to:
- describe professional literature dealing with advanced techniques of protein analysis
- plan and implement the purification of a given protein on a large scale
- present and explain work related to protein purification and analysis

Contents:
This module provides a “real-life” approach to practical protein chemistry, including purification, biophysical analysis, enzymatics, etc. It comprises a small number of revision lectures, but it is primarily based on problem solving based exercises with a further level of complexity built in compared with Protein Chemistry I. The module includes a student presentation, but does not include a final examination. The final mark comprises marks from continuous assessment. Attendance of some parts of the course is compulsory.

Mode of delivery:
Face to face teaching

Learning activities and teaching methods:
12 h seminars, plus excercises and a student report

Target group:
Major students

Prerequisites and co-requisites:
-

Recommended optional programme components:
-

Recommended or required reading:
-

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

Grading:
747601S: Protein production and analysis, 8 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Faculty of Biochemistry and Molecular Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Lloyd Ruddock
Opintokohteen kielet: English
Leikkaavuudet:
747618S  Protein production and analysis  10.0 op

ECTS Credits:
8 credits
Language of instruction:
English
Timing:
Int M.Sc. yr1 autumn
Learning outcomes:
Upon successful completion students are able to:
- tell and discuss the relevance of protein structure, including post-translational modification, to protein function
- assess the techniques available to purify proteins and to study protein function and an appreciation of the applications and limitations of these techniques
- interpret a wide range of biochemical data and to solve problems relating to the interpretation of data relating to protein function and basic structural characterization

Contents:
This module provides an overview of recombinant protein production and analysis. Topics covered include an overview of DNA technology, PCR, cloning, mutagenesis, protein production, purification, enzyme catalysis, protein structure analysis, basic proteomics and mass spectrometry. This course covers some of the material taught in Protein Chemistry I (740364A) and Molekyylibiologia I (740361A) and therefore cannot be taken by students who have either of these modules.

Mode of delivery:
Face to face teaching
Learning activities and teaching methods:
46 contact hours of lectures and seminars, 80 hours of lab
Target group:
Int MSc in Prot Sci
Prerequisites and co-requisites:
A BSc in biochemistry or a closely related subject.
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Continuous assessment (problem solving exercises, lab reports)
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5/fail
Person responsible:
Lloyd Ruddock
Working life cooperation:
No
747606S: Structural enzymology, 3 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuysikkö: Faculty of Biochemistry and Molecular Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Wierenga Rikkert
Opintokohteen kielet: English

ECTS Credits: 3 credits
Language of instruction: English
Timing: M.Sc. yr1-yr2 spring
Learning outcomes:
Upon successful completion students are able to:
- discuss the methods that are used to crystallize proteins
- describe the basic concepts of the transition state theory
- define the relation between reaction rates and free energy barriers
- describe enzyme reaction mechanisms
- describe the concepts of catalytic bases and acids
- illustrate active site strain
- tell the importance of active site electrostatics
- describe the concept of transition state analogues

Contents:
General and specific aspects of the reaction mechanism of several well studied enzymes will be discussed. It will include the serine proteases (such as chymotrypsin and trypsin). The following topics will be addressed: Chemical catalysis, transition state theory, forces stabilizing the enzyme-ligand interaction, structural properties of proteins, enzyme kinetics, crystallization of proteins, general aspects of enzyme catalysed reactions, reaction mechanisms of serine proteases, transition state analogues. The course is aimed at biochemistry and chemistry students.

Mode of delivery:
Face to face teaching
Learning activities and teaching methods:
20 h lectures and seminars
Target group:
M.Sc. in Protein science and biotechnology
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Oral presentation
Read more about assessment criteria at the University of Oulu webpage.
Grading:
pass/fail
Person responsible:
Rikkert Wierenga
Working life cooperation:
No
Other information:
Location of instruction: Kontinkangas campus

744619S: Systems biology, 4 op
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Faculty of Biochemistry and Molecular Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Gonghong Wei
Opintokohteen kielet: English

ECTS Credits:
4 credits
Language of instruction:
English
Timing:
M.Sc. 1st-2nd autumn

Learning outcomes:
After the course student is able to define the cell as an ensemble of structural and functional parts. He is also able to connect and describe their current knowledge on cellular, molecular and structural biology into a general view. The student is also able to assess scientific information critically on novel research findings and the problems associated with massive amounts of novel scientific information.

Contents:
The module aims to give a holistic picture of the cell as a system. Cells contain numerous molecules and complex structures that interact with each other to form complex interaction networks such that when taken together they form a new whole, which cannot be understood by just investigating the parts. Methods to collect and assemble biological/biochemical information for systems analysis will be introduced. Possibilities of systems approach will be critically discussed in relation to available research techniques, techniques of the future, applications, research targets, as well as from the philosophical and ethical point of view including applicability of the systems theory in biosciences.

Mode of delivery:
Face to face teaching
Learning activities and teaching methods:
The module consists of 22 h of lectures, discussions and case studies, ca. 5h of computing exercises
Target group:
Major students
Prerequisites and co-requisites:
B.Sc. in biochemistry or a related subject or otherwise adequate knowledge on cellular, molecular and structural biology.

