Opasraportti

LTK - Medical and Wellness Technology (2011 - 2012)

Tutkintorakenteisiin kuulumattomat opintokokonaisuudet ja -jaksot

080912S: Applied Biomechanics, 4 op
080912S-01: Applied Biomechanics, Written assignment nr 1, 0 op
080912S-02: Applied Biomechanics, Written assignment nr 2, 0 op
080910A: Applied Diagnostic Radiology, 4 op
080910A-02: Applied Diagnostic Radiology, Home exam, 0 op
080910A-01: Applied Diagnostic Radiology, Seminar, 0 op
580209A: Bachelor's Thesis, 10 op
040901Y: Basic Anatomy, 1,5 - 2 op
580401A: Basic Biomaterials, 2 op
580103A: Basic Biomechanics, 3 op
040105Y: Basic Epidemiology, 1,5 op
761101P: Basic Mechanics, 4 op
040904A: Basic Pharmacology, 1,5 op
580103A-02: Basics Biomechanics, exam, 0 op
580103A-01: Basics Biomechanics, exercise work, 0 op
041201A: Basics in eHealth, 5 op
040903A: Biochemistry II, 4 op
764660S: Bioelectronics, 5 op
580201A: Biomedical Engineering Programming Study, 5 op
580202S: Biomedical Engineering Project, 5 op
080914S: Biomedical Engineering and Medical Physics Seminar, 3 op
580402S: Biomedical Imaging Methods, 1 - 5 op
521126S: Biomedical Measurements, 5 op
764324A: Biophysical laboratory exercises I, 5 op
521273S: Biosignal Processing, 5 op
040005Y: Biostatistics, 3 op
764364A: Biosystems analysis, 6 op
031010P: Calculus I, 5 op
031011P: Calculus II, 6 op
764323A: Cell membrane biophysics, 7 op
050004Y: Chemistry, 3 op
521302A: Circuit Theory 1, 5 op
031017P: Differential Equations, 4 op
521467S: Digital Image Processing, 5 op
521109A: Electrical Measurement Principles, 5 op
761103P: Electricity and Magnetism, 4 op
555364S: Ergonomics, 5 op
040408S: Exercise and Work Physiology, 1 op
764115P: Foundations of cellular biophysics, 4 op
040108A: General Pathology, 3,5 - 5 op
521116S: Healthcare Information Systems, 4 op
811338A: Internet and Computer Networks, 5 op
580102P: Introduction to Medical and Wellbeing Technology, 5 op
580102P-02: Introduction to Medical and Wellbeing Technology, exam, 0 op

580102P-01: Introduction to Medical and Wellbeing Technology, lectures, attendance, 0 op
811122P: Introduction to Programming, 5 op
080901A: Introduction to Technology in Clinical Medicine, 5 op
080901A-04: Introduction to Technology in Clinical Medicine, Exam, 0 op
080901A-01: Introduction to Technology in Clinical Medicine, Initial exam, 0 op
080901A-02: Introduction to Technology in Clinical Medicine, Lectures and demonstrations, 0 op
080901A-03: Introduction to Technology in Clinical Medicine, Written assignment, 0 op
580101Y: Introduction to University Studies, 2 op
580101Y-02: Introduction to University Studies, conversation, 0 op
580101Y-01: Introduction to University Studies, tutorial, 0 op
764103P: Introduction to biophysics, 2 op
040007Y: Introduction to scientific research, 1,5 op
040910S: Laboratory Animal Course For Scientists, 6 op
761121P: Laboratory Exercises in Physics 1, 3 op
031019P: Matrix Algebra, 3,5 op
580211S: Maturity Test, 0 op
580211A: Maturity Test, 0 op
040902Y: Medical Biochemistry and molecular biology, 8 - 9 op
764369A: Medical Equipments, 3 op
764633S: Medical Physics, 4 op
040002Y: Medical cell and developmental biology, 7 op
040002Y-01: Medical cell and developmental biology, examination, 0 op
040011Y: Medical informatics, 2 op
040011Y-01: Medical informatics, module 1, information and Communication Technology, 0,5 op
040011Y-02: Medical informatics, module 2, literature retrieval, 1 op
040011Y-03: Medical informatics, module 3, clinical information systems, 0,5 op
764680S: Neural information processing, 5 op
040112A: Physiology, 15 op
040112A-021: Physiology, practicals entry examination, 1 op
580121A: Practical training, 1 - 5 op
580120A: Practical training 1, 1 - 5 op
521431A: Principles of Electronics Design, 5 op
580210S: Pro Gradu, 35 op
031021P: Probability and Mathematical Statistics, 5 op
521053S: Product Responsibility to Medical Devices, 2 op
811175P: Programming Assignment I, 2 op
764317A: Radiation physics, biology and safety, 3 op
902006Y: Reading for Academic Purposes, 1,5 op
902007Y: Scientific Communication, 1,5 op
901020Y: Second Official Language (Swedish), 3 op
521124S: Sensors and Measuring Techniques, 5 op
764359A: Spectroscopic methods, 5 op
080913A: Technology in Clinical Chemistry, 3 op
080913A-04: Technology in Clinical Chemistry, Exam, 0 op
080913A-01: Technology in Clinical Chemistry, Pre-assignment, 0 op
080913A-03: Technology in Clinical Chemistry, Written assignment, 0 op
080913A-02: Technology in Clinical Chemistry,Contact teaching, 0 op
764327A: Virtual measurement environments, 5 op
761104P: Wave Motion, 3 op
521114S: Wireless Measurements, 4 op

Opintojaksojen kuvaukset

Tutkintorakenteisiin kuulumattomien opintokokonaisuuksien ja -jaksojen kuvaukset

080912S: Applied Biomechanics, 4 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

ECTS Credits:
4 credits
Language of instruction:
Finnish or English
Timing:
Master studies, spring semester
Learning outcomes:
Learning outcomes: The student can design and implement practical biomechanical experiments, analyze data, interpret the results and report them according to good scientific practise.
Contents:
Musculoskeletal biomechanics, biomechanical measurements.
Learning activities and teaching methods:
Lectures 8 hrs, participation. Practical exercise 8 hrs, independent work. Written reports.
Recommended optional programme components:
761101P Basic Mechanics, 580103A Basic Biomechanics, physiology.
Recommended or required reading:
Material given in the lectures. Literature.
Assessment methods and criteria:
Written reports based on the labs.
Grading:
1-5 or fail.
Person responsible:
Professori Timo Jämsä
Other information:
This course is a part of specialization Medical Engineering.

080912S-01: Applied Biomechanics, Written assignment nr 1, 0 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Intermediate Studies

Laji: Partial credit

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

ECTS Credits:
4 credits
Language of instruction:
Finnish or English
Timing:
Master studies, spring semester
Learning outcomes:
After this course student has deeper knowledge in biomechanics in theory and in practice. The student will familiarize with the research methods and data analysis in experimental and clinical biomechanics by practical exercises.
Contents:
Musculoskeletal biomechanics, biomechanical measurements
Learning activities and teaching methods:
Lectures 8 hrs, participation. Practical exercise 8 hrs, independent work. Written reports

Recommended optional programme components:
761101P Basic Mechanics, 580103A Basic Biomechanics, physiology.
Recommended or required reading:
Material given in the lectures. Literature.
Assessment methods and criteria:
Written reports based on the labs.
Grading:
1-5 or fail.
Person responsible:
Professori Timo Jämsä
Other information:
This course is a part of specialization Medical Engineering.

080912S-02: Applied Biomechanics, Written assignment nr 2, 0 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Intermediate Studies

Laji: Partial credit

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

ECTS Credits:
4 credits
Language of instruction:
Finnish or English
Timing:
Master studies, spring semester
Learning outcomes:
After this course student has deeper knowledge in biomechanics in theory and in practice. The student will familiarize with the research methods and data analysis in experimental and clinical biomechanics by practical exercises.
Contents:
Musculoskeletal biomechanics, biomechanical measurements
Learning activities and teaching methods:
Lectures 8 hrs, participation. Practical exercise 8 hrs, independent work. Written reports
Recommended optional programme components:
761101P Basic Mechanics, 580103A Basic Biomechanics, physiology.
Recommended or required reading:
Material given in the lectures. Literature.
Assessment methods and criteria:
Written reports based on the labs.
Grading:
1-5 or fail.
Person responsible:
Professori Timo Jämsä
Other information:
This course is a part of specialization Medical Engineering.

080910A: Applied Diagnostic Radiology, 4 op

Voimassaolo: - 31.07.2016

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Koivula, Kalle Antero

Opintokohteen kielet: Finnish

ECTS Credits:
4 credits
Language of instruction:
Finnish
Timing:
Master studies, autumn-spring
Learning outcomes:
Learning outcomes: The student can explain the basic principles of medical imaging technoqies, possibilities of use and limitations. The student can define how and by what conditions are required to produce an image with acceptable diagnostic quality and what features are essential for interpreting images.
Contents:
Course gives insight to radiological work (conventional X-rays, computed tomography, ultrasound examinations, magnetic resonance imaging and radiological operations). Seminars include radiological examinations from the technical point of view combining technical and medical knowledge.
Learning activities and teaching methods:
Lectures 20 hrs. Seminars and demonstrations 20 hrs. Selected lectures from the course 080602A (see the ECTS guide for the Faculty of Medicine). Final exam.
Recommended or required reading:
S Soimakallio (ed), L Kivisaari, H Manninen, E Svedström, O Tervonen. Radiologia, WSOY, 2005.
Assessment methods and criteria:
Seminar presentation and final exam are graded 1–5 or fail. Seminar grade is weighted as 2/3 and final exam grade as 1/3 in the final grade.
Grading:
1-5 or fail.
Person responsible:
Doc Antero Koivula
Other information:
This course is a part of specialization Medical Engineering. For more information, please contact Dr Pasi Pulkkinen.

080910A-02: Applied Diagnostic Radiology, Home exam, 0 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Intermediate Studies

Laji: Partial credit

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Koivula, Kalle Antero

Opintokohteen kielet: Finnish

ECTS Credits:
4 credits
Language of instruction:
Finnish
Timing:
Master studies, autumn-spring
Learning outcomes:
After this course student knows the theoretical basics, usability and restrictions of different medical imaging techniques. The student knows how an image of good quality is obtained and what is essential when interpreting the images.
Contents:
Course gives insight to radiological work (conventional X-rays, computed tomography, ultrasound examinations, magnetic resonance imaging and radiological operations). Seminars include radiological examinations from the technical point of view combining technical and medical knowledge.
Learning activities and teaching methods:
Lectures 20 hrs. Seminars and demonstrations 20 hrs. Selected lectures from the course 080602A (see the ECTS guide for the Faculty of Medicine). Final exam.
Recommended or required reading:

S Soimakallio (ed), L Kivisaari, H Manninen, E Svedström, O Tervonen. Radiologia, WSOY, 2005.
Assessment methods and criteria:
Seminar presentation and final exam are graded 1–5 or fail. Seminar grade is weighted as 2/3 and final exam grade as 1/3 in the final grade.
Grading:
1-5 or fail.
Person responsible:
Doc Antero Koivula
Other information:
This course is a part of specialization Medical Engineering. For more information, please contact Dr Pasi Pulkkinen.

080910A-01: Applied Diagnostic Radiology, Seminar, 0 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Intermediate Studies

Laji: Partial credit

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Koivula, Kalle Antero

Opintokohteen kielet: Finnish

ECTS Credits:
4 credits
Language of instruction:
Finnish
Timing:
Master studies, autumn-spring
Learning outcomes:
After this course student knows the theoretical basics, usability and restrictions of different medical imaging techniques. The student knows how an image of good quality is obtained and what is essential when interpreting the images.
Contents:
Course gives insight to radiological work (conventional X-rays, computed tomography, ultrasound examinations, magnetic resonance imaging and radiological operations). Seminars include radiological examinations from the technical point of view combining technical and medical knowledge.
Learning activities and teaching methods:
Lectures 20 hrs. Seminars and demonstrations 20 hrs. Selected lectures from the course 080602A (see the ECTS guide for the Faculty of Medicine). Final exam.
Recommended or required reading:
S Soimakallio (ed), L Kivisaari, H Manninen, E Svedström, O Tervonen. Radiologia, WSOY, 2005.
Assessment methods and criteria:
Seminar presentation and final exam are graded 1–5 or fail. Seminar grade is weighted as 2/3 and final exam grade as 1/3 in the final grade.
Grading:
1-5 or fail.
Person responsible:
Doc Antero Koivula
Other information:
This course is a part of specialization Medical Engineering. For more information, please contact Dr Pasi Pulkkinen.

580209A: Bachelor's Thesis, 10 op

Voimassaolo: 01.08.2005 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
10 credits
Language of instruction:
Finnish or English
Timing:
3rd year
Learning outcomes:
Learning outcomes: The studend can describe a research problem, solve it and reports this in written form. The student can present his study orally at the seminar.
Contents:
Guided research or development work in the field of medical & wellness technology and writing of the thesis.
Learning activities and teaching methods:
Independent work with the help of a supervisor. The topic and contents should be discussed with the professor in the beginning. Thesis can be made at different research groups of the university or in industry or health care system.
Assessment methods and criteria:
Writing the thesis and an oral presentation.
Grading:
Pass or fail
Person responsible:
Professor Miika Nieminen

040901Y: Basic Anatomy, 1,5 - 2 op

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: Tuukkanen, Kaarlo Juha Kullervo

Opintokohteen kielet: Finnish

ECTS Credits:
2 credits
Language of instruction:
Finnish
Timing:
1st Spring
Learning outcomes:
After this course student is familiar with the basic anatomy of the human body.
Learning activities and teaching methods:
Lectures 20 h. Final exam
Recommended or required reading:
Material given in the lectures.
Assessment methods and criteria:
Written exam.
Grading:
1-5 or fail.
Other information:
Students have to register according to the instructions of the study advisor.This course is organized by the open university.

