Opasraportti

FMed - Courses in English for exchange students (2020 - 2021)

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

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

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

Courses in English for exchange students at the Faculty of Medicine

This Course Catalogue lists courses taught in English that are available for exchange students at the Faculty of Medicine during academic year 2020-21.

When preparing your study plan please use the information provided under the **Courses** tab in this catalogue. Read carefully the information of each course you wish to take (language of instruction, target group, course content, timing, preceding studies, additional information etc.).

For information on the exchange application process please see www.oulu.fi/university/studentexchange. All exchange applicants must submit their exchange application through SoleMOVE by the deadline given, proposed study plan is attached to the on-line application.

Accepted exchange students are required to register to all courses. Course registration takes place once you have received your University of Oulu login information, this takes place close to the start of your exchange period. When registering you will be able to find detailed information on teaching and schedule under the **Instruction** tab.

Teaching periods for 2020-21

Autumn term 2020
10.8.2020 - 18.12.2020

Spring term 2021
5.1.2021 - 31.5.2021

For arrival and orientation dates see www.oulu.fi/university/studentexchange/academic-calender

Any questions on courses should be addressed to the coordinator of the degree programme you are studying. If you wish to choose any course from the degree you are not studying please contact the coordinator responsible for that degree.

Medicine: Karri Hurskainen karri.hurskainen(at)oulu.fi

Dentistry: Saujanya Karki saujanya.karki(at)oulu.fi

Biomedical Engineering: Santeri Rytky santeri.rytky(at)oulu.fi

Nursing Science and Health Management: Pirjo Kaakinen, pirjo.kaakinen(at)oulu.fi

Further information on application process and services for incoming exchange students:
www.oulu.fi/university/studentexchange or international.office(at)oulu.fi

Tutkintorakenteisiin kuulumattomat opintokokonaisuudet ja -jaksot

060724A: Acutology 1: Resuscitation and clinical skills (autumn), 3 op
060725A: Acutology 2: Vital functions (spring), 2 op
521285S: Affective Computing, 5 op
521495A: Artificial Intelligence, 5 op
041201A: Basics in eHealth, 5 op
521283S: Big Data Processing and Applications, 5 op
080924S: Biomaterials, 2 - 5 op
080916S: Biomechanics of Human Movement, 5 op
580201A: Biomedical Engineering Programming Study, 5 op
521284S: Biomedical Engineering Project, 5 op
580202S: Biomedical Engineering Project, 5 op
080928S: Biomedical Engineering Research Methods and Seminar, 5 op
521093S: Biomedical Instrumentation, 5 op
521240S: Biophotonics and Biomedical Optics, 5 op
521273S: Biosignal Processing I, 5 op
521282S: Biosignal Processing II, 5 op
521140S: Computer Graphics, 5 op
080927S: Connected Health and mHealth, 5 op
521153S: Deep Learning, 5 op
090634A: Dental anxiety, 3 op
090622A: Dental traumas, tooth transplantations and maxillomandibular fractures, 0,5 - 1 op
080920S: Diagnostic Imaging, 5 op
521124S: Electronic Sensors, 5 op
060709A-02: Endocrinology, 3 op
090623A: Esthetics in prosthodontics, 0,2 - 1 op
060709A-04: Exam of Rheumatology, 1 op
060704A-04: Gastroenterological surgery, 4 op
090632A: Glass fibers in periodontal and prosthetic treatment, 0,3 - 1 op
080929S: Health Technology and Multimodal Monitoring, 5 op
080926S: Introduction to Artificial Intelligence for Medical Imaging, 3 - 5 op
521242A: Introduction to Biomedical Engineering, 5 op
080926A: Introduction to Biomedical Imaging Methods, 1 - 3 op
060709A-01: Introduction to Cardiology, 3 op
031025A: Introduction to Optimization, 5 op
090636A: Introduction to orthodontics, 3 op
090621A: Light curing technique for dental exchange students, 0,2 - 1 op
090624A: Literature exam: Fixed prosthodontics, 2 - 2,5 op
090625A: Literature exam: Prosthetic treatment of edentulous patient, 3 op
090626A: Literature exam: Stomatognathic physiology part I, 1 op
090627A: Literature exam: Stomatognathic physiology part II, 2 - 2,5 op
521289S: Machine Learning, 5 op
521466S: Machine Vision, 5 op
080922S: Microscopy and Spectroscopic Imaging, 5 op
060706A: Neurosurgery, 3 op
060720A: Obesity Minisymposium, 1 op
060710A: Oncology and radiotherapy, 3 op
090635A: Oral and craniofacial growth and development: genetic, epigenetic, clinical and experimental approach, 1 op
090618A: Oral and maxillofacial pathology, literature exam, 3 op
090633A: Organisation of oral health care in Finland, 1 op
060704A-01: Orthopaedics and Traumatology, 4 op

090617A: Other studies given by the Institute of Dentistry within the Erasmus-project, 0 - 60 op
061001A: Paediatrics, 14 op
090620A: Pediatric Dentistry for Erasmus Exchange Students, 1 - 3 op
090631A: Periodontal instrumentation, phantom training, 0,3 - 1 op
090628A: Periodontology: Clinical diagnosis, risk assessment, prognosis and treatment plan, literature exam, 1 op
090630A: Periodontology: Periodontal surgery, literature exam, 1,5 op
090629A: Periodontology: Periodontal therapy, literature exam, 1 op
080917S: Project in Biomedical Technology, 5 - 10 op
080919S: Project in Health Technology, 5 - 10 op
080918S: Project in Medical Imaging, 5 - 10 op
060723A: Research project, 1 - 30 op
521279S: Signal Processing Systems, 5 op
521348S: Statistical Signal Processing 1, 5 op
090619A: The principles of endodontics, literature exam, 2 op
080915S: Tissue Biomechanics, 5 op
521156S: Towards Data Mining, 5 op
764327A: Virtual measurement environments, 5 op
521097S: Wireless Measurements, 5 op

Opintojaksojen kuvaukset

Tutkintorakenteisiin kuulumattomien opintokokonaisuuksien ja -jaksojen kuvaukset

060724A: Acutology 1: Resuscitation and clinical skills (autumn), 3 op

Voimassaolo: 01.01.2020 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Janne Liisanantti
Opintokohteen kielet: English

Proficiency level:
-
Status:
-
Required proficiency level:
-
ECTS Credits:
3 ECTS
Language of instruction:
English
Timing:
Autumn 2020
Learning outcomes:
Upon completion student is able to:
-        provide advanced life support (using a defibrillator, resuscitation and immediate post arrest care).
-        Work in a multiprofessional team.
Contents:
-
Mode of delivery:
-

Learning activities and teaching methods:
Resuscitation simulation (in English) (1,5h)
- resuscitation
- using a defibrillator
- immediate post arrest care
- includes a preliminary task

Theme day on clinical skills

Moodle (online) exam (1h)

Independent studies (2-4h)

Target group:
Medical students.
Prerequisites and co-requisites:
None
Recommended optional programme components:
None
Recommended or required reading:
Latest ERC-guidelines.
Assessment methods and criteria:
Pass/fail.
If numerical evaluation is needed, please contact the supervising teacher in the beginning of the course.
Grading:
Pass/fail
Person responsible:
Janne Liisanantti
Working life cooperation:
None.

Other information:
-

060725A: Acutology 2: Vital functions (spring), 2 op

Voimassaolo: 01.01.2020 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Janne Liisanantti
Opintokohteen kielet: English

Proficiency level:
-
Status:
-
Required proficiency level:
-
ECTS Credits:
2 ECTS
Language of instruction:
English
Timing:
Spring 2021
Learning outcomes:
Management of critically ill patient(s).
Contents:

ABCDE-approach in the management of a critically ill patient.
Mode of delivery:
Small group teaching.
Learning activities and teaching methods:
Group teaching (3h)
- vital functions
- fluid therapy

Moodle (online) exam (1h)
Target group:
Medical students.
Prerequisites and co-requisites:
None
Recommended optional programme components:
None
Recommended or required reading:
Delivered during the course.
Assessment methods and criteria:
Active participation and exam.
Grading:
Pass/fail.
If numerical evaluation is needed, please contact the supervising teacher in the beginning of the course.
Person responsible:
Janne Liisanantti
Working life cooperation:
None
Other information:
-

521285S: Affective Computing, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Guoying Zhao

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits
Language of instruction:
In English
Timing:
Fall, periods 1
Learning outcomes:
After completing the course, student
1. is able to explain the emotion theory and modeling
2. is able to implement algorithms for emotion recognition from visual and audio signals, and the fusion of multi-modalities
3. has the ideas of wide applications of affective computing
Contents:
The history and evolution of affective computing; psychological study about emotion theory and modeling; emotion recognition from different modalities: facial expression, speech, fusion of multi-modalities; crowdsourcing study; synthesis of emotional behaviors; emotion applications.
Mode of delivery:
Online teaching in Moodle/Zoom.
Moodle: https://moodle.oulu.fi/course/view.php?id=325&section=0
Learning activities and teaching methods:
The course consists of lectures and exercises. The final grade is based on the points from exam while there are several mandatory exercises.