Recommended optional programme components:
-
Recommended or required reading:
-
Assessment methods and criteria:
Study diaries will be assessed for a mark on scale 1 to 5 upon request. Otherwise marking will be Pass/fail. There is no exam and thus presence on certain amount of the course is compulsory.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5/fail

Person responsible:
Gonghong Wei

Working life cooperation:
No

Other information:
Location of instruction: Kontinkangas campus

743657S: Tumor cell biology, 3 op

Voimassaolo: 01.08.2010 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Faculty of Biochemistry and Molecular Medicine
ECTS Credits:
3 credits

Language of instruction:
English

Timing:
M.Sc. yr1-yr2 spring

Learning outcomes:
Upon successful completion students are able to:
- name, list and discuss the major aspects including formation of a tumor cell
- present, describe and discuss characteristic aspects of oncogenes and tumor suppressor genes
- use methods to study, examine and to analyse tumor genesis and tumor progression

Contents:
The course covers basic aspects of the main pathways inducing formation of a tumor. The main emphasis will be made on the formation of oncogenes, the action of tumor suppressor genes and the induction of tumors by viruses.

Mode of delivery:
Face to face teaching

Learning activities and teaching methods:
20 h lectures

Target group:
MSc / Molecular and cellular biology

Prerequisites and co-requisites:
-

Recommended optional programme components:
-

Recommended or required reading:
-

Assessment methods and criteria:
Final exam

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

Grading:
1-5/fail

Person responsible:
Thomas Kietzmann

Working life cooperation:
No

Other information:
Location of instruction: Kontinkangas campus

740380A: Virology, 3 op

Voimassaolo: 01.08.2012 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuysikkö: Faculty of Biochemistry and Molecular Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Thomas Kietzmann
Opintokohteen kielet: English
Leikkaavuudet:
743661S Virology 3.0 op

ECTS Credits:
3 credits

Language of instruction:
English
Timing:
BSc. yr3 spring

Learning outcomes:
Upon successful completion students are able to:
- discuss the major groups of viruses and their infection and replication mechanisms
- present and discuss characteristic features of specific viruses and their relation to pathogenesis and immunity
- describe diagnostic methods and antiviral therapy

Contents:
The course covers basic aspects of virology. The main emphasis will be made on viral infection, replication, transcription, proteinsynthesis, virological diagnostics, infection kinetics, defense against viruses, ways of infection, vaccination, and antiviral therapy. The course involves lectures 10h and 10h seminars where the students should be able to recapitulate major aspects of the taught material in 5-7 min presentations.

Mode of delivery:
Face to face teaching

Learning activities and teaching methods:
24 h lectures and student presentations in seminars

Target group:
Major students

Prerequisites and co-requisites:
Cellular biology

Recommended optional programme components:
-

Recommended or required reading:
-

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

Grading:
1-5/fail

Person responsible:
Thomas Kietzmann

Working life cooperation:
No

Other information:
This module is the same as Virology (743661S). Location of instruction: Kontinkangas

744623S: Yeast genetics, 6 op

Opiskelumuoto: Advanced Studies
Laj: Course
Vastuuysikkö: Faculty of Biochemistry and Molecular Medicine
Arvostelu: 1 - 5, pass, fail
Opettaja: Alexander Kastaniotis
Opintokohteen kielet: English
Leikkaavuudet:
744616S  Yeast genetics and molecular biology  2.5 op
744613S  Yeast genetics  1.5 op

ECTS Credits:
3-6 credits

Language of instruction:
English

Timing:
M.Sc. yr1-yr2 spring

Learning outcomes:
Upon successful completion students are able to:
- tell a basic knowledge of yeast genetics and physiology
- tell the basic principles of using the yeast model organism to address fundamental genetic and cell biological problems
• (practical course) describe variety of genetic and molecular biology techniques commonly used to manipulate baker’s yeast in the pursuit of biological questions

Contents:
This course is an introduction to Saccharomyces cerevisiae as a model organism and the use of classical and molecular genetic approaches in this yeast to study basic cellular processes. We will also focus on genetic screens and selections designed to identify targets of interest. Aspects of transcriptional regulation will be discussed to provide a basic understanding for some of the screens and selections introduced. The lecture part is open to all students that fulfill the enrollment requirements, and equals 3 op. Performance in the course will be assessed by participation in the course review session at the beginning of each lecture (10% of total grade) and by a final written examination. The practical part of this is a block practical spread over two weeks (2 days – 3 days – 2 days – 3 days) running almost parallel to lecture course. It is designed to provide training in techniques and concepts commonly used in yeast genetics (streaking, spotting, mating, tetrad analysis, transformation, colony-color based assays, carbon source-dependent expression of genes, as well as generation and cloning of mutants). This part of the course has limited enrollment for 16 people.

Mode of delivery:
Face to face teaching

Learning activities and teaching methods:
16 h lectures, 10 days practical, final exam and oral participation in course review session

Target group:
Major students

Prerequisites and co-requisites:
-

Recommended optional programme components:
-

Recommended or required reading:
-

Assessment methods and criteria:
Course review sessions, final exam, experiment reports
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1-5/fail

Person responsible:
Alexander Kastaniotis

Working life cooperation:
No

Other information:
Location of instruction: Kontinkangas campus