580401A: Basic Biomaterials, 2 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

ECTS Credits:
2 credits
Timing:
Master studies. The course is not organized every year.
Learning outcomes:
Learning outcomes: The student can list essential biological and tissue-replacing materials and can describe their properties. The student identifies and can explain the basics of interactions between biomaterials and tissues.
Contents:
Biocompatibility, metallic and ceramic implantation materials, polymers, biodegradable materials, bioglass, multifunctional biomaterials, tissue engineering, examples of applications.
Learning activities and teaching methods:
Lectures and written exam
Recommended or required reading:
Lecture material. Literature: Park JP, Bronzino JD, Biomaterials; Principles and Applications. CRC Press 2002.
Assessment methods and criteria:
Written exam.
Grading:
1-5 or fail.
Person responsible:
Professor Timo Jämsä, professor Juha Tuukkanen
Other information:
This course is a part of specialization Biomedical Technology.

580103A: Basic Biomechanics, 3 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

ECTS Credits:
3 credits
Language of instruction:
Lectures are given in Finnish, but the practical exercises and the exam can be taken in English (English material provided).
Timing:
2nd year, autumn
Learning outcomes:
Learning outcomes: The student can describe mechanical properties of biological materials and the principles how to determine them. The student identifies and can give examples how modeling can be used to solve biomechanical problems. The student can solve biomechanical calculation problems and interpret the results of biomechanical experiments.

Contents:
Physical basics. Characteristics of biological materials. Fatigue resistance and fraction mechanics. Tissue mechanics. Biomechanical modelling of the human body. Motion analysis.
Learning activities and teaching methods:
Lectures 10 hours, mathematical exercises 8 hours, practical exercises 4 hours. Independent work. Final exam.
Recommended optional programme components:
761101P Basic Mechanics
Recommended or required reading:

Lecture material.
Literature:
Hall: Basic biomechanics, 3rd ed. McGraw-Hill,1999, parts.
Lucas, Cooke andFriis: A primer of biomechanics. Springer, 1998.
Assessment methods and criteria:
Practical exercises are marked as pass or fail, final exam is graded 1–5 or fail.
Grading:
1-5 or fail
Person responsible:
Professor Timo Jämsä

040105Y: Basic Epidemiology, 1,5 op

Opiskelumuoto: General Studies
Laji: Course
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Jouni Jaakkola
Opintokohteen kielet: Finnish

ECTS Credits:
1,5 op
Language of instruction:
Finnish. Can be offered in English if several English speaking student registered.

Timing:
Lectures on 2. Year spring term.
Learning outcomes:
Students are expected to learn the basic concepts of epidemiology and basics of epidemiologic methods used in medicine and in general in health sciences.
Contents:
The course includes a lecture on the following topics: 1) introduction to basic concepts and causality, 2) principles of study design, 3) precision and validity, 4) exposure assessment, 5) assessment of health effects and measures of disease occurrence, association and effect , 6) principles of cohort studies, 7) data analysis in cohort studies, 8) principles of case-control studies, 9) data analysis in case-controls studies and 10) cross-sectional studies. In addition, the course includes two exercise sessions conducted in small groups on: 1) epidemiologic methods based on critical reviews of articles and 2) calculation. Students will also review individually and critically an scientific article.

Learning activities and teaching methods:
10 one-hour lectures, two 3-hour exercise sessions and critical review of an articles.
Target group:
Basic course for medical students, but suitable for students planning research in health sciences.
Recommended optional programme components:
Closely linked to the course in biostatiistics taught in the same term.
Recommended or required reading:
Lecture notes. Recommended books: Hernberg S. Introduction to occupational epidemiology (1992) ja Rothman K. Epidemiology. An Introduction (2002).
Assessment methods and criteria:
Lectures highly recommended and exercise sessions compulsory. Written exam.
Grading:
5 - 1 / fail.

Person responsible:
Jouni J.K. Jaakkola, professor of public health.

761101P: Basic Mechanics, 4 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Department of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

761118P Mechanics 1 5.0 op
761118P-01 Mechanics 1, lectures and exam 0.0 op
761118P-02 Mechanics 1, lab. exercises 0.0 op
761111P-01 Basic mechanics, lectures and exam 0.0 op
761111P-02 Basic mechanics, lab. exercises 0.0 op
761111P Basic mechanics 5.0 op
761101P2 Basic Mechanics 4.0 op

ECTS Credits:
4 credits
Language of instruction:
The lectures will be in Finnish. The textbook is in English and exercises are selected from the textbook. For further information, contact the responsible person of the course.
Timing:
Autumn
Learning outcomes:
The student is able to describe the basic concepts of mechanics and to apply those when solving the problems related to mechanics.
Contents:
We encounter many phenomena related to mechanics in our everyday life. Most engineering sciences are based on mechanics and mechanics forms the basis of many other fields of physics, also the modern physics.
Contents in brief: Short summary of vector calculus. Kinematics, projectile motion and circular motion. Newton's laws of motion. Work and different forms of energy. Momentum, impulse and collisions. Rotational motion and moment of inertia. Torque and angular momentum. Rigid body equilibrium problems. Gravitation. Periodic motion. Fluid mechanics.
Learning activities and teaching methods:
Lectures 32 h, 8 exercises (16 h).
Target group:
Secondary subject students.
Recommended optional programme components:
Knowledge of vector calculus and basics of differential and integral calculus would be desirable.
Recommended or required reading:
Text book: H.D. Young and R.A. Freedman: University physics, Addison-Wesley, 12th edition, 2008, chapters 1-14. Also 11th and 10th editions can be used.
Lecture material: Finnish lecture material will be available on the web page of the course.
Course material availability can be checked here.
Assessment methods and criteria:
Four mini examinations and end examination or final examination.
Grading:
Scale 1-5 / fail
Person responsible:
Anita Aikio
Other information:
https://wiki.oulu.fi/display/761101P/

040904A: Basic Pharmacology, 1,5 op

Voimassaolo: - 31.07.2012

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: Hakkola, Jukka Antti Tapio

Opintokohteen kielet: Finnish

ECTS Credits:
1,5 credits
Language of instruction:
Finnish
Learning outcomes:
After this course student is familiar with the basics of different medicinal substances and their effects.
Contents:
Different medicinal substances and their effects.
Learning activities and teaching methods:
Lectures 12 hours. Final exam.
Recommended or required reading:
Pelkonen, Ruskoaho: Lääketieteellinen farmakologia ja toksikologia. 3. painos, Kustannus Oy Duodecim, Helsinki, 2003
or
Koulu, Tuomisto: Farmakologia ja toksikologia. 6. painos, Medisiina, Kuopio, 2001.
Assessment methods and criteria:
Written exam
Grading:
1-5 or fail
Person responsible:
Jukka Hakkola
Other information:
Students should register to the course according to the instructions given by the study advisor. The course is organized by the Open University.

580103A-02: Basics Biomechanics, exam, 0 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Intermediate Studies

Laji: Partial credit

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

ECTS Credits:
2 credits
Language of instruction:
Lectures are given in Finnish, but the practical exercises and the exam can be taken in English (English material provided).
Timing:
2nd year, autumn
Learning outcomes:
After this course student is familiar with the concepts and phenomena of biomechanics and their modeling principles.
Contents:
Physical basics. Characteristics of biological materials. Fatigue resistance and fraction mechanics. Tissue mechanics. Biomechanical modelling of the human body. Motion analysis.
Learning activities and teaching methods:
Lectures 10 hours, mathematical exercises 6 hours, practical exercises 4 hours. Independent work. Final exam
Recommended optional programme components:
761101P Basic Mechanics
Recommended or required reading:
Lecture material.
Literature:
Hall: Basic biomechanics, 3rd ed. McGraw-Hill,1999, parts.
Lucas, Cooke andFriis: A primer of biomechanics. Springer, 1998.

Assessment methods and criteria:
Practical exercises are marked as pass or fail, final exam is graded 1–5 or fail.
Grading:
1-5 or fail
Person responsible:
Professor Timo Jämsä

580103A-01: Basics Biomechanics, exercise work, 0 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Intermediate Studies

Laji: Partial credit

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

ECTS Credits:
2 credits
Language of instruction:
Lectures are given in Finnish, but the practical exercises and the exam can be taken in English (English material provided).
Timing:
2nd year, autumn
Learning outcomes:
After this course student is familiar with the concepts and phenomena of biomechanics and their modeling principles.
Contents:
Physical basics. Characteristics of biological materials. Fatigue resistance and fraction mechanics. Tissue mechanics. Biomechanical modelling of the human body. Motion analysis.
Learning activities and teaching methods:
Lectures 10 hours, mathematical exercises 6 hours, practical exercises 4 hours. Independent work. Final exam
Recommended optional programme components:
761101P Basic Mechanics
Recommended or required reading:
Lecture material.
Literature:
Hall: Basic biomechanics, 3rd ed. McGraw-Hill,1999, parts.
Lucas, Cooke andFriis: A primer of biomechanics. Springer, 1998.
Assessment methods and criteria:
Practical exercises are marked as pass or fail, final exam is graded 1–5 or fail.
Grading:
1-5 or fail
Person responsible:
Professor Timo Jämsä

041201A: Basics in eHealth, 5 op

Voimassaolo: 01.08.2011 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: Jarmo Reponen

Opintokohteen kielet: English

Leikkaavuudet:

ay041201A Basics in eHealth (OPEN UNI) 5.0 op

ECTS Credits:
Web course: 5 ECTS credit points.
Language of instruction:
English or Finnish
Learning outcomes:
Learning outcomes: The student can define central information and communication technological terms and solutions in healthcare, and can list respective applications in healthcare services and training. The student can evaluate the societal and economical significance of information and communication technology in healthcare
Contents:
- terms and concepts
- societal dimensions
- delivery of health services
- human interaction
- electronic patient records and data transfer
- remote consultations, radiology, surgery (in Finnish), psychiatry,
- economic assessment
- functional assessment
- education
- technical requirements (in Finnish)
- data security and legislation (in Finnish).

Learning activities and teaching methods:
The course consists of video-taped lectures, power point-dias and links to other material available in the web. Interactivity takes place in virtual learning environment Optima.
Performance of duties include an essay (homework), exam (homework), participating in discussions, and making at least two questions on the grounds of the lectures.
Grading:
1 - 5.
Person responsible:
Jarmo Reponen
Other information:
Recommended literature:
Graig J Wootton R, Patterson V (Eds): An introduction to Telemedicine,RSM Press 2006
Saranto K, Korpela M (toim) Tietotekniikka ja tiedonhallinta sosiaali- ja terveydenhuollossa, WSOY, Porvoo-Helsinki-Juva 1999
Hämäläinen P, Reponen J, Winblad I: eHealth of Finland,, Check point 2008, Report 1/2009 Gummerus. Jyväskylä 2009
(http://www.thl.fi/thl-client/pdfs/f5ca5a36-f2c6-4e94-ae95-a7b439b1169b
Winblad I, Reponen J, Hämäläinen P, Kangas M: Informaatio- ja ommunikaatioteknologian käyttö Suomen terveydenhuollossa vuonna 2007. Tilanne ja kehityksen suunta (English summary incl). Stakesin raportteja 37/2008, Stakes, Helsinki 2008
http://www.stakes.fi/verkkojulkaisut/raportit/R37-2008-VERKKO.pdf
Journal of Telemedicine and Telecare
In addition: eLibrary in the Optima comprising updating of the topics of the lectures and some selected essays (by permission of the author).

040903A: Biochemistry II, 4 op

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

ECTS Credits:
4 cr
Language of instruction:
Finnish
Timing:

2nd year, spring
Learning outcomes:
Student deepers his knowledge in Biochemistry I and knows after the course the metabolism of carbohydrates and lipids, significance of vitamins and minerals for the body and familiarizes to biochemistry of liver and connective tissue.
Contents:
Carbohydrates (excluding structure), lipids (exclusing structure), water soluble vitamins, fat-soluble vitamins, eikosanoids, nutrition, liver, bile acids, porphyrins, bilirubins, minerals, biochemistry of diseases
Learning activities and teaching methods:
Participating in the lectures of 040103A partly. Lectures 45 h, group teaching 9 h. Exam.
Recommended or required reading:
Murray, R.K. (toim.): Harper's Illustrated Biochemistry, 27. ed, 2006.
Assessment methods and criteria:
Group teaching. Exam (4 written essays, each 0-2.5 points, limit for accepted grade 5-)
Grading:
Based on the points of the exam.
1= 4.75-5.5
2= 5.75-6.5
3= 6.75-7.5
4= 7.75-8.5
5= 8.75-10
Person responsible:
Professori Taina Pihlajaniemi
Other information:
Course is a part of specialization studies B) Biomedical Technology.