Target group:
Computer Science and Engineering students and other Students of the University of Oulu.
Prerequisites and co-requisites:
A prior programming knowledge with Python, possibly the bachelor level mathematical studies and/or some lower level intermediate studies (e.g. computer engineering or artificial intelligence courses). The recommended optional studies include the advanced level studies e.g. the pattern recognition and neural networks and/or computer vision courses.
Recommended optional programme components:
-
Recommended or required reading:
All necessary material will be provided by the instructor.
Assessment methods and criteria:
The assessment of the course is based on the exam (100%) with mandatory exercises.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course unit utilizes a numerical grading scale 1-5, zero stands for fail.
Person responsible:
Guoying Zhao, Henglin Shi, Yante Li
Working life cooperation:
No
Other information:
Course work space can be found from University of Oulu Moodle platform moodle.oulu.fi.

521495A: Artificial Intelligence, 5 op

Voimassaolo: 01.08.2012 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Jaakko Suutala, Pekka Sangi

Opintokohteen kielet: English

Leikkaavuudet:

  ay521495A   Artificial Intellig (OPEN UNI)   5.0 op

ECTS Credits:
5 ECTS credits / 135 hours of work
Language of instruction:
English
Timing:
The course in held in the spring semester, during period III. For bachelor students of Computer Science and Engineering specializing to artificial intelligence, it is recommended to complete the course at the 3rd spring semester.
Learning outcomes:
After completing the course, students
1. know the basic search strategies that can be applied in problem solving and optimization.
2. understand how search-based decisions are made in game-like competitive applications.
3. know the basic principles of probabilistic reasoning in artificial intelligence systems.
4. know how rational decision making under uncertainty can be formulated using utility theory.
5. understand the fundamentals of machine learning and how some of the established methods can be applied to problems in AI.
6. are familiar with advanced AI applications of perception and robotics and how probabilistic inference and machine learning can be used in these settings.

In the course projects, students get some experience in programming and using search methods.
Contents:
intelligent agent types, uninformed search methods, informed (heuristic) search, local search, constraint satisfaction problems, adversarial search, uncertainty handling, probabilistic reasoning, utility, machine learning, decision networks, Markov decision process, reinforcement learning, applications
Mode of delivery:
The tuition is implemented as web-based teaching. Moodle environment is used in the course.

Due to Covid-19 pandemic, teaching in Spring 2021 will be implemented remotely. Course work space can be found from University of Oulu Moodle platform.

Moodle page in Spring 2021 will be https://moodle.oulu.fi/course/view.php?id=3211, where details of implementation will be provided. The page will be available from December 21, 2020.

Online lectures will be given with Zoom and link for them will be provided in Moodle.

Learning activities and teaching methods:

Lectures 28 h / Group work (programming projects) 42 h / Self-study 65 h

Target group:

The primary target group is the students of the Computer Science and Engineering specializing in Artificial Intelligence.

Prerequisites and co-requisites:

Completion of the course "521160P Introduction to Artificial Intelligence" (lectured in Finnish) is recommended, but is not a prerequisite. It is also recommended that a student has completed studies related to probability and statistics (e.g. course "031021P Probability and Mathematical Statistics") and Python programming (e.g. course "521141P Elementary Programming").

Recommended optional programme components:

The course is an independent entity and does not require additional studies carried out at the same time.

Recommended or required reading:

The course is based on the book Stuart Russell, Peter Norvig (2010, global edition 2016): Artificial Intelligence: A Modern Approach (3rd Edition), Chapters 1-6, 13-18, 20-21, partly 24-25.

The course utilizes materials of an introductory course on artificial intelligence taught at UC Berkeley (http://ai. berkeley.edu).

Assessment methods and criteria:

The assessment of the course is based on the final exam. Both the final exam and the course projects must be passed. Well-done course projects can increase the grade by one unit.

Grading:

The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail.

Person responsible:

Pekka Sangi, Jaakko Suutala

Working life cooperation:

The course does not contain working life cooperation.

Other information:

Course work space can be found from University of Oulu Moodle platform moodle.oulu.fi.

Moodle page in Spring 2021 will be https://moodle.oulu.fi/course/view.php?id=3211

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:
5 ECTS cr, 135 hours of work

Language of instruction:
English
(native Finnish speakers are allowed to write their essay in Finnish)
Timing:
The main course for students of the (Master´s) degree programmes is held in the spring semester, 3rd period. This course is meant also for exchange students of the Biomedical Engineering programme.
The special edition course is held for exchange students of the Faculty of Medicine (medicine, health sciences) in the autumn semester, 2nd period. Other students can participate in this course depending on availability of free places (limited number of places).

Learning outcomes:

Upon completion of the course:

The student can define central information and communication technology (ICT) terms and solutions in healthcare, and can list respective applications in healthcare services and training.

The student can evaluate the societal and economic significance of information and communication technology in healthcare

The student can understand the position of e-health and telemedicine solutions as a part of the national health care information system.

The student receives an initial view of future health ICT trends from clinical perspective and possibilities to contribute to these with his/her professional background

Contents:

Terms and concepts

- societal dimensions
- delivery of health services
- electronic patient records
- data transfer within the health care system
- data transfer between the health care professionals and the citizens
- citizens providing their own health data, mHealth-solutions
- national healthcare information exchange in Finland
- remote consultations, examples like teleradiology, telepsychiatry, telerehabilitation
- economical and functional assessment
- remote education in health care
- future visions of health care information systems
- changing current topics in connected health like: artificial Intelligence, knowledge based medicine, cybersecurity etc according to availability
- Most presented examples in the course are based on information system installations in Northern Finland

Mode of delivery:

Web-based teaching

Learning activities and teaching methods:

Interactivity takes place in virtual learning environment Moodle. The course consists of videotaped lectures, power point presentations and links to other material available in the web. Performance of duties includes an essay, exam, participating in moderated discussions on the grounds of the lectures.

Web lectures 15h / Web exams 40h / Written tasks/ essay 40h* / Self-study and participation in web discussion 40h

 (*Exchange students can relate their essay to the situation in their home countries)

Target group:

MSc and 3rd year BSc students of degree programmes in medical and wellness technology, biomedical engineering, biophysics, physics, and other degree programs; students of medicine and health sciences and everyone who is interested. Please, note the recommended separate course timings for different groups.

Prerequisites and co-requisites:

None

Recommended optional programme components:

The course is independent and does not require additional studies carried out at the same time.

Recommended or required reading:

All recommended or required reading is offered in the Moodle virtual learning environment or in linked web pages.

Assessment methods and criteria:

Web tasks, contribution to moderated discussion, an essay and course exams and optional final exam.

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

Grading:

The course utilizes a numerical grading scale 0 – 5. In the numerical scale zero stands for a fail.

Person responsible:

Professor Jarmo Reponen

Course teacher Nina Keränen, MD, MSc

Course teacher Anna Maijala MSc

521283S: Big Data Processing and Applications, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Lauri Lovén

Opintokohteen kielet: English

ECTS Credits:

5 ECTS credits

Language of instruction:

English

Timing:

Period IV. It is recommended that the course is taken on the fourth year Spring.

Learning outcomes:

Upon completion of the course, the student :

1. is able to explain the big data phenomenon, its challenges and opportunities.
2. is able to explain the requirements and common principles for data intensive systems design and implementation, and evaluate the benefits, risks and restrictions of available solutions.
3. can explain the principles of big data management and processing technologies and utilize them on a basic level.

Contents:

General introduction into big data, namely: big data fundatmenals, data storage, batch and stream data processing, data analysis, privacy and security, big data use cases.

Mode of delivery:

Online teaching, exercises and seminars. Independent and group work.

Learning activities and teaching methods:

Lectures, exercises, seminars, independent and group work

Target group:

M.Sc. students (computer science and engineering) and other Students of the University of Oulu

Prerequisites and co-requisites:

The Bachelor level studies of Computer science and engineering study programmes or respective knowledge.

Recommended optional programme components:

Finishing 521290S Distributed Systems, 521497S Pattern recognition and neural networks, and 521286A Computer Systems is beneficial.

Recommended or required reading:

Lecture slides and exercise material will be provided. Each lecture will include the refernce list for recommended reading. Instructions to necessary installations will be given.

Assessment methods and criteria:

This course assesses students continuously by the completion of small project work, seminar presentations and short reports on a selected topic (group work). Answering two quizzes during the course is optional and provides additional points for final grade. To pass the course, it is enough to get 50 % of available points. No exam.

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

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:

Lauri Lovén

Working life cooperation:

The course includes also invited lectures from industry.

Other information:

Course is in Moodle.

080924S: Biomaterials, 2 - 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Mikko Finnilä

Opintokohteen kielet: English

Proficiency level:

-

Status:

-

Required proficiency level:

-

ECTS Credits:

5 ECTS credits, 135 hours of work.

Language of instruction:

English

Timing:

Master studies, spring term, 3rd period.

Learning outcomes:

Upon completion of this course student is familiar with biomaterials and tissue engineering terminology.

Student knows the most frequently used characterization methods in biomaterials research.

Student is able to explain foreign body reaction and biocompatibility.

Student can list different material types used in biomaterials and tissue engineering and is able to understand how material characteristics affect biocompatibility.

Student gains basic information of drug delivery and tissue engineering as well as manufacturing methods for tissue engineering scaffolds.

Student is able to do aseptic work and cell culture

Contents:

Biomaterials and tissue engineering terminology, basic properties of biomaterials, Characterization, Surface modification, Sterilization, Biomaterial types (Metals, Ceramics, Polymers and Natural polymers), Biocompatibility (Biological systems, Cell and tissue interaction with biomaterials, Biocompatibility evaluation methods), Drug delivery, Tissue engineering, Clinical applications.

Mode of delivery:

Blended teaching

Learning activities and teaching methods:

Lectures 20 h, interactive lecture 2 h, group work (exercises) 8 h, reporting 36 h, self-study 65 h. Exam 4 h

Target group:

Biomedical Engineering MSc students. Other master and doctoral students interested in biomaterials

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

Lecture material based on selected chapters of the book: Biomaterials Science: An Introduction to Materials in Medicine. 3rd ed. Oxford: Elsevier, 2013. Ratner, B. D., Hoffman, A. S., Schoen, F. J. & Lemons, J. E.

Assessment methods and criteria:

Peer-reviewed project reports, exam. Read more about assessment criteria at the University of Oulu webpage.

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for fail

Person responsible:

University Lecturer Mikko Finnilä

Working life cooperation:

-

Other information:

-

080916S: Biomechanics of Human Movement, 5 op

Voimassaolo: 01.08.2012 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: English

Proficiency level:

-
Status:
-
Required proficiency level:
-
ECTS Credits:
5 ECTS, 135 hours of work

Language of instruction:
English
Timing:
Master´s studies, spring term 4th period
Learning outcomes:
The student can describe the main challenges of movement biomechanics and principles for motion analysis.
The student understands basics of biomechanical measurement and modeling of movement.
The student can perform practical biomechanical experiments, analyze measurement data, interpret results, and report them using good scientific reporting practice.

Contents:
Musculoskeletal biomechanics. Motion sensors and motion analysis. Biomechanical modeling of movement. Balance measurement. Fall biomechanics. Measurement of physical activity.
Mode of delivery:
Face-to-face teaching

Learning activities and teaching methods:
Lectures 14h / Assignment and group work 54h / Self-study 67h. Final exam

Target group:
Master´s students of biomedical engineering, medical and wellness technology, information technology and other related degree programs. Master´s students of physics (biomedical physics). Other interested master's and postgraduate students.
Prerequisites and co-requisites:
The student needs to have basic knowledge on statistical analysis, sensors and measurement techniques and signal processing. It is also recommended to have basic knowledge of anatomy and physiology.
Recommended optional programme components:
The course is an independent entity and does not require additional studies carried out at the same time. Tissue biomechanics will be studied in the course 080915S.

Recommended or required reading:
Material given during lectures
Assessment methods and criteria:
Accepted home exercises and lab assignments, exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail. Grading is made based on the exercise report and exam.

Person responsible:
Professor Timo Jämsä
Working life cooperation:
None
Other information:
-

580201A: Biomedical Engineering Programming Study, 5 op

Voimassaolo: 01.08.2008 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Health Sciences
Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko
Opintokohteen kielet: Finnish

Proficiency level:
-
Status:
-
Required proficiency level:
-
ECTS Credits:
5 ECTS
Language of instruction:
Finnnish / English
Timing:
The course can be taken in autumn or spring semester, or during the summer period. The course can be taken as an elective course of Bachelor or Master studies.
Learning outcomes:
Upon completion of the course, the student will be able to
- design and generate a solution to a programming problem related to biomedical engineering and
- report this in written form.
Contents:
Independent computer programming based on a defined task using modern programming tools; a written report.
Mode of delivery:
Independent work
Learning activities and teaching methods:
Student contacts the supervisor of programming task (list in folder of the course in the university´s virtual learning platform) in order to agree on the topic and supervision. Student may also suggest own topic or topic from a company for the responsible person of the course, who evaluates suitability of the topic to the course. In latter case, the supervisor is from the company.
Target group:
Degree students of Biomedical Engineering (primarily BME students at the Faculty of Medicine)
Prerequisites and co-requisites:
The required prerequisite is completion of the following courses (or student has otherwise acquired corresponding knowledge and skills) prior to enrolling for the course: 521141P Elementary Programming 5 ECTS cr, 764327A (764627S) Virtual Measurement Environments.

Recommended optional programme components:
The course is an independent entity.

Recommended or required reading:
-
Assessment methods and criteria:
The grading is based on evaluating the fulfillment of task requirements based on the programmed software and prepared documentation. Read more about assessment criteria at the University of Oulu webpage.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes grading scale pass or fail

Person responsible:
Professor Timo Jämsä
Working life cooperation:
A company or another organization can commission programming task. In such case the student will agree on topic and supervision with the client.
Other information:
-

521284S: Biomedical Engineering Project, 5 op

Voimassaolo: 01.01.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Tapio Seppänen

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits
Language of instruction:
English.
Timing:
As part of the master level studies, in any period suitable to the student.
Learning outcomes:
1. has develop skills for being initiative, creativity, application of theoretical knowledge, programming and cooperation.
Contents:
A small-scale research work in an active research group. Topics will be selected from the needs of present research activities in the site of work and the interests of student. Main emphasis is on the development and application of methods and algorithms for biomedical data processing. Often the work includes programming with Matlab, C or Java languages.
Mode of delivery:
Self-study under supervision.
Learning activities and teaching methods:
First the research group is studied to get understanding of what are its goals. Detailed task description is written with the advisor. Typically, the work includes study of theoretical background information, programming, testing and simulations, and documentation. Task assignments can be applied at any time all year round.
Target group:
Master-level students that are interested in biomedical engineering. Students of the University of Oulu.
Prerequisites and co-requisites:
The mathematic studies of the candidate degree program of computer science and engineering, or equivalent. Courses such as Biosignal processing I and II, Biomedical image processing and Machine learning are recommended. Programming skills, especially the Matlab.
Recommended optional programme components:
The course is an independent entity and does not require additional studies carried out at the same time.
Recommended or required reading:
Literature and scientific articles depending on the task assignment.
Assessment methods and criteria:
Course assessment is based on the technical report.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
Tapio Seppänen
Working life cooperation:
No

580202S: Biomedical Engineering Project, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Mikko Finnilä

Opintokohteen kielet: Finnish

Proficiency level:
-
Status:
-
Required proficiency level:

-
ECTS Credits:
5 - 10 ECTS
Language of instruction:
Finnish / English
Timing:
The course can be taken during Master studies in autumn or spring semester, or during the summer period. However, it is recommended to be completed during the 2nd autumn semester.
Learning outcomes:
Upon completion of the course, the student will be able to solve a research or development problem and report it in writing and by giving an oral presentation.