764660S: Bioelectronics, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Department of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
4 credits
Timing:
4th spring
Learning outcomes:
Students have basic skills for understanding and analyzing of electronics and its applications to measurements of living organisms.
Contents:
The course introduces bioelectric recording techniques, electrodes, most commenly used amplifier types, basic signal processing of biosignals, but also concepts related to the origin of bio-potentials and currents and how they are distributed in biological volume conductors.
Learning activities and teaching methods:
Lectures 24 h, MatLab-based project work 10 h, calculation exercises 15 h.
Target group:
Optional for biophysics M.Sc. students.
Recommended optional programme components:
Physics courses, programming skills.
Recommended or required reading:
Lectures and lecture notes. Books e.g. Semmlov J, Circuits signals and systems for bioenergetics, Elsevier Academic Press, 2005; Electronic Signal Processing, parts I-IV, The Open University Press, Milton Keynes 1984.
Assessment methods and criteria:
Exam
Grading:
Scale 1-5 / fail
Person responsible:
Matti Weckström
Other information:

https://wiki.oulu.fi/display/764660S/

580201A: Biomedical Engineering Programming Study, 5 op

Voimassaolo: 01.08.2008 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Institute of Health Sciences
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

ECTS Credits:
5 credits
Language of instruction:
Finnish or English
Timing:
3rd autumn or spring
Learning outcomes:
Learning outcomes: The student can design a solution to a programmig problem related to medical technology, can solve the task and report this in written form.
Contents:
Independent computer programming using modern programming tools.
Learning activities and teaching methods:
Students carry out an assigned programming project individually or in pairs and write out a report.
Recommended optional programme components:
811122P Introduction to Programming, 764627S Virtual Measurement Environments
Assessment methods and criteria:
The program and the report are assessed by the supervisor.
Grading:
Pass or fail.
Person responsible:
Professori Timo Jämsä
Other information:
More information on the available topics can be inquired on the assistants of the department.

580202S: Biomedical Engineering Project, 5 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Institute of Health Sciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Jämsä, Timo Jaakko
Opintokohteen kielet: Finnish

ECTS Credits:
5-10 ECTS.
Language of instruction:
Finnish or English
Timing:
Master studies, elective course
Learning outcomes:
Learning outcomes: The student can solve a research problem and report this in written form.
Contents:
Working with a project
Learning activities and teaching methods:
Student takes part in a research or a developmental project carried out either in the University or outside. Student writes out a report and presents it orally. The project can be linked to a summer job or practical training.
Assessment methods and criteria:

Written report and oral presentation
Grading:
Pass or fail.
Person responsible:
Professor Timo Jämsä

080914S: Biomedical Engineering and Medical Physics Seminar, 3 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

ECTS Credits:
3 credits
Language of instruction:
Finnish or English
Timing:
Master studies, autumn or spring. The course is not organized every year.
Learning outcomes:
Learning outcomes: The student can identify the essential features of scientific publications. The student can present the central content of a scientific article to others. The student can present critical questions related to a scientific presentation.
Contents:
Assigned topics are reviewed in seminar meetings.
Learning activities and teaching methods:
Seminar presentations and conversations based on the presentations.
Assessment methods and criteria:
Attending seminars, making presentations and acting as an opponent.
Grading:
Pass or fail.
Person responsible:
Professor Timo Jämsä
Other information:
Also for doctoral studies

580402S: Biomedical Imaging Methods, 1 - 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

ECTS Credits:
4 credits
Language of instruction:
Finnish
Timing:
Master studies. The course is not organized every year.
Learning outcomes:
Learning outcomes: The student can list the different sample processing methods and identifies the meaning of them. The student can describe the principles of imaging techniques used in biomedical research.
Contents:
Basics in morphology, light and fluorescence microscopy, confocal microscopy, electron microscopy, atomic force microscopy

Learning activities and teaching methods:
Lectures, demonstrations. Final exam.
Recommended or required reading:
Literature is given in the lectures.
Assessment methods and criteria:
Exercises. Written exam.
Grading:
1-5 or fail
Person responsible:
Docent Simo Saarakkala
Other information:
This course is a part of specialization area Biomedical Technology

521126S: Biomedical Measurements, 5 op

Voimassaolo: - 31.07.2012

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Department of Electrical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Myllylä, Risto Antero

Opintokohteen kielet: Finnish

Language of instruction:
Lectures are in Finnish. Calculation exercises are in Finnish but same material is available in English.

Timing:
Period 4-5.
Learning outcomes:
The objective of the course is to give an overall presentation of modern medical equipment and their special requirements. The emphasis is on technical and functional presentation. The goal is to provide the student sufficient knowledge to study hospital engineering.
Learning outcomes: After the course the student is capable to explain principles, applications and design of medical instruments most commonly used in hospitals. He/she can describe the electrical safety aspects of medical instruments and can present the physiological effects of electric current on humans. In addition the student is able to explain medical instrumentation development process and the factors affecting it. He/she also recognizes typical measurands and measuring spans and is able to plan and design a biosignal amplifier.
Contents:
Diagnostic instruments (common theories for medical devices, measurement quantities, sensors, amplifiers and registering instruments). Bioelectrical measurements (EKG, EEG, EMG, EOG, ERG), blood pressure and flow meters, respiration studies, measurements in a clinical laboratory, medical imaging methods and instruments, ear measurements, heart pacing and defibrillators, physical therapy devices, intensive care and operating room devices and electrical safety aspects.
Learning activities and teaching methods:
Lectures and exercises. The course is passed by a final exam.
Recommended or required reading:
J. G. Webster: Medical Instrumentation, Application And Design. John Wiley & Sons, 1998; lecture notes (in Finnish); exercise notes (also in English)

764324A: Biophysical laboratory exercises I, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Department of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

521273S: Biosignal Processing, 5 op

Voimassaolo: 01.08.2005 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Department of Computer Science and Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Tapio Seppänen
Opintokohteen kielet: Finnish

Language of instruction:
In Finnish.
Timing:
Period 2-3.
Learning outcomes:
The course provides knowledge of most common biomedical signals and signal processing methods that can be used for computerized biomedical signal analysis.

Learning outcomes: After passing the course, the student can explain the importance of artifact filtering, time- and frequency-domains, and nonstationarity for biomedical signal analysis and select a proper solution for most common application situations. In addition, (s)he can explain the central feature detection methods to analyze the contents of biosignals.

Contents:
Biomedical signals. Digital filtering. Time- and frequency-domain analysis, Nonstationarity of biomedical signals. Feature detection and classification. Diagnostic decision.
Learning activities and teaching methods:
Lectures 10 hours + Laboratory exercises 20-30 hours + Written exam

Recommended optional programme components:
The basic engineering math courses, digital filtering, programming skills
Recommended or required reading:
The course is based on the book "Biomedical Signal Analysis, A Case-Study Approach", R.M Rangayyan. 516 pages. +Lecture transparencies
+ Task assignment specific material.

040005Y: Biostatistics, 3 op

Opiskelumuoto: General Studies
Laji: Course
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Pentti Nieminen
Opintokohteen kielet: Finnish

ECTS Credits:
3 credits
Timing:
C4
Learning outcomes:

By the end of the course the student should be able to:
- plan study designs and statistical computing in medical and dental research,
- obtain and analyze data with basic statistical methods,
- use basic statistical significance tests and inference methods,
- evaluate critically medical research reports

Contents:

Aims and phases of statistical research, planning statistical research, obtaining data, variable distributions (frequencies, graphs and statistics), basics in statistical inference and methods (estimates, significance tests and confidence limits), basic methods in comparing groups and estimating associations between variables, specific methods applied in medical research.

Learning activities and teaching methods:
Lessons 18 h, study-group sessions 12 h, practical projects and home-works 30 h.

Recommended or required reading:
Uhari M ja Nieminen P: Epidemiologia ja biostatistiikka. Duodecim, 2001.

Assessment methods and criteria:
Regular and active participation in the small group lessons and completion of a practical project. Written examination.

Grading:
0-5

Person responsible:
Docent Pentti Nieminen

Other information:
This course is a part of the studies in research skills.

764364A: Biosystems analysis, 6 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Department of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

764664S	Analysis and simulation of biosystems	6.0 op

ECTS Credits:
5 credits

Timing:
2nd spring

Learning outcomes:
Learning outcomes: The student is able to use modelling in the analysis of simple biosystems, with the utilization of the concept of analogies between different types of systems.

Contents:
Models and analogies are studied as tools to analyse biological systems. Also the foundations of system identification and feedback are considered, and especially the utilization of transfer function and impedance in identification and analysis.

Learning activities and teaching methods:
Lectures 30 h, calculation exercises 15 h, final exam.

Target group:
Compulsory in biophysics major (BSc) and 25 cu (approbatur) minor.

Recommended optional programme components:
Introduction to biophysics (764103P) is recommended before this course. Knowing Laplace transform is useful.

Recommended or required reading:
Lecture handouts; W.B. Blesser, A Systems Approach to Biomedicine, McGraw-Hill, New York 1969 (partly) or some corresponding literature.

Person responsible:
Iikka Salmela

Other information:
https://wiki.oulu.fi/display/764364A/

031010P: Calculus I, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Mathematics Division

Arvostelu: 1 - 5, pass, fail

Opettajat: Ilkka Lusikka

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay031010P Calculus I (OPEN UNI) 5.0 op

ECTS Credits:
5 cp
Language of instruction:
Finnish
Timing:
Period 1-3
Learning outcomes:
The course gives the basics of vector algebra, analytic geometry, elementary functions and differential and integral calculus of real valued functions of one variable. Learning outcomes : After completing the course the student identifies concepts of vector algebra and can use vector algebra for solving problems of analytic geometry. The student can also explain basic characteristics of elementary functions and is able to analyse the limit and the continuity of real valued functions of one variable. Furthermore, the student can solve problems associated with differential and integral calculus of real valued functions of one variable.
Contents:
Vector algebra and analytic geometry. Limit, continuity, differential and integral calculus and applications of real valued functions of one variable. Complex numbers.
Learning activities and teaching methods:
Term course. Lectures 5 h/week.
Recommended or required reading:
Grossmann, S.I.: Calculus of One Variable; Grossmann, S.I.: Multivariable Calculus, Linear Algebra and Differential Equations (partly); Adams, R.A.: A Complete Course Calculus (partly).

031011P: Calculus II, 6 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Mathematics Division

Arvostelu: 1 - 5, pass, fail

Opettajat: Ilkka Lusikka

Opintokohteen kielet: Finnish

Leikkaavuudet:

031075P Calculus II 5.0 op

ay031011P Calculus II (OPEN UNI) 6.0 op

Language of instruction:
Finnish
Timing:
Period 4-6
Learning outcomes:
The course gives the basics of theory of series and differential and integral calculus of real and vector valued functions of several variables.
Learning outcomes **:** After completing the course the student is able to examine the convergence of series and power series of real terms and estimate the truncation error. Furthermore, the student can

explain the use of power series e.g. in calculating limits and approximations for definite integrals and is able to solve problems related to differential and integral calculus of real and vector valued functions of several variables.

Contents:

Sequences, series and power series of real terms. Differential and integral calculus of real and vector valued functions of several variables.

Learning activities and teaching methods:

Term course. Lectures 5 h/week.

Recommended optional programme components:

Calculus I.

Recommended or required reading:

Kreyszig, E.: Advanced Engineering Mathematics; Grossmann, S.I.: Multivariable Calculus, Linear Algebra and Differential Equations.

764323A: Cell membrane biophysics, 7 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Department of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

764623S Cell membrane biophysics 7.0 op

ECTS Credits:

7 credits

Language of instruction:

Can be taught partly or completely in English.

Timing:

3rd or 4th autumn

Learning outcomes:

Learning outcomes: After finishing the course the student is able to describe the basics of cell membrane structure and function, to present the basic biophysical models describing the electrical function of the cell membrane, and to solve problems and calculations concerning these models. In addition, the student will be able make and present a short review and a talk about given scientific literature of this field.

Contents:

During the course the students will become acquainted with the central biophysical phenomena of the cell membrane, for example: the physical structure and properties of the cell membrane, lipids and proteins in the membrane, permeation and selectivity, ion channels and their kinetics. In addition they will get to know the basics about the theory of the intracellular or cell membrane recordings, the models describing the electrical function of the cell membrane and the analysis of these signals.

Learning activities and teaching methods:

Lectures 30 h, calculation exercises 22 h, seminars 4-8 h, seminar presentation, weekly assignments, home exam, final exam.

Target group:

Biophysics students: recommended in minor (LuK), compulsory in major (FM). Other students: recommended in biophysics minor (25 cu).

Recommended optional programme components:

Introduction to biophysics (764103P) and Foundations of cellular biophysics (764115P) are recommended to be done before this course. This course itself forms theoretical to Information processing in the nervous system (764680S).

Recommended or required reading:

Lecture handouts; J. Keener, J. Sneyd: Mathematical Physiology, Springer, Berlin, 1998 (partly).; D. Johnston, S. Wu: Foundations of Cellular Neurophysiology, MIT Press, Cambridge MA, 1995 (partly).

Person responsible:

Kyösti Heimonen, Marja Hyvönen

Other information:

https://wiki.oulu.fi/display/764323A/

050004Y: Chemistry, 3 op

Opiskelumuoto: General Studies
Laji: Course
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Johanna Myllyharju
Opintokohteen kielet: Finnish

ECTS Credits:
3 op
Timing:
C2
Learning outcomes:
After finishing the module student should have a basic knowledge concerning chemistry.
Contents:

General and inorganic chemistry: Basic concepts of chemistry; structure of atom; chemical bond; chemical formula, reaction and equations, stoichiometry; thermodynamics; phase equilibrium; reaction kinetics; chemical equilibrium; acid/base equilibrium; electrochemistry. Organic chemistry: nomenclature of organic compounds; carbon bonds; stereochemistry; properties and reactions of organic compounds.
Learning activities and teaching methods:
Lectures 26 h, practice of calculations 6 h.
Recommended or required reading:
R. Laitinen ja J. Toivonen: Yleinen ja epäorgaaninen kemia, soveltuvin osin. Otakustantamo. Harold Hart: Organic Chemistry. A short Course (soveltuvin osin), Houghton Mifflin Company, 6. (1983) tai uudempi painos. Luennot ja harjoitukset. Kemian opintojakson 39 työt -moniste (LTK/lääketieteellisen biokemian ja molekyylibiologian laitos).