Contents:
Performing a small-scale research or development project.
Mode of delivery:
Independent work
Learning activities and teaching methods:
The student participates in project within or outside the university. Project topics are available in course folder in Moodle learning platform. The student prepares a personal project plan and after the project, the student prepares a written research report and presents it in a seminar. Additionally, the student participates in two other seminar sessions.
Target group:
Degree students of the Medical and Wellness Technology programme and the Biomedical Engineering programme (primarily BME students at the Faculty of Medicine).
Prerequisites and co-requisites:
-
Recommended optional programme components:
The course is an independent entity
Recommended or required reading:
-
Assessment methods and criteria:
The student prepares a project plan, participates in seminars, and reports project results in written report and in oral presentation.
Read more about assessment criteria at the University of Oulu webpage
Grading:
Pass / Fail
Person responsible:
University lecturer Mikko Finnilä
Working life cooperation:
A company or another organization can commission project. In such case the student agrees on topic and supervision with the client
Other information:
-

080928S: Biomedical Engineering Research Methods and Seminar, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Health Sciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Jämsä, Timo Jaakko
Opintokohteen kielet: English

Proficiency level:
-
Status:
-
Required proficiency level:
-
ECTS Credits:

5 ECTS, 135 hours of work

Language of instruction:
English
Timing:
Master studies, Autumn term, 1st and 2nd periods
Learning outcomes:
The student familiarizes with the principles of scientific work and research ethics.
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, and give and receive feedback on the presentations.
Contents:
Principles of scientific work. Ethical principles. Lectures, seminars and scientific literature. Publication forums in the field and characteristics of scientific articles. Popularization of science.
Mode of delivery:
Face-to-face teaching, remote connection will be offered for lectures and seminars

Learning activities and teaching methods:
Introduction lectures, presentations and discussion based on the latest scientific publications. Each student will give two presentations and act as an opponent for two (peer-assessment).
Lectures 8h, seminars 26h, home exercise, self-study 101 h.
Target group:
Biomedical Engineering MSc students
Prerequisites and co-requisites:
-
Recommended optional programme components:
The course prepares the student for thesis work
Recommended or required reading:
Material given during lectures, selected scientific articles.
Assessment methods and criteria:
Attending seminars, making presentations and acting as an opponent and peer. The assessment criteria are based on the learning outcomes of the course. More detailed assessment criteria can be found in e-learning platform. Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail. Grading is made based on student´s presentations.
Person responsible:
Professor Timo Jämsä
Working life cooperation:
The course prepares for working life.

Other information:
For advanced and doctoral studies

521093S: Biomedical Instrumentation, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Electrical Engineering DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Teemu Myllylä
Opintokohteen kielet: Finnish
Leikkaavuudet:

521107S   Biomedical Instrumentation   6.0 op

ECTS Credits:
5
Language of instruction:

English.
Timing:
Period 4.
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 signals commonly measured 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). Introduction to medical imaging and monitoring methods and instruments and physical therapy devices. Electrical safety aspects.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures/exercises 30 h and self-study 100 h.
Target group:
Students interested in biomedical measurements.
Prerequisites and co-requisites:
None
Recommended optional programme components:
Course replaces earlier courses Biomedical measurements and Biomedical instrumentation.

Recommended or required reading:
R. S. Khandpur: Biomedical Instrumentation, Technology and Applications, McGraw-Hill, 2005 and J. G. Webster: Medical Instrumentation, Application and Design, 4th edition, John Wiley & Sons, 2010.
Assessment methods and criteria:
The course is passed by the final exam or optionally with the assignments/test agreed at the first lecture.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1 - 5.
Person responsible:
Teemu Myllylä
Working life cooperation:
No.

521240S: Biophotonics and Biomedical Optics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Electrical Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Alexey Popov, Aliaksandr Bykau

Opintokohteen kielet: Finnish

ECTS Credits:
5
Language of instruction:
English
Timing:
Period 2
Learning outcomes:
On successful completion of the course, students will be able to categorize the basic principles of modern optical and laser-based diagnostic modalities and instruments used in advanced biomedical research and clinical medicine. They will be able to demonstrate detailed understanding and evaluate the key biophotonics techniques underlying day-to-day clinical diagnostic and therapies and industrial applications in pharmacy, health care and cosmetic products. They can operate with the selected techniques of their choice.
Contents:

The course includes in-depth coverage of state-of-the-art optical imaging and spectroscopy systems for advanced biomedical research and clinical diagnosis, fundamental properties of light such as coherence, polarization, angular momentum, details of light interaction with tissue, and modern imaging system. Coherent Optical Tomography (OCT), Laser Doppler Flowmetry, Laser Speckle Imaging (LSI), Photo-Acoustic Tomography (PAT), Tissue polarimetry; Optical and Near-Infra-Red Spectroscopy (NIRS), Confocal and Fluorescence Microscopies; Tissue Optics: Light/matter interactions, index of refraction, reflection, optical clearing, absorption, Mie scattering, Rayleigh scattering, Monte Carlo modelling.

Mode of delivery:
Online teaching.
The information about the remote teaching of the course: 521240S Biophotonics and Biomedical Optics
has been added to the course workspace in moodle https://moodle.oulu.fi/course/view.php?id=2436&section=0
Shortly, the lectures and seminars will be organized remotely via the zoom environment.
The corresponding link will be published on the moodle page prior to the lecture.
The exam/test will performed online through the moodle or google forms at the estimated day.

Learning activities and teaching methods:
Lectures/exercises 38 h and self-study 100 h.
The information about the remote teaching of the course: 521240S Biophotonics and Biomedical Optics
has been added to the course workspace in moodle https://moodle.oulu.fi/course/view.php?id=2436&section=0
Shortly, the lectures and seminars will be organized remotely via the zoom environment.
The corresponding link will be published on the moodle page prior to the lecture.
The exam/test will performed online through the moodle or google forms at the estimated day.

Target group:
Students interested in biomedical measurements.

Prerequisites and co-requisites:
None.

Recommended optional programme components:
A new course

Recommended or required reading:
V.V Tuchin: Handbook of Optical Biomedical Diagnostics, SPIE Press, 2002; V.V Tuchin: Handbook of Coherent Domain Optical Methods, Springer, 2nd edition, 2013. D.A Boas, C. Pitris, N. Ramanujam, Handbook of Biomedical Optics, CRC Press, 2011.

Assessment methods and criteria:
The course is passed by the final exam and with the assignments.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
1 - 5

Person responsible:
Aliaksandr Bykau and Alexey Popov

Working life cooperation:
No.

521273S: Biosignal Processing I, 5 op

Voimassaolo: 01.08.2005 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Tapio Seppänen, Zalan Rajna

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits.
Language of instruction:
English.
Timing:
The course unit is held in the autumn semester, during period 2. It is recommended to complete the course at the master's degree level.
Learning outcomes:

After completing the course, student:
1. knows about special characteristics of the biosignals and typical signal processing methods
2. can solve small-scale problems related to biosignal analysis
3. implement small-scale MATLAB software for signal processing algorithms.

Contents:
Biomedical signals. Digital filtering. Analysis in time-domain and frequency domain. Nonstationarity. Event detection. Signal characterization.

Mode of delivery:
Face-to-face teaching and guided laboratory work. The laboratory work can alternatively be performed on an online system (MathWorks Grader). Student can do the lab works remotely or in the lab using the same online system.

Learning activities and teaching methods:
Lectures 12h, Laboratory work 24h, Self-study for laboratory working and examination 99 h.

Target group:
Students interested in digital signal processing applications in biomedical engineering, at their master's level studies.

Prerequisites and co-requisites:
The mathematic studies of the candidate degree program of computer science and engineering, or equivalent. Programming skills, especially basics of the MATLAB. Basic knowledge of digital signal processing.

Recommended optional programme components:
The course is an independent entity and does not require additional studies carried out at the same time.

Recommended or required reading:
The course is based on selected chapters of the book "Biomedical Signal Analysis", R.M Rangayyan, 2nd edition (2015). + Lecture slides + Task assignment specific material.

Assessment methods and criteria:
Face-to-face lectures. Students solve the programming problems in the laboratory work independently, supervised by assistants. The MathWorks Grader online system is used for programming tasks and it also verifies the completed tasks. Written examination.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

Person responsible:
Tapio Seppänen

Working life cooperation:
No.

521282S: Biosignal Processing II, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Jukka Kortelainen

Opintokohteen kielet: Finnish

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
5 ECTS cr
Language of instruction:
Lectures and laboratory works are given in English. The examination can be taken in Finnish or English.
Timing:
Period 4
Learning outcomes:
After completing the course, student
1. knows the special characteristics of neural signals and the typical signal processing methods related to them
2. can solve advanced problems related to the neural signal analysis
Contents:
Introduction to neural signals, artifact removal, anesthesia and natural sleep, topographic analysis and source localization, epilepsy, evoked potentials.

Mode of delivery:
 Online teaching / Moodle
Learning activities and teaching methods:
Lectures (8 h) and laboratory work (20 h), written exam.
Target group:
Engineering students, medical and wellness technology students, and other students interested in biomedical engineering. Students of the University of Oulu.
Prerequisites and co-requisites:
The basic engineering math courses, digital filtering, programming skills, Biosignal Processing I.
Recommended optional programme components:
-
Recommended or required reading:
The course is based on selected parts from books "EEG Signal Processing", S. Sanei and J. A. Chambers, "Bioelectrical Signal Processing in Cardiac and Neurological Applications", L. Sörnmo and P. Laguna, and "Neural Engineering", B. He (ed.) as well as lecture slides and task assignment specific material.
Assessment methods and criteria:
Laboratory work is supervised by the assistants who will also check that the task assignments are completed properly. The course ends with a written exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Numerical grading of the accepted exam is in the range 1-5.
Person responsible:
Jukka Kortelainen
Working life cooperation:
-
Other information:
Course work space can be found from University of Oulu Moodle platform moodle.oulu.fi.

521140S: Computer Graphics, 5 op

Voimassaolo: 01.08.2018 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Guoying Zhao

Opintokohteen kielet: English

Leikkaavuudet:

  521493S   Computer Graphics   7.0 op

ECTS Credits:
5 ECTS credits
Language of instruction:
In English
Timing:
Spring, period 4.
Learning outcomes:
Upon comletion of the course, the student
1. is able to specify and design 2D graphics algorithms including: line and circle drawing, polygon filling and clippin
2. is able to specify and design 3D computer graphics algorithms including transformations, viewing, hidden surface removal, shading, texture mapping and hierarchical modeling
3. is able to explain the relationship between the 2D and 3D versions of such algorithms
4. possesses the necessary basic skills to use these basic algorithms available in PyOpenGL
Contents:
The history and evolution of computer graphics; 2D graphics including: line and circle drawing, polygon filling, clipping, and 3D computer graphics algorithms including viewing transformations, shading, texture mapping and hierarchical modeling; graphics API (PyOpenGL) for implementation.
Mode of delivery:
Remote teaching

Learning activities and teaching methods:
Lectures 22 h / Programming lessons 12 hours / Self-study and programming assignments 101 h.
Target group:
Computer Science and Engineering students and other Students of the University of Oulu.
Prerequisites and co-requisites:
Programming skills using Python; basic data structures; simple linear algebra.
Recommended optional programme components:
The course is an independent entity and does not require additional studies carried out at the same time.
Recommended or required reading:
1) Textbook: Edward Angel, Dave Shreiner: Interactive Computer Graphics: A Top-Down Approach with WebGL, 7th Edition, Addison-Wesley 2015
2) Textbook: Edward Angel: Interactive Computer Graphics, 5th Edition, Addison-Wesley 2008
3) Reference: Peter Shirley, Michael Ashikhmin, Michael Gleicher, et al. : Fundamentals of Computer Graphics, second edition, AK Peters, Ltd. 2005
4) Lecture notes (in English)
5) Online PyOpenGL tutorials (e.g. http://pyopengl.sourceforge.net/context/tutorials/index.html)
Assessment methods and criteria:
The assessment of the course is based on the exam (70%) and programming assignments (30%).
Read more about assessment criteria at the University of Oulu webpage.

Grading:
The course unit utilizes a numerical grading scale 1-5, zero stands for fail.
Person responsible:
Guoying Zhao, Tuomas Varanka, Muzammil Behzad.
Working life cooperation:
No
Other information:
Course work space can be found from University of Oulu Moodle platform moodle.oulu.fi.

080927S: Connected Health and mHealth, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Health Sciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Jarmo Reponen
Opintokohteen kielet: English

Proficiency level:
-
Status:
-
Required proficiency level:
-
ECTS Credits:
5 ECTS, 135 hours of work
Language of instruction:
English
Timing:
The course is held in the autumn semester period I (1st period)
Learning outcomes:

Upon completion of the course:
-The students will have knowledge about the current overall status of clinical use of health information systems and related tools (e.g. e-Health, telemedicine, Virtual Hospital, ODA-portal and other self-care portals) in Finland
-The students will have knowledge about the state of the art development in mobile health technology solutions and connected health projects.
-The students have been introduced to some practical development examples taking place in OYS Testlab and possibly in other Oulu health test labs

-The students have had an opportunity to consult with some enterprises currently working in the m-Health / Connected health domain.
-Depending on the student composition of the course, the students have learned collaboration and co-creation in a multiprofessional environment in the medical information and communication technology domain.
Contents:

-terms and concepts
-overview of information and communication technology and information systems in Finnish healthcare
-new processes that activate patient: virtual hospital, self-care models
-current update about mHealth, Connected Health, Artificial Intelligence in health care, secondary use of healthcare information
-collaborative development process in multiprofessional healthcare environment
-introduction to test laboratories
-case example, depending of current R&D&I work at the time of course
-web discussions and possible group assignments

Mode of delivery:
Blended teaching
Learning activities and teaching methods:
The implementation methods of the course vary. The course will consist of a combination of self-learning materials and activating workshops and other modules. The below mentioned numbers of hours are approximations, because the actual contents will vary according to available development projects:
-virtual learning material in the university virtual learning environment (recorded lectures, examples, additional material) /with self-learning 40 hours of student´s time
-activating facilitated workshops, where the iterative innovation process is introduced to the students + introductions to the test laboratory environment + special key-note lectures either in the virtual environment or as participatory lectures in seminars/with self-learning 40 hours of student`s time
-Discussions and participation to web tasks /with self-learning 40 h of student´s time
-Exams and related work/with self-learning 15 h hours of student´s time
Target group:
Students of the Master´s Programs in Biomedical Engineering and Medical & Wellness Technology. The course will also be available as an elective course for medicine, health sciences, information technology and other interested degree programs.
Prerequisites and co-requisites:
-
Recommended optional programme components:
It is recommended that the student has completed the course 041201A Basics in eHealth.
Recommended or required reading:
Recommended or required reading is offered in Oulu University´s virtual learning environment and in linked web pages. The teachers can recommend additional material in the beginning of the course
Assessment methods and criteria:
Web tasks, contribution to moderated discussion and workshops, and course exams.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes a numerical grading scale 1 – 5 or fail.
Person responsible:
Professor Jarmo Reponen (responsible teacher)
Professor Minna Pikkarainen
Course assistant teacher Anna Maijala MSc
Working life cooperation:
The facilitated workshops are meant to be organized in collaboration with OuluHealth TestLabs and enterprises according to availability.
Other information:
-

521153S: Deep Learning, 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Computer Science and Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Li Liu

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits/135 hours of work
Language of instruction:
English
Timing:
autumn, period 2
Learning outcomes:
Upon completion of this course, the students will be able to:
1. learn the theories, models, algorithms, implementation and recent progress of deep learning, and obtain empirical experience on training deep neural networks.
2. will learn about linear classifiers, multilayer neural networks, back propagation and stochastic gradient descent, convolutional neural networks, recurrent neural networks, generative adversarial networks, deep network compression, deep transfer learning techniques and deep reinforcement learning (tentative).
3. know about applications of deep learning to typical computer vision problems such as image classification, object detection and segmentation.
4. learn to implement, train and debug their own neural networks with PyTorch.

Contents:
Students should be comfortable taking derivatives and understanding matrix vector operations and notations. Basic Probability and Statistics, Linear Algebra, basics of probabilities, Gaussian distributions, mean, standard deviation, etc.
have knowledge of Machine Learning course and digital image processing course

Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
20h lectures, 12h exercise sessions, independent studying 95 hours.
Target group:
B.Sc. and M.Sc. students of Computer Science and Engineering. The course fits also for Statistics and Math M. Sc. students interested in learning deep learning techniques.
Prerequisites and co-requisites:
The Bachelor level knowledge of Computer science and engineering study programmes. Good programming skills in a chosen language.
Recommended optional programme components:
The course is an independent entity and does not require additional studies carried out at the same time.
Recommended or required reading:
Lecture hand-out, complementary reading list, and exercise material will be provided.
Assessment methods and criteria:
Attending lectures and exercise sessions, and returning the weekly exercises and final project.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
Li Liu
Working life cooperation:
The course may include the invited guest lectures from industry and other top universities.

090634A: Dental anxiety, 3 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Dentistry

Arvostelu: 1 - 5, pass, fail

Opettajat: Marja-Liisa Laitala

Opintokohteen kielet: English

ECTS Credits:
3 ECTS credits / 81 hours of work
Language of instruction:
English
Timing:
Autumn and spring semesters
Learning outcomes:
Upon completion of the course, the student will be able to
- understand causes and prevalence of dental anxiety
- know treatment of anxious child and adult patients

Contents:
Causes and prevalence of dental anxiety, treatment of anxious child and adult patients
Mode of delivery:
Self-study, literature exam
Learning activities and teaching methods:
Self-study, total of 81 hours (= 3.0 ECTS credits)
Target group:
Dental exchange students
Prerequisites and co-requisites:
No
Recommended optional programme components:
No
Recommended or required reading:
Milgrom, Weinstein & Heaton; Treating Fearful patients. A Patient management Handbook
Assessment methods and criteria:
Literature exam
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The literature exam utilizes verbal grading scale "Pass/Fail"
Person responsible:
PhD, DDS Vesa Pohjola, DDS, PhD Marja-Liisa Laitala
Working life cooperation:
No
Other information:
The courses given by the Institute of Dentistry within the Erasmus-project

090622A: Dental traumas, tooth transplantations and maxillomandibular fractures, 0,5 - 1 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Dentistry