Assessment methods and criteria:
Chemistry course includes 1 exam (4 essays, 0-2.5 p/essay, points needed for passing 4.75).

Grading:
Accepted/Fail.
Person responsible:
Professor Johanna Myllyharju

521302A: Circuit Theory 1, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Department of Electrical Engineering
Arvostelu: 1 - 5, pass, fail
Opettajat: Rahkonen, Timo Erkki
Opintokohteen kielet: Finnish

Language of instruction:
The course and exercises are held in Finnish.
Timing:
Period 5-6.
Learning outcomes:
In this course the student learns to analyse simple DC, AC, and transient circuits. The course gives necessary basic knowledge for all analogue electronics courses (Basics of Electronic Design, Electronics Design I - III, Analog Filters).
Learning Outcomes: After completing the course the student can write and solve a system of equations describing the behaviour of electric circuits, use complex phasor arithmetics to solve the response of circuits driven by sinusoidal signals, solve time responses of circuits, simplify circuit by employing equivalent circuits and series and parallel combinations, and run simple circuit simulations and understands the differences and limitations of different types of analyses.

Contents:
Electric quantities, circuit laws, systematic writing and solving of circuit equations using nodal and mesh analysis, time and frequency response, phasor calculation. Basics of circuit simulation.
Learning activities and teaching methods:
6 hours lectures and exercises per week. Basic circuit simulation exercises. The course is passed by a final exam and the simulation exercises (contact the lecturer for exam in English).
Recommended optional programme components:
Matrix Algebra, Differential Equations.
Recommended or required reading:
Handouts. The same topics are covered in Nilsson, Riedel: Electric Circuits (6th ed., Prentice-Hall 1996), chapters 1-11.

031017P: Differential Equations, 4 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Mathematics Division

Arvostelu: 1 - 5, pass, fail

Opettajat: Hamina, Martti Aulis

Opintokohteen kielet: Finnish

Leikkaavuudet:

800320A	Differential equations	5.0 op
031076P	Differential Equations	5.0 op

Language of instruction:
Finnish
Timing:
Period 4-6
Learning outcomes:
The students learn the concepts concerning differential equations and get the ability to read associated literature. The students will achieve adequate mathematical skills for treating differential equations. They can identify simple analytically solvable differential equations and they can solve these by using various methods.
Learning outcomes: The students can apply differential equations as a mathematical model. They can identify and solve various differential equations and they have knowledge on basic solvability of differential equations. The student can use the Laplace transform as a solution method.
Contents:
Principles of mathematical modelling. Ordinary differential equations of first and higher order. Laplace transform with applications to differential equations.
Learning activities and teaching methods:
Lectures 3h/week. Two intermediate exams or one final exam.
Recommended optional programme components:
Calculus I.
Recommended or required reading:
Lecture notes in Finnish. Kreyszig. E., Advanced Engineering Mathematics

521467S: Digital Image Processing, 5 op

Voimassaolo: - 31.07.2012

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Department of Computer Science and Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Pietikäinen, Matti

Opintokohteen kielet: English

Learning outcomes:

To make an introduction to digital image processing and image analysis.
Learning outcomes: After passing the course the student knows the theoretical foundations and most important application areas of digital image processing and image analysis. The student is able to apply spatial domain, frequency domain and wavelet-based image processing methods introduced in the course to solve practical problems in image enhancement, restoration, compression, segmentation and recognition.

Contents:
1. Digital image fundamentals, 2. Image enhancement, 3. Image restoration, 4. Color image processing, 5. Wavelets, 6. Image compression, 7. Morphological image processing, 8. Image segmentation, 9. Representation and description, 10. Basic principles of pattern recognition.
Learning activities and teaching methods:
Lectures, exercises, examination. Interactive image processing in Matlab environment is introduced in the programming exercise.
Recommended optional programme components:
Basic studies of mathematics
Recommended or required reading:
Gonzalez R.C., Woods R.E.: Digital image processing, Second edition, Addison-Wesley, 2002. Lecture notes (in Finnish), exercise material.

521109A: Electrical Measurement Principles, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Department of Electrical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Juha Saarela

Opintokohteen kielet: Finnish

Language of instruction:
Lectures are in Finnish. Laboratory exercises can be done in English.
Timing:
Periods 4-6.
Learning outcomes:
The goal of this course is to give the theoretical and practical basis on electrical measuring techniques and to give basic knowledge to later studies. The course will also provide knowledge to use of general electrical measurement equipment.
Learning outcomes: Upon completion of the course, students are be able to measure basic measurements with a ammeter, voltmeter and oscilloscope. They can estimate the validity of their measurements.
Contents:
Units of measures, standards of measures, analysis of errors, most commonly used analog and digital measuring methods, equipment and safety regulations.
Learning activities and teaching methods:
Lectures and laboratory exercises. One or two exams and passed lab exercises.
Recommended optional programme components:
Calculus I and II, Physics S.
Recommended or required reading:
A.D. Helfrich, W.D. Cooper: Modern Electronic Instrumentation and Measurement Techniques, Prentice Hall, 1990., material from Optima.

761103P: Electricity and Magnetism, 4 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Department of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

761119P Electromagnetism 1 5.0 op
761119P-01 Electromagnetism 1, lectures and exam 0.0 op
761119P-02 Electromagnetism 1, lab. exercises 0.0 op
761113P-01 Electricity and magnetism, lectures and exam 0.0 op
761113P-02 Electricity and magnetism, lab. exercises 0.0 op
761113P Electricity and magnetism 5.0 op
766319A Electromagnetism 7.0 op

ECTS Credits:
4 credits
Language of instruction:
The lectures will be in Finnish. The textbook is in English and exercises are selected from the textbook. For further information, contact the responsible person of the course.
Timing:
Spring
Learning outcomes:
Learning outcomes: The student is able to describe the basic concepts of electricity and magnetism and to apply those when solving the problems related to electromagnetism.
Contents:
Electromagnetic interaction is one of the four fundamental interactions in physics and many phenomena like light, radio waves, electric current, magnetism and formation of solid matter are based on electromagnetism. The current technological development is largely based on applications of electromagnetism in energy production and transfer, telecommunications and information technology.
Contents in brief: Coulomb's law. Electric field and potential. Gauss's law. Capacitors and dielectrics. Electric current, resistors, electromotive force and DC circuits. Magnetic field, motion of a charged particle in electric and magnetic fields, and applications. Ampère's law and Biot-Savart law. Electromagnetic induction and Faraday's law. Inductance and inductors. R-L-C circuits, alternating current and AC circuits.
Learning activities and teaching methods:
Lectures 32 h, 6 exercises (12 h).
Target group:
Secondary subject students.
Recommended optional programme components:
Knowledge of vector calculus and basics of differential and integral calculus are needed.
Recommended or required reading:
Text book: H.D. Young and R.A. Freedman: University physics, Addison-Wesley, 12th edition, 2008, chapters 21-31. Also 11th and 10th editions can be used.
Lecture material: Finnish lecture material will be available on the web page of the course.
Assessment methods and criteria:
Four mini examinations and end examination or final examination.
Person responsible:
Anita Aikio
Other information:
https://wiki.oulu.fi/display/761103P/

555364S: Ergonomics, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Department of Industrial Engineering and Management

Arvostelu: 1 - 5, pass, fail

Opettajat: Seppo Väyrynen

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

Language of instruction:
Finnish.

Learning outcomes:
The course familiarises the student with the fundamental principles of ergonomics.
Learning outcomes: After the completion of the course students are able to present and justify human artefacts and the interaction of the essential principles for the production and use of products. He can choose the methods which will enhance the employees safety, health, well-being to achieve work satisfaction. Still, he can develop and design products in the production according to physical, cognitive and organizational ergonomics.

Contents:
The anthropometrics, biomechanics, gerontechnology, work physiology, cognitive psychology and organisational and participative approaches. The principles of design and measurement (CAD, simulation, participative design). Usability.
Recommended or required reading:
Väyrynen, S, Nevala, N & Päivinen, M (2004), ***Ergonomia ja käytettävyys suunnittelussa*** . Teknologiateollisuus. 336 s . **Additional literature:** Bridger, R. (2009). ***Introduction to ergonomics*** . 3rd edition. CRC Press ; SFS-ergonomiastandardit (EN-ISO, www.sfs.fi), Copies from lectures.

040408S: Exercise and Work Physiology, 1 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Vuolteenaho, Olli Jaakko Tuomas
Opintokohteen kielet: Finnish

Language of instruction:
Finnish
Timing:
C 3
Learning outcomes:
After completion of the course the student:
- knows the principles and main methods of exercise physiology.
- can evaluate the knowledge and apply it for investigations of clinical physiological problems and mechanisms of diseases.
- can follow and evaluate the development of exercise physiology, as well as maintain and improve knowledge in it
- can apply knowledge in exercise physiology for acquiring, evaluating and reporting scientific medical and dental information.

Contents:
1. Physical work capacity
2. Assessment of physical strain
3. The effect of temperature on physiological functions

Learning activities and teaching methods:
Lectures (8 h), a practical (4 h), independent study (18 t)
Recommended or required reading:
Material is provided during the course
Assessment methods and criteria:
Attending the lectures and completing the practical
Grading:
No examination. Attending the lectures and practical is compulsory.
Person responsible:
Olli Vuolteenaho (olli.vuolteenaho@oulu.fi) ja Hannu Rintamäki (hannu.rintamaki@ttl.fi)

Other information:
Optional course complementing Physiology for Medical and Dental curricula

764115P: Foundations of cellular biophysics, 4 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Department of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

764125P Foundations of cellular biophysics 5.0 op

ECTS Credits:
2 credits
Timing:
2nd autumn
Learning outcomes:
Learning outcomes: After finishing the course the student is able to describe the foundations or basics of cellular structure and function, to present the biophysical background for some of these, and to solve simple problems and calculations concerning cellular biophysics and -chemistry. In addition, the student can specify and categorize some of the central fields of cell biology and cellular biophysics.
Contents:
In this course cellular function is considered from the point of view of biophysics. The course concentrates on the subjects of energy metabolism, information transfer, and the cellular structures and features that are biophysically interesting. The course contains, for instance, the introduction to the physical chemistry of the cells, the structure of cell and cell membrane (some basic cell biology), cellular energy sources and metabolism, cellular trafficking, kinetics of enzyme reactions, basics of cell membrane function and transportation phenomena, some introduction into the electrical phenomena of the cell membrane and the basics of cellular information processing.
Learning activities and teaching methods:
Lectures 14 h, calculation exercises 6 h, weekly assignments, home exam, final exam.
Target group:
Compulsory in biophysics major (LuK) and 25 cu (approbatur) minor.
Recommended optional programme components:
Introduction to biophysics (764162P) is recommended to be done before this course. This course forms an introduction for the course Biophysics of cell membranes (764323A).
Recommended or required reading:
Lecture handouts; P.J. Antikainen, Biotieteiden fysikaalista kemiaa, WSOY, Helsinki 1981 (partly); J. Heino and M. Vuento, Solubiologia, WSOY, Porvoo 2002 (partly). Since the books are in Finnish, some corresponding literature can be discussed upon with the lecturer.
Person responsible:
Marja Hyvönen, Kyösti Heimonen
Other information:
https://wiki.oulu.fi/display/764115P/

040108A: General Pathology, 3,5 - 5 op

Voimassaolo: 01.08.2014 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: Karttunen, Tuomo Juhani

Opintokohteen kielet: Finnish

ECTS Credits:
4,5 op
Timing:
C3 (DC3)
Learning outcomes:
Upon completion the student should know the basic mechanisms of diseases (etiology and pathogenesis), their basic morphological, functional and clinical characteristics, and terminology related with diseases. The student should be able to recognize the most common macroscopical and microscopical features of diseases and be able to reason the relationship between these features of the diseases and their symptoms and other clinical manifestations.