Arvostelu: 1 - 5, pass, fail

Opettajat: Petri Iso-Kungas

Opintokohteen kielet: English

Voidaan suorittaa useasti: Kyllä

ECTS Credits:
0.5 ECTS credits
Language of instruction:
English
Timing:
In Spring semester (lectures and practical sessions)
(In Fall semester only a written exam)
Learning outcomes:
Upon completion of the course, the student will be able to understand the treatment options of dental traumas and will be able to perform a simple dental trauma spinting.
Contents:

Lectures and practical sessions
Substance:
- Epidemiology of dental and maxilla-mandibular traumas
- Diagnosis and examination of trauma patients
- Prevention of traumas
- First aid treatment protocols
- Treatment guidelines and options of dental traumas
- Treatment guidelines and options of maxilla-mandibular traumas
- Late complications of traumas
- Splinting of traumatized teeth
- Immobilization and osteosynthesis of maxilla-mandibular fractures

Practical part:
- Construction of flexible wire-composite splint
- Construction of rigid wire-composite splint
- Construction of arch bar splint a.m. Erich
- Construction of wire fixation a.m. Ernst
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 4 h, practicalities 2 h (0.5 ECTS credits)
Target group:
Dental exchange students
Prerequisites and co-requisites:
Basic courses and basic knowledge in oral and maxillofacial surgery
Recommended or required reading:
Hubb, Ellis & Tucker: Contemporary Oral and Maxillofacial Surgery, 6th Ed.2014
Hand-outs

Assessment methods and criteria:
In Spring semester lectures and practicalities
(In Fall semester only a written exam)
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Lectures and practical sessions pass/fail
(A written exam 0-5)
Person responsible:
Petri Iso-Kungas
Other information:
The courses given by the Institute of Dentistry within the Erasmus-project
Oral and Maxillofacial Surgery

080920S: Diagnostic Imaging, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Health Sciences
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: English

Proficiency level:
-
Status:
-
Required proficiency level:
-
ECTS Credits:
5 ECTS
Language of instruction:
English

Timing:
Master studies, autumn, 2nd period
Learning outcomes:
The student is able to define the physical principles on which various medical imaging devices are based upon.
Contents:
The course acquaints the students to the basic physics related to imaging modalities and therapeutic systems used in hospitals. Covered topics include e.g. x-ray imaging, computed tomography, magnetic resonance imaging, nuclear medicine and ultrasound
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 27h, demonstrations 8h, exercises 8h and preparing reports and independent studying 92h. Final exam.
Target group:
Students of biomedical engineering and medical and wellness technology, information technology, master degree students in physics with biophysics as major or/and medical physics as minor, other minor subject students. Also for other students of the University of Oulu.

Prerequisites and co-requisites:
Recommended: basic courses in physics and course Radiation physics, biology and safety (766116P, 761116P, 764117P or 764317A).
Recommended optional programme components:
Other courses of biomedical engineering
Recommended or required reading:
Dowsett, Kenny, Johnston: The Physics of Diagnostic Imaging, 2nd ed., Hodder Arnold, 2006.
Assessment methods and criteria:
Mandatory parts of the course: Participation in demonstrations, accepted written reports relating to demonstrations and written final exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes a numerical grading scale 1-5 or fail. Course grade is based on score of the final exam. Possibility to earn additional points from mathematical exercises.
Person responsible:
Professor Miika Nieminen
Working life cooperation:
Demonstrations are held in hospital environment and are related to diagnostics.
Other information:
-

521124S: Electronic Sensors, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Electrical Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Alexey Popov, Aliaksandr Bykau

Opintokohteen kielet: Finnish

ECTS Credits:
5
Language of instruction:
English.

Timing:
Period 2.
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.
Mode of delivery:
Pure face-to-face teaching.
Learning activities and teaching methods:
Lectures 26h, exercises 12h and self-study 100h.
The information about the course 521124S - Anturit ja mittausmenetelmät/Electronic Sensors has been added to the Moodle page:
https://moodle.oulu.fi/course/view.php?id=5357

Course description: "The course is aimed at students willing to be capable of explaining the operating principles of different sensors and selecting the right sensor for each measuring target. We will focus on how to quantify the requirements that affect sensor selection as well as recognize and evaluate the uncertainty of a measurement. In addition, we will go into questions on how to plan and design sensor signal conditioning circuits."

The lectures and seminars will be organized remotely via Zoom environment. The corresponding link will be published on the page of the course in Moodle prior to the lecture.
Target group:
4 year students.
Prerequisites and co-requisites:
No.
Recommended optional programme components:
No.
Recommended or required reading:
H. N. Norton: Handbook of Transducers, Prentice Hall P T R, 1989 or 2002; lecture and exercise notes.
Assessment methods and criteria:
The course is passed by a final exam and passed exercises.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
1-5
Person responsible:
Aliaksandr Bykau ja Alexey Popov
Working life cooperation:
No.

060709A-02: Endocrinology, 3 op

Voimassaolo: 01.08.2013 -
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Olavi Ukkola
Opintokohteen kielet: English

Ei opintojaksokuvauksia.

090623A: Esthetics in prosthodontics, 0,2 - 1 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Dentistry
Arvostelu: 1 - 5, pass, fail
Opettajat: Kirsi Sipilä, Ritva Näpänkangas
Opintokohteen kielet: English

ECTS Credits:
2 h of work, 0.2 ECTS credits
Language of instruction:
English
Timing:
Fall and Spring semester
Learning outcomes:
Upon completion of the course, the student will be able to discuss the esthetic considerations in fixed and removable prostheses.
Contents:
Esthetic considerations in fixed and removable prostheses.
Mode of delivery:
face-to-face teaching
Learning activities and teaching methods:
Lectures (2 hours)
Target group:
Dental Exchange Students
Prerequisites and co-requisites:
Basic courses in fixed and removable prosthodontics
Recommended optional programme components:
Fixed and removable prosthodontics
Recommended or required reading:
Lecture hand-outs
Schillingburg HT, Hobo S, Whittsett LD, Jakobi R, Brachett SE: Fundamentals of fixed prosthontodontics. Quintessence Publishing Co. 4th ed. Pages: 413 - 424
Assessment methods and criteria:
The course unit utilizes verbal grading scale pass/fail.
Read more about [assessment criteria](#) at the University of Oulu webpage.
Grading:
The course unit utilizes verbal grading scale pass/fail.
Person responsible:
Senior lecturer Ritva Näpänkangas, Professor Kirsi Sipilä
Working life cooperation:
No
Other information:
The courses given by the Institute of Dentistry within the Erasmus-project
[Prosthetic Dentistry and Stomatognathic Physiology](#)

060709A-04: Exam of Rheumatology, 1 op

Voimassaolo: 01.08.2013 -
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Karjalainen, Anna Helena
Opintokohteen kielet: English

Ei opintojaksokuvauksia.

060704A-04: Gastroenterological surgery, 4 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Juha Saarnio

Opintokohteen kielet: English

Ei opintojaksokuvauksia.

090632A: Glass fibers in periodontal and prosthetic treatment, 0,3 - 1 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Dentistry
Arvostelu: 1 - 5, pass, fail
Opettajat: Ritva Näpänkangas, Pernu, Hilkka Elina
Opintokohteen kielet: Finnish

ECTS Credits:
0,3 ECTS credits
Language of instruction:
Finnish (handouts in English)
Timing:
Spring term
Contents:
Glass fibers in periodontal and prosthetic treatment (Stick Tech)
Mode of delivery:
Phantom practise 8 h
Learning activities and teaching methods:
Phantom practise 8 h
Target group:
Dental Exchange Students (with 3rd year dental students)
Recommended or required reading:
Handouts (in English)
Grading:
The course unit utilizes verbal grading scale pass/fail.
Person responsible:
Senior lecturers Hilkka Pernu and Ritva Näpänkangas

080929S: Health Technology and Multimodal Monitoring, 5 op

Voimassaolo: 01.08.2017 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Health Sciences
Arvostelu: 1 - 5, pass, fail
Opettajat: Teemu Myllylä
Opintokohteen kielet: English

Proficiency level:
-
Status:
-
Required proficiency level:
-
ECTS Credits:
5 ECTS credit points /135 hours of work
Language of instruction:
English
Timing:
The course is held in the Spring semester, during period III.

Learning outcomes:
The course provides students with a broad overview of the health technology that is currently in development and becoming for home and/or clinical use.
Students learn the concepts of multimodal monitoring and examples of its usage in clinical applications and in medical research (including human and animal studies).
Contents:
Multimodal monitoring is increasingly being employed in clinical monitoring and in the study of human physiology. It is the simultaneous measurement of multiple physiological parameters to provide better context for their interpretation and correlations, and to enable studies of relationships between different physiological signals. Besides the concepts of multimodal monitoring, this course provides students a broad overview of the health technology that is currently in development and becoming for home or clinical use. Moreover, their usage in medical applications and for different study purposes (human and animal) are dealt.
Mode of delivery:
Web-based teaching + Face-to-face teaching
Learning activities and teaching methods:
Lectures, demonstrations, seminars and self-study

Target group:
Medical and biomedical engineering students
Prerequisites and co-requisites:
-
Recommended optional programme components:
The course is an independent entity and does not require additional studies carried out at the same time.
Recommended or required reading:
Reading material will be provided during the course.
Assessment methods and criteria:
The assessment of the course is based on the learning outcomes of the course, based on the seminar work and exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
Adjunct professor Teemu Myllylä
Working life cooperation:
There is no working life cooperation in this course
Other information:
-

080926S: Introduction to Artificial Intelligence for Medical Imaging, 3 - 5 op

Voimassaolo: 01.08.2020 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Simo Saarakkala

Opintokohteen kielet: English

ECTS Credits:
3 ECTS, 81 hours of work
5 ECTS credits, 135 hours of work.
Language of instruction:
English
Timing:
Master studies, autumn term, 1st period.
The course will be organized every year.
Learning outcomes:
Upon completion of this course, the student will be able to:
1. Formalize problems in terms of machine learning
2. Understand common issues related medical data analysis and predictive modelling as well as the ways to mitigate them

3. Design machine learning experiments and assess their results

4. Use basic computer vision techniques to solve image recognition and segmentation problems

Contents:

Basics of Machine Learning, Machine Learning Experiments Design, Simple parametric and Non-parametric Models,

Deep Convolutional Neural Networks, Image Recognition, Image Segmentation, Interpretability of Deep Learning, Practical use cases.

Mode of delivery:

Face-to-face teaching

Learning activities and teaching methods:

3 ECTS: Lectures 20 h, Project work 34 h, Self-study 16 h, weekly Moodle midterm exams 8 h, final exam 3 h.

5 ECTS: Lectures 20 h, Exercises 14 h, Project work 34 h, Self-study 44 h, Home Programming Exercises 12 h, weekly Moodle midterm exams 8 h, final exam 3 h.

Target group:

Biomedical Engineering and Computer Science MSc students (for 5 ECTS course) as well as Medical students (for 3 ECTS course). Also BSc students can take the course, given basic understanding of mathematics and programming.

Prerequisites and co-requisites:

• Basics of Linear Algebra, probability and statistics (not needed for 3 ECTS)

• Basics of Programming (not needed for 3 ECTS)

• Basic knowledge of medical physics

Recommended or required reading:

Friedman, J., Hastie, T., & Tibshirani, R. (2001). The elements of statistical learning (Vol. 1, No. 10). New York: Springer series in statistics.

Goodfellow, I., Bengio, Y., & Courville, A. (2016). Deep learning. MIT press.

Assessment methods and criteria:

3 ECTS: Lecture attendance, accepted project work, weekly Moodle midterm exams, final exam

5 ECTS: Lecture attendance, exercises, accepted project work, home programming exercises, weekly Moodle midterm exams, final exam.

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

Grading:

The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for fail.

Person responsible:

Professor Simo Saarakkala

Working life cooperation:

Guest lectures from industry will be organized.

521242A: Introduction to Biomedical Engineering, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Electrical Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Teemu Myllylä

Opintokohteen kielet: English

ECTS Credits:

5 ECTS cr

Language of instruction:

English

Timing:

Period 1

Learning outcomes:

After completing the course, the student has a basic knowledge of the biomedical engineering discipline and the applications of engineering science to biomedical problems.

Contents:

Biomedical engineering is a multidisciplinary field of study that ranges from theory to applications at the interface between engineering, medicine and biology. This course will introduce the subdisciplines within biomedical

engineering, including such as systems physiology, bioinstrumentation, bioimaging, biophotonics and biomedical signal analysis. General issues of the subdisciplines will be presented together with selected examples and clinical applications. A number of lectures will be given by professionals working in health tech companies, University of Oulu and Oulu University Hospital, presenting different fields of the biomedical engineering. In addition, course offerings of biomedical engineering at the University of Oulu are introduced.

Mode of delivery:

Face-to-face teaching. Under some circumstances distance learning using online material is possible (please, ask the teacher).

Learning activities and teaching methods:

The course includes online material, lectures and a group project. Lectures 28h and laboratory exercises 4 h and self-study 100h

Target group:

-

Prerequisites and co-requisites:

-

Recommended optional programme components:

-

Recommended or required reading:

-

Assessment methods and criteria:

Participation in lectures or using the online material and writing a work report.

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

Grading:

1 - 5, pass, fail

Person responsible:

Teemu Myllylä

Working life cooperation:

Guest lecturers

Other information:

-

080926A: Introduction to Biomedical Imaging Methods, 1 - 3 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Lassi Rieppo

Opintokohteen kielet: English

Proficiency level:

-

Status:

-

Required proficiency level:

-

ECTS Credits:

1-3 ECTS credit points / 27-81 hours of work

Language of instruction:

English

Timing:

Master studies, spring term 4th period

Learning outcomes:

The student understands and can describe the basic principles and main applications of imaging methods used in biomedical research.

Contents:

Differences between in vivo, ex vivo and in vitro imaging.
Light and electron microscopy.
Optical projection and coherence tomography.
Optical in vivo imaging.
Magnetic resonance imaging.
Fourier transform infrared imaging spectroscopy and Raman imaging spectroscopy.
Micro-computed tomography.
Basics of image analysis and interpretation
Mode of delivery:
Face-to-face teaching. Compulsory participation in lectures.
Learning activities and teaching methods:
Number of ECTS cr of the course and the methods of implementation vary. The course includes lectures 19h, demonstrations 8h and final exam 3 h. Number of hours left for independent study depends on the number of the ECTS cr the student wishes to complete and is from 8 to 51 hours.
Target group:
All Bachelor´s, Master´s and postgraduate students interested in methods of biomedical imaging.
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
Handouts and literature given in the lectures
Assessment methods and criteria:
In this field, write with which method the teacher will monitor/
Participation in the lectures and demonstrations. Exam. The course can be completed with 1, 2 or 3 ECTS cr.
1 ECTS ¬# compulsory participation in lectures
2 ECTS ¬# compulsory participation in lectures and demonstrations
3 ECTS ¬# compulsory participation in lectures, demonstrations and final exam
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The 1 and 2 ECTS cr courses utilize verbal grading "pass" or "fail". The 3 ECTS cr course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
Dr Lassi Rieppo
Working life cooperation:
-
Other information:
-

060709A-01: Introduction to Cardiology, 3 op

Voimassaolo: 01.08.2013 -
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Juha Perkiömäki
Opintokohteen kielet: English

Ei opintojaksokuvauksia.

031025A: Introduction to Optimization, 5 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Applied Mathematics and Computational Mathematics
Arvostelu: 1 - 5, pass, fail
Opettajat: Ruotsalainen Keijo

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 135 hours of work
Language of instruction:
English
Timing:
The course is held in the autumn, during period 1.
Learning outcomes:
After completing the course the student is able to solve optimization convex optimization problems with the basic optimization algorithms. The student is also able to form the necessary and sufficient conditions for the optimality.
Contents:
Linear optimization, Simplex-algorithm, nonlinear optimization, KKT-conditions, duality, conjugate gradient method, penalty and barrier function methods.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 28 h / Group work 14 h / Self-study 93 h.
The course, Introduction to Optimization, will be lectured remotely through the ZOOM video conferencing tool. The more detailed instructions and access to ZOOM lectures can be found in the Moodle work space of the course. The link is here: https://moodle.oulu.fi/course/view.php?id=5350.
Target group:
Students in Wireless Communication Engineering
Prerequisites and co-requisites:
The recommended prerequisite is the completion of the courses Calculus I and II, Matrix algebra
Recommended optional programme components:
-
Recommended or required reading:
P. Ciarlet; Introduction to numerical linear algebra and optimization, M. Bazaraa, H. Sherali, C.M. Shetty; Nonlinear programming
Assessment methods and criteria:
The course can be completed by a final exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail
Person responsible:
Keijo Ruotsalainen
Working life cooperation:
-
Other information:
The course, Introduction to Optimization, will be lectured remotely through the ZOOM video conferencing tool. The more detailed instructions and access to ZOOM lectures can be found in the Moodle work space of the course. The link is here: https://moodle.oulu.fi/course/view.php?id=5350.