Contents:
Cellular adaptation; cell and tissue injury; genetic and environmental causes of diseases; infections and immunological mechanisms in disease; inflammation; healing; disorders of fluid balance and circulation; basic pathology of neoplastic diseases; basics of medical post-mortem investigation.
Learning activities and teaching methods:
Lectures 23 hours, practicals 33 hours. Self study. Written examination 3 hours.
Target group:
Medical and dental students.
Recommended or required reading:
Books:Underwood JCE: General and systematic pathology, 4 th ed. (2004; sections: Basic pathology and General disease mechanisms); or Kumar V. et al.: Robbins Basic Pathology, 8 th ed. (2007, or 7 th ed. 2003). Alternatives: Kumar et al.: Robbins and Cotran, Pathologic basis of disease, 7 th ed. (2005); Rubin & Strayer; Rubin's Pathology (2005). In Finnish: lecture handouts; Guidebook for microscopy practicals; Guidebook for autopsy practicals. Web-based material (in Finnish): http://www.medicine.oulu.fi/pato/opetus/YP_ATK_JOHDANTO.htm
Assessment methods and criteria:
The course requirements include participation in the compulsory practicals and passing in the end-of-course examination.
Grading:
The evaluation scale is 1-5/fail.
Person responsible:
Professor Ari Ristimäki

521116S: Healthcare Information Systems, 4 op

Voimassaolo: 01.08.2005 - 31.07.2012

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Department of Electrical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Esko Alasaarela

Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

811338A: Internet and Computer Networks, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Department of Information Processing Science

Arvostelu: 1 - 5, pass, fail

Opettajat: Kokkoniemi, Jouni Kalevi

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS
Language of instruction:
Finnish
Timing:
Timing: 1 st year, spring semester, period 3
Learning outcomes:
Learning outcomes: The student is able to describe the functioning of a computer network and how data is transmitted in a network, to list the distinct layers of a network (in two reference models), to estimate the significance and operation of distinct layers and to compare connectionless and connection-oriented transport. She/he identifies the most important network protocols and is able to estimate their functions. The student is able to explain the structure of the Internet addressing system and those general principles along which routing in IP-networks is carried out. She/he is able to calculate values to parameters describing the capacity of the network (transmission rate, traffic intensity, delay, etc.) and to apply the theory in a computer class, for instance, when analysing the network traffic.

Contents:
Contents:

1. The history and development of Internet and WWW
2. The basic concepts of computer networks: network devices, physical media, circuit switching, packet switching, delay, loss and throughput, protocols layers and reference models
3. The functioning of the application layer, network application architectures, communicating processes, transport services
4. Classical network applications: electronic mail, file transfer, remote login, newsgroups
5. New applications on the Internet: DNS, World Wide Web and HTTP, content distribution
6. Data transmission on the Internet. UDP protocol: connectionless and simple. TCP protocol: connection-oriented and reliable data transfer
7. Addressing and routing on the Internet, IP protocol
8. Multimedia: real-time applications, streaming stored audio and video, Internet radio, Internet telephone (VoIP), QoS
9. Local area networks, multiple access protocols, link-layer addressing, network devices, wireless connections
10. The principles of network security, security in different layers of the network.

Learning activities and teaching methods:

Mode of delivery: Lectures 40h, exercises 30h, autonomous work about 60h
Target group:
Target group: Bachelor level students, compulsory
Recommended optional programme components:
Prerequisites: Preceding course “Discrete Structures”
Recommended or required reading:
Study materials: Lecture slides (about 250 slides), lecture notes (about 100 pages), text book: J. F. Kurose and K. W. Ross, *Computer Networking. A Top-Down Approach, Fifth Edition*, Pearson Education Inc., 2010. ISBN: 978-0-136548-3.
Assessment methods and criteria:
Assessment methods: either partial exams (3 exams) or by a final exam
Grading:
on the scale 1 - 5
Person responsible:
Jouni Kokkoniemi

580102P: Introduction to Medical and Wellbeing Technology, 5 op

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

ECTS Credits:
2 credits
Timing:
1st year, autumn
Learning outcomes:
Learning outcomes: The student can define areas of medical technology and can list technological innovations used in these fields. The student can describe milestones in medical technology from history to present time.
Contents:
Practical examples of medical and wellness technology, introducing terms. Group work based on the material given and presenting the results.
Learning activities and teaching methods:
Lectures, demonstrations and excursions. Group work. Final exam.
Recommended or required reading:
Given material.
Assessment methods and criteria:

Participating in the contact teaching and group work. Written exam.
Grading:
Pass or fail
Person responsible:
Professor Timo Jämsä

580102P-02: Introduction to Medical and Wellbeing Technology, exam, 0 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: General Studies

Laji: Partial credit

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

ECTS Credits:
2 credits
Timing:
1st year, autumn
Learning outcomes:
Introductive course to medical and wellness technology studies. After this course the student is introduced to the major subject and orientated to his or her studies. Student has a general overview of the different areas of medical and wellness technology and engineering.
Contents:
Practical examples of medical and wellness technology, introducing terms. Group work based on the material given and presenting the results.
Learning activities and teaching methods:
Lectures, demonstrations and excursions. Group work. Final exam.
Recommended or required reading:
Given material
Assessment methods and criteria:
Participating in the contact teaching and group work. Written exam.
Grading:
Pass or fail
Person responsible:
Professor Timo Jämsä

580102P-01: Introduction to Medical and Wellbeing Technology, lectures, attendance, 0 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: General Studies

Laji: Partial credit

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

ECTS Credits:
2 credits
Timing:
1st year, autumn
Learning outcomes:
Introductive course to medical and wellness technology studies. After this course the student is introduced to the major subject and orientated to his or her studies. Student has a general overview of the different areas of medical and wellness technology and engineering.
Contents:

Practical examples of medical and wellness technology, introducing terms. Group work based on the material given and presenting the results.
Learning activities and teaching methods:
Lectures, demonstrations and excursions. Group work. Final exam.
Recommended or required reading:
Given material
Assessment methods and criteria:
Participating in the contact teaching and group work. Written exam.
Grading:
Pass or fail
Person responsible:
Professor Timo Jämsä

811122P: Introduction to Programming, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Department of Information Processing Science

Arvostelu: 1 - 5, pass, fail

Opettajat: Ilkka Räsänen

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay811122P Introduction to Programming (OPEN UNI) 5.0 op

ECTS Credits:
5 ECTS
Language of instruction:
Finnish
Timing:
1st year, period 1
Learning outcomes:
Objective: Student can systematically design, accomplish and test simple programs using C-language as a target language.

Learning outcomes: After the course, the student:

- Understands the importance of design in programming;
- Can design and implement modular programs;
- Understands the principles of control structures and can exploit them;
- Understands the meaning on array constructions and can exploit them;
- Understands the meaning of pointers and can exploit them;
- Understands the meaning of data structures and can exploit them;
- Can manipulate text files programmatically.

Contents:
Contents:

- Software design method (waterfall)
- Problem solving
- Stepwise refinement
- Control structures
- Modular programming, calling modules, communication between modules
- Data types
- Arrays
- Pointers
- Character strings
- Data structures
- File processing

Learning activities and teaching methods:
Mode of delivery: Lectures and exercises
Target group:

Target group: Bachelor level students, compulsory
Recommended optional programme components:
-
Recommended or required reading:
Study materials: http://www.tol.oulu.fi/users/ilkka.rasanen/johdanto.html
Course book: Datel, Datel: C HOW TO PROGRAM; Pearson Education Inc. 2007
Assessment methods and criteria:
Assessment methods: two ways **:** 1. Final exam & exercise points; and 2. Weekly exams & exercise points
Grading:
1-5
Person responsible:
Ilkka Räsänen

080901A: Introduction to Technology in Clinical Medicine, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
6 credits
Language of instruction:
Finnish
Timing:
2nd year, autumn-spring
Learning outcomes:
Learning outcomes: The student can list technologies in different fields of medical technology, can describe the working principle of these technologies and evaluate the advantages and limitationc of the technologies.

Contents:
Course introduction lectures. Specialists from different clinical areas give lectures and demonstrations, in which main themes and terms of the field are introduced and technical equipment and methods are presented.
Learning activities and teaching methods:
Initial exam. Lectures 35 hours, demonstrations 30 hours, written work. Final exam.
Assessment methods and criteria:
Initial exam and written work. Taking part in the lectures and demos. Written final exam.
Grading:
1-5 or fail.
Person responsible:
Professor Miika Nieminen

080901A-04: Introduction to Technology in Clinical Medicine, Exam, 0 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Intermediate Studies

Laji: Partial credit

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
6 credits
Language of instruction:
Finnish
Timing:
2nd year, autumn-spring

Learning outcomes:
After this course student is familiar with the different applications of medical technology and engineering that are used in different clinical areas.
Contents:
Course introduction lectures. Specialists from different clinical areas give lectures and demonstrations, in which main themes and terms of the field are introduced and technical equipment and methods are presented.
Learning activities and teaching methods:
Initial exam. Lectures 35 hrs, demonstrations 30 hrs, written work. Final exam.
Assessment methods and criteria:
Initial exam and written work. Taking part in the lectures and demos. Written final exam.
Grading:
1-5 or fail
Person responsible:
Professor Timo Jämsä

080901A-01: Introduction to Technology in Clinical Medicine, Initial exam, 0 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Intermediate Studies

Laji: Partial credit

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
6 credits
Language of instruction:
Finnish
Timing:
2nd year, autumn-spring
Learning outcomes:
After this course student is familiar with the different applications of medical technology and engineering that are used in different clinical areas.
Contents:
Course introduction lectures. Specialists from different clinical areas give lectures and demonstrations, in which main themes and terms of the field are introduced and technical equipment and methods are presented.
Learning activities and teaching methods:
Initial exam. Lectures 35 hrs, demonstrations 30 hrs, written work. Final exam.
Assessment methods and criteria:
Initial exam and written work. Taking part in the lectures and demos. Written final exam.
Grading:
1-5 or fail
Person responsible:
Professor Timo Jämsä

080901A-02: Introduction to Technology in Clinical Medicine, Lectures and demonstrations, 0 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Intermediate Studies

Laji: Partial credit

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
6 credits
Language of instruction:

Finnish
Timing:
2nd year, autumn-spring
Learning outcomes:
After this course student is familiar with the different applications of medical technology and engineering that are used in different clinical areas.
Contents:
Course introduction lectures. Specialists from different clinical areas give lectures and demonstrations, in which main themes and terms of the field are introduced and technical equipment and methods are presented.
Learning activities and teaching methods:
Initial exam. Lectures 35 hrs, demonstrations 30 hrs, written work. Final exam.
Assessment methods and criteria:
Initial exam and written work. Taking part in the lectures and demos. Written final exam.
Grading:
1-5 or fail
Person responsible:
Professor Timo Jämsä

080901A-03: Introduction to Technology in Clinical Medicine, Written assignment, 0 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Intermediate Studies

Laji: Partial credit

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
6 credits
Language of instruction:
Finnish
Timing:
2nd year, autumn-spring
Learning outcomes:
After this course student is familiar with the different applications of medical technology and engineering that are used in different clinical areas.
Contents:
Course introduction lectures. Specialists from different clinical areas give lectures and demonstrations, in which main themes and terms of the field are introduced and technical equipment and methods are presented.
Learning activities and teaching methods:
Initial exam. Lectures 35 hrs, demonstrations 30 hrs, written work. Final exam.
Assessment methods and criteria:
Initial exam and written work. Taking part in the lectures and demos. Written final exam.
Grading:
1-5 or fail
Person responsible:
Professor Timo Jämsä

580101Y: Introduction to University Studies, 2 op

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
2 ECTS

Language of instruction:
Finnish or English
Timing:
1st autumn
Learning outcomes:
Learning outcomes: After the course the student

- 1. identifies the most important departments, organisations and associations related to studying and knows their function and services
- 2. identifies the essential features for university studies and study planning in the field of medical and wellness technology
- 3. identifies ones path of studies
- 4. can compose and define the first personal study plan

Contents:
University studies. University and the learning environment, aims of the studies, structure and content, working methods, services provided for students. How to plan studies and making a personal study plan. Peer and teacher tutorial.
Learning activities and teaching methods:
Common informative meetings, group meetings by the tutors. Writing and updating the personal study plan. No exam.
Assessment methods and criteria:
Taking part actively into group meetings led by peer and teacher tutors. Making a personal study plan.
Grading:
Pass of fail
Person responsible:
Peer and teacher tutors, study advisor

580101Y-02: Introduction to University Studies, conversation, 0 op

Voimassaolo: 01.08.2010 -
Opiskelumuoto: General Studies
Laji: Partial credit
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

580101Y-01: Introduction to University Studies, tutorial, 0 op

Voimassaolo: 01.08.2010 -
Opiskelumuoto: General Studies
Laji: Partial credit
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

764103P: Introduction to biophysics, 2 op

Voimassaolo: 01.08.2009 -
Opiskelumuoto: Basic Studies
Laji: Course
Vastuuyksikkö: Department of Physics
Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

764163P-02 Basic biophysics (part 2) 0.0 op

764163P Basic biophysics 5.0 op

764163P-01 Introduction to Biomedical Physics (part 1) 0.0 op

ECTS Credits:
3 credits
Language of instruction:
Finnish
Timing:
1st spring
Learning outcomes:
Learning outcomes: Acquiring basic knowledge of biophysics useful in more advanced courses.
Contents:
The course gives knowledge of basic biological processes from biophysics point of view. The focus is on cellular and molecular mechanisms but also includes introduction to the biophysics of movement and fluid flow phenomena and some other more specialized topics.
Learning activities and teaching methods:
Lectures 21 h.
Target group:
Students in Physics B.Sc. program (obligatory) and students aiming for Biophysics minor.
Recommended optional programme components:
None. This course is a good starting point for other studies in the field of Biophysics.
Recommended or required reading:
Lectures and lecture notes.
Assessment methods and criteria:
Written examination.
Person responsible:
Kyösti Heimonen, Marja Hyvönen and Matti Weckström
Other information:
https://wiki.oulu.fi/display/764103P/

040007Y: Introduction to scientific research, 1,5 op

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: Pentti Nieminen

Opintokohteen kielet: Finnish

ECTS Credits:
1,5 credits
Timing:
C2
Learning outcomes:
By the end of the course the student will have practiced the following skills:
- understanding scientific research process
- obtaining data
- exploring research methods and analyzing data
- reporting research findings in medical and dental journals

Contents:

Scientific communication, study planning, study designs, analyzing research data and reporting. Special points in medical research: ethics in research, regulations in clinical research and use of animals in scientific research.
Learning activities and teaching methods:

Lessons 10 h, homework and learning tasks 24 h.

Assessment methods and criteria:
Participation in the Faculty of Medicine Science Day and completion of homework.
Grading:
Pass/Fail
Person responsible:
Docent Pentti Nieminen
Other information:
This course is a part of the studies in research skills.

040910S: Laboratory Animal Course For Scientists, 6 op

Voimassaolo: - 31.07.2012
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Laboratory Animal Centre
Arvostelu: 1 - 5, pass, fail
Opettajat: Voipio Hanna-marja
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

761121P: Laboratory Exercises in Physics 1, 3 op

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

761115P	Laboratory Exercises in Physics 1	5.0 op
761118P-01	Mechanics 1, lectures and exam	0.0 op
761115P-02	Laboratory Exercises in Physics 1, laboratory exercises	0.0 op
761115P-01	Laboratory Exercises in Physics 1, lecture and exam	0.0 op
761114P-01	Wave motion and optics, lectures and exam	0.0 op
761113P-01	Electricity and magnetism, lectures and exam	0.0 op

ECTS Credits:
3 credits
Language of instruction:
The lectures and the instruction material will be in Finnish. The laboratory experiments will be made in groups guided either in Finnish or in English.
Timing:
Autumn, spring.
Learning outcomes:
The student can safely make physical measurements, use different measurement tools, read different scales, handle the data, calculate the error estimations and make a sensible report of his laboratopy measurements.
Contents:
The skill to make laboratory measurements is important for physicists. This is an introductory course how to make physical measurements and how to treat the measured data. Laboratory works are made in groups. The laboratory security is an essential part also in physics. Measurements are made with different instruments. As a result the most probable value is determined as well as its errors. The skills obtained during this course can be applied in the other laboratory courses Laboratory exercises in physics 2 and 3.
Learning activities and teaching methods:
Lectures 12 h, exercises 20 h (5 x 4 h).
Five different works will be made during the course in groups of up to 8 students.
Target group:

Compulsory in physics.
Recommended or required reading:
A booklet: Fysiikan laboratoriotyöt I, laboratoriotöiden työohje. Course material is in Finnish. A few English material is available in teaching laboratory.
Assessment methods and criteria:
Written reports of the experiments and a written examination.
Grading:
Scale 1-5 / fail
Person responsible:
Kari Kaila
Other information:
https://wiki.oulu.fi/display/761121P/
Registration for the course and exams will be found by using the code 761121P-01

031019P: Matrix Algebra, 3,5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Mathematics Division

Arvostelu: 1 - 5, pass, fail

Opettajat: Matti Peltola

Opintokohteen kielet: Finnish

Leikkaavuudet:

031078P Matrix Algebra 5.0 op

Language of instruction:
Finnish
Timing:
Period 1-3
Learning outcomes:
The course gives the elementary theory of linear equations, matrices and vector spaces. The eigenvalues and eigenvectors with applications are introduced.
Learning outcomes **:** After completing the course the student is able to apply arithmetic operations of matrices. He can solve system of linear equations by matrix methods and can apply iterative methods to _nd the solution of the system of linear equations. The student is able to recognise the vector space and can relate the consepts of linear transform and matrix. He can analyse matrices by the parameters, vectors and vector spaces of matrices. The student is able to diagonalize matrices and apply diagonalization to the simple applications.
Contents:
Vectors and matrices. Systems of linaer equations. Vector spaces and linear transformations. The rank, nullity, row space and the column space of a matrix. The determinant of a matrix. Eigenvalues and eigenvectors of a matrix. The diagonalization with applications. The iterative methods of solving linear system of equations. The theorems of Gershgorin and Cayley- Hamilton.
Learning activities and teaching methods:
Term course. Lectures 4 h/week. Two examinations or final examination.
Recommended or required reading:
Grossman, S.I. : Elementary Linear Algebra.

580211S: Maturity Test, 0 op

Voimassaolo: 01.08.2003 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

ECTS Credits:
0 credits
Timing:
After completion of the thesis.
Learning outcomes:
Learning outcomes: The student can produce mature text in popular form of the research field and thus show ones familiarity to the field.
Learning activities and teaching methods:
Takes place after master's thesis. Written based on a given topic considering the thesis.
Grading:
Pass or fail.
Person responsible:
Professor Timo Jämsä

580211A: Maturity Test, 0 op

Voimassaolo: 01.08.2008 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

Timing:
After completion of the bachelor's thesis.
Learning outcomes:
Learning outcomes: The student can produce mature text in popular form of the research field and thus show ones familiarity to the field.
Learning activities and teaching methods:
Takes place after bachelor's thesis. Written based on a given topic considering the thesis.
Grading:
Pass or fail.
Person responsible:
Professor Timo Jämsä

040902Y: Medical Biochemistry and molecular biology, 8 - 9 op

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: Johanna Myllyharju

Opintokohteen kielet: Finnish

ECTS Credits:
7,0 cr
Timing:
2nd year, spring
Learning outcomes:
Aim of this module is to learn the function of the cells at the molecular level and recognize the basic biochemical compounds, reactions and the overall regulation of various metabolic pathways, especially those which are meaningful for Medicine.
Contents:

Structure of carbohydrates, amino acids, lipids and nucleic acids; metabolism of the carbohydrates, amino acids, lipids and nucleic acids; porphyrins and bile pigments; prostaglandins; thromboxanes; leukotrienes; regulation of gene expression; recombinant DNA technology; stem cells; intracellular messengers; energy metabolism; hormones; hypoxia response of the cells; components and function of extracellular matrix.

Learning activities and teaching methods:
Lectures 117 h.

Recommended or required reading:
Murray, R.K. (ed.): Harper's Illustrated Biochemistry, 28th edition, 2009.

Assessment methods and criteria:
Medical biochemistry and molecular biology course includes 4 different intermediate exams; the first exam with principle of fail or accepted, and the rest exams will be graded (4 essays, 0-2.5 p/essay, points needed for passing 4.75). Final exam consist of 5 essays (0-10 p/essay). In final exams only 1 essay from 5 can have points lower than 4.5, otherwise exam will be failed. All the intermediate exams should be passed before participation in final exam.

Grading:
5 = 42,5 or more; 4 = 37,5-42; 3 = 32,5-41,75; 2 = 27,5-32,25; 1= 23-32.

Person responsible:
Prof. Johanna Myllyharju

764369A: Medical Equipments, 3 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Department of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Other information:
https://wiki.oulu.fi/display/764369A/

764633S: Medical Physics, 4 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Department of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
4 credits

Timing:
4th-5th Autumn

Learning outcomes:
Learning outcomes: The student is able to define the physical principles on which various medical diagnostic and therapeutic devices are based upon.

Contents:
The course gives an introduction to the basic physics related to biomedical equipment used in hospitals (e.g. imaging and therapeutic devices). Covered topics include e.g. x ray imaging, computed tomography, magnetic resonance imaging, isotope techniques, radiation therapy and biomedical signal processing. The course contents may vary depending on the lecturers.

Learning activities and teaching methods:
Lectures 30 h, calculus assignments 15 h, exam.

Target group:
Physics MSc students with biophysics major or/and medical physics minor, biomedical engineering students.

Recommended optional programme components:

Recommended: physics basic courses and Radiation physics, biology and safety (761116P, 764117P or 764317A).
Recommended or required reading:
Dowsett, Kenny, Johnston. The Physics of Diagnostic Imaging, 2nd ed., Hodder Arnold, 2006
Additional literature depending on the lecturers.
Person responsible:
Iikka Salmela
Other information:
https://wiki.oulu.fi/display/764633S/

040002Y: Medical cell and developmental biology, 7 op

Opiskelumuoto: General Studies

Laji: Course

Vastuuyksikkö: Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: Tuukkanen, Kaarlo Juha Kullervo

Opintokohteen kielet: Finnish

ECTS Credits:
7credit points
Timing:
C1
Learning outcomes:
The learning outcomes are to identify the structure of various cell types (especially mammalian cells), the structure and function of cell organelles, cell growth and cell division and the principles of the regulation of cell function, genetic regulation and the common research techniques in cell biology. The student should understand gametogenesis, fertilization, embryonal development (0-40days) and its regulation as well as the development of embryonal malformations. The student should also understand the human growth and development. In addition, the student should learn the basic tissues of the human body and the microscopic structure of the tissues for understanding their normal and pathological function.
Contents:
Cell evolution and cell biology, human embryonal development (embryology), basic tissues which make up the organs (histology).
.
Learning activities and teaching methods:
Lectures 54 h and small group exercises 15 h
Recommended or required reading:
A.L. Kierszenbaum: Histology and Cell Biology: an introduction to pathology. Mosby, St Louis, (the latest edition), or J. Heino, M. Vuento: Biokemian ja solubiologian perusteet. WSOY oppimateriaalit, 1. edition (2007)
B. Young, J.S. Lowe, A. Stevens, J.W. Heath: Wheater's Functional Histology, A Text and Colour Atlas. Elsevier, Churchill Livingstone (or similar Atlas of Histology)
T.W. Sadler: Langman's Medical Embryology. Williams&Wilkins co, Baltimore
Additional material among the following books: 1) M. Niemi, K. Väänänen: Ihmisyksilön kehitysbiologia. Kustannus Oy Duodecim, 1993 2) H. Sariola, M. Filander, T. Heino, J. Jernvall, J. Partanen, K. Sainio, M. Salminen, I. Theseleff: Solusta yksilöksi, Kehitysbiologia. Kustannus Oy Duodecim, 2003
Web material:
http://www.solunetti.fi histology, pathology and embryology (partly under construction)
http://www.thieme.com/dyn/ebooklibrary/index.php
many atlas books, free access from the computers in the internet domain of Oulu University. Handouts of the lectures and practicals.
Assessment methods and criteria:
Participation in the small group practicals. The study module includes final examination . Medical cell and developmental biology and histology together with the study module of Anatomy will make the final grade of Anatomy. (See Anatomy study module)
Grading:
See Anatomy
Person responsible:
Professor Petri Lehenkari (Professor Juha Tuukkanen, leave of absence)

Other information:
Medical and dental students have the same study module .
The students in Medical and Wellness Technology have the same study module in extent of 5 credit points when participating in the lectures (54 h), one microscopy practical and the examination.

040002Y-01: Medical cell and developmental biology, examination, 0 op

Voimassaolo: 01.08.2011 -

Opiskelumuoto: General Studies

Laji: Partial credit

Vastuuyksikkö: Medicine

Arvostelu: 0,0 - 99,9

Opettajat: Tuukkanen, Kaarlo Juha Kullervo

Opintokohteen kielet: Finnish

ECTS Credits:
7credit points
Timing:
C1
Learning outcomes:
The learning outcomes are to identify the structure of various cell types (especially mammalian cells), the structure and function of cell organelles, cell growth and cell division and the principles of the regulation of cell function, genetic regulation and the common research techniques in cell biology. The student should understand gametogenesis, fertilization, embryonal development (0-40days) and its regulation as well as the development of embryonal malformations. The student should also understand the human growth and development. In addition, the student should learn the basic tissues of the human body and the microscopic structure of the tissues for understanding their normal and pathological function.
Contents:
Cell evolution and cell biology, human embryonal development (embryology), basic tissues which make up the organs (histology).
.
Learning activities and teaching methods:
Lectures 54 h and small group exercises 15 h
Recommended or required reading:
A.L. Kierszenbaum: Histology and Cell Biology: an introduction to pathology. Mosby, St Louis, (the latest edition), or J. Heino, M. Vuento: Biokemian ja solubiologian perusteet. WSOY oppimateriaalit, 1. edition (2007)
B. Young, J.S. Lowe, A. Stevens, J.W. Heath: Wheater's Functional Histology, A Text and Colour Atlas. Elsevier, Churchill Livingstone (or similar Atlas of Histology)
T.W. Sadler: Langman's Medical Embryology. Williams&Wilkins co, Baltimore
Additional material among the following books: 1) M. Niemi, K. Väänänen: Ihmisyksilön kehitysbiologia. Kustannus Oy Duodecim, 1993 2) H. Sariola, M. Filander, T. Heino, J. Jernvall, J. Partanen, K. Sainio, M. Salminen, I. Theseleff: Solusta yksilöksi, Kehitysbiologia. Kustannus Oy Duodecim, 2003
Web material:
http://www.solunetti.fi histology, pathology and embryology (partly under construction)
http://www.thieme.com/dyn/ebooklibrary/index.php
many atlas books, free access from the computers in the internet domain of Oulu University. Handouts of the lectures and practicals.
Assessment methods and criteria:
Participation in the small group practicals. The study module includes final examination . Medical cell and developmental biology and histology together with the study module of Anatomy will make the final grade of Anatomy. (See Anatomy study module)
Grading:
See Anatomy
Person responsible:
Professor Petri Lehenkari (Professor Juha Tuukkanen, leave of absence)
Other information:
Medical and dental students have the same study module .
The students in Medical and Wellness Technology have the same study module in extent of 5 credit points when participating in the lectures (54 h), one microscopy practical and the examination.

040011Y: Medical informatics, 2 op

Opiskelumuoto: General Studies
Laji: Course
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Pentti Nieminen
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

040011Y-01: Medical informatics, module 1, information and Communication Technology, 0,5 op

Opiskelumuoto: General Studies
Laji: Partial credit
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Paadar, Matti Reino Isak
Opintokohteen kielet: Finnish

Timing:
C1
Learning outcomes:
By the end of the course the student will have practiced the following skills:
- using information and communication technology resources in the University of Oulu,
- using workstations available in the Medical Faculty,
- applying basic software necessary in the studies
Contents:
Workstations, information security and confidentiality, networks, office software
Learning activities and teaching methods:

Lectures 2 h, group work in computer class-room 6-8 h and completion of a practical project 4 h. Group works include practical work with the university network, web-learning environment and software installed in the workstations.
Assessment methods and criteria:
Regular and active participation in the small group lessons and completion of a practical project.
Grading:
Pass/Fail
Person responsible:
Docent Pentti Nieminen
Other information:
This course is a part of the studies in research skills.

040011Y-02: Medical informatics, module 2, literature retrieval, 1 op

Opiskelumuoto: General Studies
Laji: Partial credit
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Pentti Nieminen
Opintokohteen kielet: Finnish

ECTS Credits:

1 cr
Timing:
C2
Learning outcomes:
By the end of the course the student will have practiced the following skills:
- search research articles using basic literature retrieval methods
- use bibliographic databases available at the Medical Faculty
Contents:
1. Library information systems, 2. Medical and dental publications, 3. Scientific online journals, 4. Medline, 5. Medic, 6. Scopus, 7. Cochrane, 8. Electronic books, 9. Reference management software.
Learning activities and teaching methods:
Lectures 4 h, group lessons in computer class-room 9 h and completion of practical projects 10 h.
Assessment methods and criteria:
Regular and active participation in the small group lessons and completion of practical projects.
Grading:
Pass/Fail
Person responsible:
Docent Pentti Nieminen
Other information:
This course is a part of the studies in research skills.

040011Y-03: Medical informatics, module 3, clinical information systems, 0,5 op

Opiskelumuoto: General Studies

Laji: Partial credit

Vastuuyksikkö: Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: Pentti Nieminen

Opintokohteen kielet: Finnish

ECTS Credits:
0,5 credits
Timing:
C5
Learning outcomes:

By the end of the course the student will have practiced the following skills:
- providing clinical knowledge
- using electronic patients information systems
- using health care classification systems
- using workstations and network for clinical work
Contents:
Medical databases, critical appraisal of medical research article, electronic patients records and information systems.
Learning activities and teaching methods:
Lessons 12 h and completion of a practical project.4 h.
Assessment methods and criteria:
Regular and active participation in the lessons and completion of a practical project.
Grading:
Pass/Fail
Person responsible:
Docent Pentti Nieminen
Other information:
This course is a part of the studies in research skills

764680S: Neural information processing, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Department of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
5 credits
Language of instruction:
Can be taught also in English.
Timing:
4th autumn
Learning outcomes:
Learning outcomes: After finishing the course the student is able to describe and explain the basic principles, model and functions in the information processing of neurons, for example: membrane functions of neurons, synaptic functions, neural signals, neural information. These models and functions enable the student to solve, analyze and calculate problems and exercises concerning this field. In addition the student is able to describe certain special issues of neural information processing, to illustrate biophysical models made of them and solve calculations concerning them.
Contents:
The course introduces the basics of the cellular functions concerning neural information processing, for example: nerve cell membrane phenomena, synaptic functions, neural signals, neuronal information. In addition some special issues of neuronal information processing are dealt with.
Learning activities and teaching methods:
Lectures ca. 30 h, calculation exercises 15 h, exam, home exam.
Target group:
This is an optional course for the students in the biophysics master program (major) and in biophysics minor.
Recommended optional programme components:
Cell membrane biophysics (764323A or 764623S) is recommended to be done before this course.
Recommended or required reading:
Lectures and other material given during the course.
Person responsible:
Matti Weckström, Kyösti Heimonen
Other information:
https://wiki.oulu.fi/display/764680S/

040112A: Physiology, 15 op

Voimassaolo: 01.08.2005 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: Vuolteenaho, Olli Jaakko Tuomas

Opintokohteen kielet: Finnish

ECTS Credits:
15op
Language of instruction:
Mainly Finnish, part of lectures and practical in English
Timing:
C3
Learning outcomes:
After completion of the course the student:
- knows the principles of the function, regulation, and interrelations of the cells, tissues and organ systems of the healthy human being, as required for independent work as a physician or dentist
- can evaluate the knowledge and apply it for investigations of clinical physiological problems and mechanisms of diseases
- can follow and evaluate the development of physiology as a science, and maintain and improve knowledge in it
- can apply knowledge in physiology for acquiring, evaluating and reporting scientific medical and dental information

After reaching the learning aims the student has sufficient knowledge and skills in physiology for studies leading to the degrees of Licenciate of Medicine and Licenciate of Dentistry, and for continuous learning.

Contents:
1. Cell physiology
2. Organ physiology
3. Physiological regulation and integrative physiology
4. Clinical physiology

Learning activities and teaching methods:
Guidance and tutorial (3 h), lectures (100 h), practicals (28 h), English-language group discussion (2 h), term papers (6 h), independent study (255 h), interim ja final examinations (6 h)

Recommended or required reading:
Textbook: Ganong's Review of Medical Physiology (most recent edition). The availability of the textbook in the library can be checked here.
Practicals Textbook (in Finnish): Fysiologian harjoitustyöt (Oulun yliopiston oppimateriaalia-sarja, Lääketiede D 3, most recent edition)
Lecture notes can be found in Optima Environment (http://optima.oulu.fi

Assessment methods and criteria:
Lectures, attending the English-language group discussion and practicals, completing the term papers, passing the examinations. There are three attempts for each examination.

Grading:
Numerical grades for interim & final examinations and term paper II (1-3/fail). Assessment of practicals and term paper (pass/fail). Attending the final examination requires prior passing of the interim examination, both term papers, practicals, and English-language group discussion. The final grade for Physiology (1-5/fail) is based on the grades obtained from term paper II (weight 10%), interim examination (30%) and final examination (60%). Corresponding studies abroad are assessed case-by-case on the basis of official documentation.

Person responsible:
Professor Olli Vuolteenaho

Other information:
Physiology for Medical and Dental curricula

040112A-021: Physiology, practicals entry examination, 1 op

Voimassaolo: 01.08.2014 -
Opiskelumuoto: Basic Studies
Laji: Partial credit
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Vuolteenaho, Olli Jaakko Tuomas
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

580121A: Practical training, 1 - 5 op

Voimassaolo: 01.08.2005 -
Opiskelumuoto: Intermediate Studies
Laji: Practical training
Vastuuyksikkö: Institute of Health Sciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Jämsä, Timo Jaakko
Opintokohteen kielet: Finnish

ECTS Credits:
1-4 credits

Timing:
Master studies, elective course

Learning outcomes:
Learning outcomes: The student can undertake tasks in practical working life.
Assessment methods and criteria:
Practical training in the field. The student should fill out the form about training and return it to the department.
Grading:
Practical training can be accepted to elective studies. Maximum is 4 ECTS. One ECTS is equal to three weeks training.
Person responsible:
Professor Timo Jämsä
Other information:
Practical Training 2 can be included in the Master's Degree. For more information, please contact assistant Maarit Kangas.

580120A: Practical training 1, 1 - 5 op

Voimassaolo: 01.08.2005 -

Opiskelumuoto: Intermediate Studies

Laji: Practical training

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

ECTS Credits:
1-4 credits
Timing:
From 1st to 3rd year, elective course
Learning outcomes:
Learning outcomes: The student can undertake supervised tasks in working life.
Assessment methods and criteria:
Practical training in the field. The student fills the form for training and returns it to the department.
Grading:
Practical training can be accepted to elective studies. Maximum is 4 ECTS. One ECTS is equal to three week of training.
Person responsible:
Professor Timo Jämsä
Other information:
Practical Training 1 can be included in the Bachelor's Degree. For more information, please contact assistant Maarit Kangas.

521431A: Principles of Electronics Design, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Department of Electrical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Juha Kostamovaara

Opintokohteen kielet: Finnish

Language of instruction:
Finnish.
Timing:
Period 1-3.
Learning outcomes:
To give the students all the basic information that all electrical engineers needs about circuit techniques of analogue electronics and internal structure of digital circuits.
Contents:

Analogue and digital circuits, basic amplifier related concepts, operational amplifier, diodes and diode circuits, single stage bipolar- and MOS-transistor amplifiers and how to bias them, small signal modeling and analyzing ac-properties of the amplifiers, internal structures of digital circuits (mainly CMOS), the principles of AD/DA - conversion and principles of VLSI-technology.
Learning activities and teaching methods:
Lectures and exercises. Final exam.
Recommended optional programme components:
Basic knowledge in Circuit Theory (Circuit Theory I). Also, understanding the basic operation of semiconductors helps (Principles of Semiconductor Devices).
Recommended or required reading:
Handout. Sedra, Smith: Microelectronic Circuits (4th edition), chapters 1, 3-5, 10.9, 13 and 14. OR Hambley: Electronics (2nd edition), chapters 1, 2, 3, 4, 5; 6 partially and some parts of other chapters.

580210S: Pro Gradu, 35 op

Opiskelumuoto: Advanced Studies

Laji: Diploma thesis

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
35 credits
Language of instruction:
Finnish or English
Timing:
Master studies
Learning outcomes:
Learning outcomes: The student can independently solve a research problem, and describe and solve it. The student can report the work in written form according to the scientific report principles.
Contents:
Research project in the field of medical & wellness technology and writing of the thesis.
Learning activities and teaching methods:
Thesis can be made at different research groups of the university or in industry or health care system. The student writes the thesis independently supported by the supervisor. The topic and contents should be discussed with the professor beforehand.
Grading:
1-5 or fail
Person responsible:
Professor Miika Nieminen

031021P: Probability and Mathematical Statistics, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Mathematics Division

Arvostelu: 1 - 5, pass, fail

Opettajat: Jukka Kemppainen

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay031021P Probability and Mathematical Statistics (OPEN UNI) 5.0 op

Language of instruction:
Finnish
Timing:
Period 4-6
Learning outcomes:

The course provides the student the fundamental knowledge of the basic concepts of probability, random variables, management of statistical material, hypothesis testing and estimation methods.
Learning outcomes **:** After completing the course the student is able to use the basic concepts of probability and most important random variables and is also able to apply these to calculate probabilities and expected values. The student is also able to analyze statistical material by calculating confidence intervals, formulating and testing hypotheses and by performing maximum likelihood estimations.
Contents:
Basic concepts of probability, conditional probability, discrete and continuous random variables and their distributions, expectation and variance, joint distributions, central limit theorem, elements of statistics, interval of confidence, hypothesis testing, maximum likelihood estimation.
Learning activities and teaching methods:
Term course. Lectures 4 h/week. Two examinations or a final examination.
Recommended optional programme components:
Calculus I and Calculus II.
Recommended or required reading:
Milton J.S. and Arnold J.C.: Introduction to Probability and Statistics, McGraw-Hill (1992).

521053S: Product Responsibility to Medical Devices, 2 op

Voimassaolo: - 31.07.2012

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Department of Electrical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Hannu Sorvoja

Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

811175P: Programming Assignment I, 2 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Department of Information Processing Science

Arvostelu: 1 - 5, pass, fail

Opettajat: Ilkka Räsänen

Opintokohteen kielet: Finnish

ECTS Credits:
2 ECTS
Timing:
1st year, periods 2 + 3

Learning outcomes:
Objective: Student can systematically design, implement and test simple pro-grams using C-language as a target language.
Learning Outcomes: to deepen the understanding of design, implementation and testing in programming
Contents:
- problem analysis
- design
- implementation
- documentation

Learning activities and teaching methods:
Independent working + 2 workshop
Target group:
1st year
Recommended optional programme components:

Introduction to programming
Recommended or required reading:
Introduction to programming lecture material

Assessment methods and criteria:
Accomplish programming assignment
Grading:
1-5
Person responsible:
Ilkka Räsänen

764317A: Radiation physics, biology and safety, 3 op

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

Ei opintojaksokuvauksia.

902006Y: Reading for Academic Purposes, 1,5 op

Voimassaolo: 01.08.1995 -
Opiskelumuoto: Language and Communication Studies
Laji: Course
Vastuuyksikkö: Language Centre
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: English
Leikkaavuudet:

ay902006Y Reading for Academic Purposes (OPEN UNI) 1.5 op

Proficiency level:
B2/C1
Status:
This course is compulsory for the students who choose English but are not exempted on the basis of their matriculation exam grade or an exemption exam. An alternative course is 903007Y German.
Required proficiency level:
Students are expected to have had English as their A1 or A2 language at school or to have acquired equivalent skills.
ECTS Credits:
1,5 credits
Timing:
1st year spring term for the students of medicine and dentistry, and 2 nd year spring term for wellness technology students.
Learning outcomes:
Objective: The learning outcomes to be obtained by students include the following skills

- employing appropriate reading strategies (skimming, scanning and strategies of extensive reading) to identify main points, locate information and synthesize knowledge in the academic texts of the student's field of study

- recognizing the discipline and genre -specific conventions of the target texts as manifested in distinctive patterns of text organization, phraseology and word formation

- inferring textual meaning based on an understanding of text organization, cohesive devices, grammatical structures and patterns of word formation

- combining information from various academic sources, creating a synthesis, and summarizing

- critical reading: recognizing the author's communicative purpose and point of view, assessing the validity of textual arguments, recognizing implications, understanding the communicative value of the text

Target group:
Students in the degree programs of medicine, dentistry, and wellness technology
Recommended or required reading:
Information will be provided at the beginning of the course.
Assessment methods and criteria:
The course requirements include active participation in classroom work and completion of home assignments. Alternatively, an end-of-course examination may be offered. The evaluation scale is 1-5.
Grading:
The evaluation scale is 1-5.
Person responsible:
Eva Braidwood
Other information:
Students with the matriculation exam grade laudatur or eximia cum laude approbatur , or who have graduated from an IB -program will be exempted from the course but can participate voluntarily. For the rest of the students **an exemption exam will be offered on December 2nd, 2011 at 9-12 in lecture hall F202.** The exemption exam is voluntary and can be taken only once. Students **sign up for the exam in WebOodi from November 14th - 28th.** The students not exempted in the above ways are required to participate in the course. Students **sign up for the course in WebOodi from February 1st-17th 2012.** Information on the time and place of the classes will be provided in Optima and WebOodi.

902007Y: Scientific Communication, 1,5 op

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Language Centre

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Leikkaavuudet:

ay902007Y Scientific Communication (OPEN UNI) 1.5 op

Proficiency level:
B2/C1
Status:
This course is compulsory for the students who have chosen English. An alternative course is 903008Y German.
Required proficiency level:
Students are expected to have had English as their A1 or A2 language at school or to have acquired equivalent skills.
ECTS Credits:
1,5 ECTS credits
Timing:
Students in the degree program of
o medicine: 4th year fall term
o dentistry: 3rd year spring term
o wellness technology: 1st year fall term
Learning outcomes:
The learning outcomes to be obtained by students include the following skills
- accuracy of pronunciation, word stress and intonation especially in the language used for professional and academic communication in the student's field of study,
- using English fluently and accurately to communicate knowledge and express opinions in a conversation relating to the target field,
- an ability to summarize orally texts on professional and academic topics in the target field,- an ability to give a presentation on a professional or academic topic relating to the student's field of study.

Students with adequate oral skills previously acquired, may choose, as an alternative, **a writing course with learning outcomes including an ability**
- to write a research article that follows the main discourse conventions of the target field,

- to use grammatical patterns that are stylistically appropriate for the research articles of the target field,
- to use general scientific vocabulary and field specific terminology in an idiomatic way,
- to create field-specific patterns of text structure,
- to develop a systematic argument with supporting detail.

Target group:
Students in the degree programs of medicine, dentistry, and wellness technology
Recommended or required reading:
Information will be provided at the beginning of the course.
Assessment methods and criteria:
Assessment is based on active participation in classroom activities, completion of home assignments and the presentations given/completion of writing assignments.
Grading:
The evaluation scale is 1-5.
Person responsible:
Eva Braidwood
Other information:
Medical students **sign up** for the course **in WebOodi from August 15th-22nd 2011.** Information on the time and place of the classes will be provided in Optima and WebOodi.
Wellness technology and dentistry students sign up at their departments.

901020Y: Second Official Language (Swedish), 3 op

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Language Centre

Opintokohteen kielet: Swedish

Ei opintojaksokuvauksia.

521124S: Sensors and Measuring Techniques, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Department of Electrical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Myllylä, Risto Antero

Opintokohteen kielet: Finnish

Language of instruction:
In Finnish. Materials also available in English.

Timing:
Period 1-2.
Learning outcomes:
The objective of the course is to present common practical solutions for electrically measuring physical quantities. This course covers especially sensors and methods used in process industry.
Learning outcomes: After the course the student is capable to explain the operating principles of different sensors and can select a right sensor for each measuring target. He/she is able to quantify the requirements that affect sensor selection as well as recognize and evaluate the uncertainty of a measurement. In addition the student is able to plan and design sensor signal conditioning circuits.
Contents:
Methods for measuring displacement, velocity, acceleration, torque, liquid level, pressure, flow, humidity, sound and temperature. Ultrasound, optical and nuclear measurement techniques and applications, material analyses such as pH measurement and gas concentration, pulp and paper measurements and smart sensors.

Learning activities and teaching methods:
Lectures and exercises. The course is passed by a final exam.
Recommended or required reading:
H. N. Norton: Handbook of Transducers, Prentice Hall P T R, 1989 or 2002; lecture notes (in Finnish); exercise notes (also in English)

764359A: Spectroscopic methods, 5 op

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

Ei opintojaksokuvauksia.

080913A: Technology in Clinical Chemistry, 3 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Institute of Health Sciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Jämsä, Timo Jaakko
Opintokohteen kielet: Finnish

ECTS Credits:
3 credits
Language of instruction:
Finnish
Timing:
Master studies, autumn or spring. The course is not organized every year.
Learning outcomes:
Learning outcomes: The student can describe the principles of fundamental laboratory methods used in clinical diagnosis and identify typical areas of application.
Contents:
Introduction to laboratory diagnostics. Fotometry, chromatography, electrophoresis, potentiometry, immunochemical methods, entsymatic methods, cell counting, molecule biology techniques, point of care analytics, hematological analyzers.
Learning activities and teaching methods:
Initial exam, seminars, final exam
Recommended or required reading:
Laboratoriolääketiede, kliininen kemia ja hematologia. Kandidaattikustannus Oy, 2003.
Assessment methods and criteria:
Initial exam, seminars and final exam.
Grading:
1-5 or fail. Final grade is the average of the grades of seminar presentation and written exam.
Person responsible:
Professor Timo Jämsä
Other information:
Course is organised every other year.

080913A-04: Technology in Clinical Chemistry, Exam, 0 op

Voimassaolo: 01.08.2010 -
Opiskelumuoto: Intermediate Studies

Laji: Partial credit

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Maarit Kangas

Opintokohteen kielet: Finnish

ECTS Credits:
3 credits
Language of instruction:
Finnish
Timing:
Master studies, autumn or spring. The course is not organized every year.
Learning outcomes:
After this course student is familiar with the basic laboratory techniques and equipment used in clinical diagnostics.
Contents:
Introduction to laboratory diagnostics. Fotometry, chromatography, electrophoresis, potentiometry, immunochemical methods, entsymatic methods, cell counting, molecule biology techniques, point of care analytics, hematological analyzers.
Learning activities and teaching methods:
Initial exam, seminars, final exam
Recommended or required reading:
Laboratoriolääketiede, kliininen kemia ja hematologia. Kandidaattikustannus Oy, 2003.
Assessment methods and criteria:
Initial exam, seminars and final exam.
Grading:
1-5 or fail. Final grade is the average of the grades of seminar presentation and written exam.
Person responsible:
Professor Timo Jämsä
Other information:
Course is organised every other year.

080913A-01: Technology in Clinical Chemistry, Pre-assignment, 0 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Intermediate Studies

Laji: Partial credit

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

ECTS Credits:
3 credits
Language of instruction:
Finnish
Timing:
Master studies, autumn or spring. The course is not organized every year.
Learning outcomes:
After this course student is familiar with the basic laboratory techniques and equipment used in clinical diagnostics.
Contents:
Introduction to laboratory diagnostics. Fotometry, chromatography, electrophoresis, potentiometry, immunochemical methods, entsymatic methods, cell counting, molecule biology techniques, point of care analytics, hematological analyzers.
Learning activities and teaching methods:
Initial exam, seminars, final exam
Recommended or required reading:
Laboratoriolääketiede, kliininen kemia ja hematologia. Kandidaattikustannus Oy, 2003.
Assessment methods and criteria:
Initial exam, seminars and final exam.

Grading:
1-5 or fail. Final grade is the average of the grades of seminar presentation and written exam.
Person responsible:
Professor Timo Jämsä
Other information:
Course is organised every other year.

080913A-03: Technology in Clinical Chemistry, Written assignment, 0 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Intermediate Studies

Laji: Partial credit

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

ECTS Credits:
3 credits
Language of instruction:
Finnish
Timing:
Master studies, autumn or spring. The course is not organized every year.
Learning outcomes:
After this course student is familiar with the basic laboratory techniques and equipment used in clinical diagnostics.
Contents:
Introduction to laboratory diagnostics. Fotometry, chromatography, electrophoresis, potentiometry, immunochemical methods, entsymatic methods, cell counting, molecule biology techniques, point of care analytics, hematological analyzers.
Learning activities and teaching methods:
Initial exam, seminars, final exam
Recommended or required reading:
Laboratoriolääketiede, kliininen kemia ja hematologia. Kandidaattikustannus Oy, 2003.
Assessment methods and criteria:
Initial exam, seminars and final exam.
Grading:
1-5 or fail. Final grade is the average of the grades of seminar presentation and written exam.
Person responsible:
Professor Timo Jämsä
Other information:
Course is organised every other year.

080913A-02: Technology in Clinical Chemistry,Contact teaching, 0 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Intermediate Studies

Laji: Partial credit

Vastuuyksikkö: Institute of Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

ECTS Credits:
3 credits
Language of instruction:
Finnish
Timing:

Master studies, autumn or spring. The course is not organized every year.
Learning outcomes:
After this course student is familiar with the basic laboratory techniques and equipment used in clinical diagnostics.
Contents:
Introduction to laboratory diagnostics. Fotometry, chromatography, electrophoresis, potentiometry, immunochemical methods, entsymatic methods, cell counting, molecule biology techniques, point of care analytics, hematological analyzers.
Learning activities and teaching methods:
Initial exam, seminars, final exam
Recommended or required reading:
Laboratoriolääketiede, kliininen kemia ja hematologia. Kandidaattikustannus Oy, 2003.
Assessment methods and criteria:
Initial exam, seminars and final exam.
Grading:
1-5 or fail. Final grade is the average of the grades of seminar presentation and written exam.
Person responsible:
Professor Timo Jämsä
Other information:
Course is organised every other year.

764327A: Virtual measurement environments, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Department of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

764627S Virtual measurement environments 5.0 op

ECTS Credits:
5 credits
Timing:
3rd autumn
Learning outcomes:
Learning outcomes: The students will learn how to construct sofware environments for measurements and data analysis.
Contents:
The course gives basic skills to use MATLAB and LabView programming environments to construct their own (custom) programs, with which they can both measure and analyze data with the computer.
Learning activities and teaching methods:
Lectures 10 h, project work about 60 h. Project reports.
Target group:
Students in Physics B.Sc. program (obligatory) and students aiming for Biophysics minor.
Recommended optional programme components:
None, but basics of programming principles are useful. The skills acquired in this course can be used in various courses and laboratory projects.
Person responsible:
Matti Weckström, Jouni Takalo
Other information:
https://wiki.oulu.fi/display/764327A/

761104P: Wave Motion, 3 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Department of Physics

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

761310A Wave motion and optics 5.0 op
761310A-01 Wave motion and optics, lectures and exam 0.0 op
761310A-02 Wave motion and optics, lab. exercises 0.0 op
761114P-01 Wave motion and optics, lectures and exam 0.0 op
761114P-02 Wave motion and optics, lab. exercises 0.0 op
761114P Wave motion and optics 5.0 op

ECTS Credits:
3 credits
Language of instruction:
Lectures and exercises in Finnish. Material in English.
Timing:
Spring
Learning outcomes:
Learning outcomes: The student can classify different types of wave motions and can name the characterizing quantities (wavelength, period, wave speed), can apply geometrical optics to simple mirror and lens systems, can explain the meaning of interference and diffraction and their applications, like using interference to determine wavelength of radiation.
Contents:
Basic course on wave motion, and geometric and wave optics.
Wave motion and propagation. Acoustics. Geometric optics: basic principles, mirrors and lenses. Electromagnetic waves. Wave optics: interference, diffraction, and polarization. Optical instruments. Photometry. Laser.
Learning activities and teaching methods:
Lectures 32 h, exercises 10 h.
Target group:
For students of minor subject.
Recommended optional programme components:
Upper secondary school physics and mathematics.
Assessment methods and criteria:
Four mini examinations and one end examination or a final examination.
Person responsible:
Sami Heinäsmäki
Other information:
https://wiki.oulu.fi/display/761104P/

521114S: Wireless Measurements, 4 op

Voimassaolo: 01.08.2005 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Department of Electrical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Esko Alasaarela

Opintokohteen kielet: Finnish

Leikkaavuudet:

521097S Wireless Measurements 5.0 op

Language of instruction:
In Finnish or in English if three or more foreign students participate.

Timing:
Period 4
Learning outcomes:

The objective of the course is to supply student with basic understanding of methods, standards and components, which are needed in the wireless measurements of industrial, traffic, environmental and healthcare applications. Learning outcomes: Upon completing the course, the student can apply wireless technologies in industrial, traffic, environmental and healthcare measurements. He/she can tell and argument the benefits and challenges of using wireless measurement solutions and is able to apply the most important standards in his/her engineering work. In addition, he/she can use a representing set of industrial and scientific applications of wireless measurements to develop his/her own solutions.

Contents:
Basics of wireless measurement technologies and standards, wireless sensors and sensor networks, wireless industrial measurement and testing applications, wireless measurement applications in traffic, wireless environmental measurements and wireless human health monitoring.
Learning activities and teaching methods:
The course is lectured intensively within one period. At the end of the period the students prepare presentations about contemporary themes selected by them or proposed by the teacher and give 15-20 minutes presentation to other students in the seminars.
Recommended optional programme components:
Basics of measurement technology and Electronic measurement technology or equivalent basic knowledge.

Recommended or required reading:
Lecture notes (in English) prepared by the teacher and contemporary seminar presentations with their source material.
Assessment methods and criteria:
The course is passed with a literal final exam (70 %) and a contemporary seminar (30 %)