090636A: Introduction to orthodontics, 3 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Dentistry
Arvostelu: 1 - 5, pass, fail
Opettajat: Pirttiniemi, Pertti Mikael
Opintokohteen kielet: English

ECTS Credits:
3 ECTS credits
Language of instruction:
English

Timing:
Fall and Spring
Contents:
Introduction to orthodontics
Mode of delivery:
Literature exam
Learning activities and teaching methods:
Literature exam
Target group:
Dental Exchange Students
Recommended or required reading:
Littlewood and Mitchell. An Introduction to Orthodontics, 5th Edition, Oxford.
Assessment methods and criteria:
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
Professor Pertti Pirttiniemi
Working life cooperation:
No
Other information:
The courses given by the Institute of Dentistry within the Erasmus-project
Oral Development and Orthodontics

090621A: Light curing technique for dental exchange students, 0,2 - 1 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Dentistry
Arvostelu: 1 - 5, pass, fail
Opettajat: Tarja Tanner
Opintokohteen kielet: Finnish

ECTS Credits:
0.2 ECTS credits
Language of instruction:
English
Timing:
The course is held in the spring semester
Learning outcomes:
Upon completion of the course, the student will be able to know light curing techniques and how it effects for polymerization.
Mode of delivery:
Face-to-face training
Learning activities and teaching methods:
Interactive phantom training
Target group:
Dental exchange students
Grading:
The course utilizes verbal grading scale "Pass/ Fail"
Person responsible:
PhD, DDS Tarja Tanner
Working life cooperation:
The course does not contain working life cooperation
Other information:
The courses given by the Institute of Dentistry within the Erasmus-project
Cariology, Endodontology and Paediatric Dentistry

090624A: Literature exam: Fixed prosthodontics, 2 - 2,5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Dentistry
Arvostelu: 1 - 5, pass, fail
Opettajat: Ritva Näpänkangas, Kirsi Sipilä
Opintokohteen kielet: English

ECTS Credits:
2,5 ECTS credits
Language of instruction:
English
Timing:
Fall and Spring semester
Learning outcomes:
Student knows the principles of fixed prosthetic treatment phases.
Mode of delivery:
Literature exam
Learning activities and teaching methods:
Literature exam
Target group:
Dental Exchange Students
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
Schillingburg HT, Hobo S, Whittsett LD, Jakobi R, Brachett SE:
Fundamentals of fixed prosthontodontics. Quintessence Publishing Co. 4th ed. Pages:
6) Treatment planning for single-tooth restorations (pp. 71 – 80)
7) Treatment planning for the replacement of missing teeth (pp. 81 – 98)
8) Fixed partial denture and implant configurations (pp. 99 – 130)
9) Principles of tooth preparations (pp. 131 – 148)
12) Preparations for intracoronal restorations (pp. 193 – 201)
13) Preparations for severely debilitated teeth (pp. 203 – 228)
14) Preparations for periodontally weakened teeth (pp. 229 – 240)
21) Cementation and bonding (pp. 383 – 412)
Assessment methods and criteria:
Written exam
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
Senior lecturer Ritva Näpänkangas, Professor Kirsi Sipilä
Working life cooperation:
No
Other information:
The courses given by the Institute of Dentistry within the Erasmus-project
Prosthetic Dentistry and Stomatognathic Physiology

090625A: Literature exam: Prosthetic treatment of edentulous patient, 3 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Dentistry
Arvostelu: 1 - 5, pass, fail

Opettajat: Kirsi Sipilä, Ritva Kuoppala
Opintokohteen kielet: English

ECTS Credits:
3,0 ECTS credits
Language of instruction:
English
Timing:
Fall and Spring semester
Learning outcomes:
Student knows the principles of prosthetic treatment of edentulous patients.
Contents:
Prosthetic treatment of edentulous patient
Mode of delivery:
Literature exam
Learning activities and teaching methods:
Literature exam
Target group:
Dental Exchange Students
Recommended or required reading:
Basker RM and Davenport JC: **Prosthetic Treatment of the Edentulous Patient**. Blackwell Munksgaard, 4th ed. pp. 1-306.
Assessment methods and criteria:
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
Senior lecturer Ritva Kuoppala, Professor Kirsi Sipilä
Working life cooperation:
No
Other information:
The courses given by the Institute of Dentistry within the Erasmus-project
Prosthetic Dentistry and Stomatognathic Physiology

090626A: Literature exam: Stomatognathic physiology part I, 1 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Dentistry
Arvostelu: 1 - 5, pass, fail
Opettajat: Ritva Näpänkangas, Kirsi Sipilä
Opintokohteen kielet: English

ECTS Credits:
1,0 ECTS credits
Language of instruction:
English
Timing:
Fall and Spring semester
Learning outcomes:
Student knows the functional antomy and biomechanics of the masticatory system.
Mode of delivery:
Literature exam
Learning activities and teaching methods:
Literature exam
Target group:
Dental Exchange Students
Prerequisites and co-requisites:
None

Recommended optional programme components:
The courses given by the Institute of Dentistry within the Erasmus-project
Recommended or required reading:
Jeffrey P. Okeson: Management of Temporomandibular Disorders and Occlusion. 7th edition. Mosby, pp 1-99.
Assessment methods and criteria:
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
Professor Kirsi Sipilä, Senior lecturer Ritva Näpänkangas
Working life cooperation:
No
Other information:
The courses given by the Institute of Dentistry within the Erasmus-project
Prosthetic Dentistry and Stomatognathic Physiology

090627A: Literature exam: Stomatognathic physiology part II, 2 - 2,5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Dentistry

Arvostelu: 1 - 5, pass, fail

Opettajat: Kirsi Sipilä, Ritva Näpänkangas

Opintokohteen kielet: English

ECTS Credits:
2,5 ECTS credits
Language of instruction:
English
Timing:
Fall and Spring term
Learning outcomes:
Student knows epidemiology, etiology, diagnosis and treatment of temporomandibular disorders.
Contents:
Structure and function of masticatory system
Mode of delivery:
Literature exam
Learning activities and teaching methods:
Literature exam
Target group:
Dental Exchange Students
Prerequisites and co-requisites:
None
Recommended optional programme components:
The courses given by the Institute of Dentistry within the Erasmus-project
Recommended or required reading:
Jeffrey P. Okeson: Management of Temporomandibular Disorders and Occlusion. 7th edition. Mosby, pp 102-456.
Assessment methods and criteria:
Written literature exam
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
Professor Kirsi Sipilä, Senior lecturer Ritva Näpänkangas
Working life cooperation:
No
Other information:
The courses given by the Institute of Dentistry within the Erasmus-project
Prosthetic Dentistry and Stomatognathic Physiology

521289S: Machine Learning, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Tapio Seppänen

Opintokohteen kielet: Finnish

Leikkaavuudet:

  521497S-01   Pattern Recognition and Neural Networks, Exam   0.0 op

  521497S-02   Pattern Recognition and Neural Networks; Exercise Work   0.0 op

  521497S   Pattern Recognition and Neural Networks   5.0 op

ECTS Credits:
5 ECTS credits.
Language of instruction:
English.
Timing:
The course unit is held in the spring semester, during period III. It is recommended to complete the course at the end of studies.
Learning outcomes:
After completing the course, student
1. can design simple optimal classifiers from the basic theory and assess their performance.
2. can explain the Bayesian decision theory and apply it to derive minimum error classifiers and minimum cost classifiers.
3. can apply regression techniques to practical machine learning problems.
Contents:
Introduction. Bayesian decision theory. Parametric and non-parametric classification. Feature extraction. Classifier design and optimization. Example classifiers. Statistical regression methods.
Mode of delivery:
Online teaching, guided laboratory work and independent assignment. The laboratory works are done on an online system (Mathworks Grader). Student can do the lab works remotely or in the lab using the same online system.
The course is implemented as remote education via the Moodle work space https://moodle.oulu.fi/course/view. php?id=5729
This work space opens to students before the course begins. The student must register to the course in WebOodi in order to participate the course.
Learning activities and teaching methods:
Lectures 16 h, Laboratory work 16 h, and Self-study the rest (Independent task assignment).
Target group:
Students who are interested in machine learning and pattern recognition theory and methods.
Prerequisites and co-requisites:
The mathematic studies of the candidate degree program of computer science and engineering, or equivalent. Programming skills, especially basics of the Matlab.
Recommended optional programme components:
The course is an independent entity and does not require additional studies carried out at the same time.
Recommended or required reading:
Will be informed when the course starts.
Assessment methods and criteria:
Laboratory work is supervised by assistants who also verify that the task assignments are completed properly. The Matworks Grader online system also verifies the completed tasks. The independent task assignment is graded which establishes the grade for the course.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail. The final grade is established by the independent task assignment.
Person responsible:
Tapio Seppänen

Working life cooperation:
No

521466S: Machine Vision, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Heikkilä, Janne Tapani

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS cr
Language of instruction:
English
Timing:
Spring, period 3.
Learning outcomes:
Upon completion of the course the student
1. understands the fundamentals of image acquisition, representation and modeling
2. can utilize elementary methods of machine vision for image recognition problems
3. can use 2D transformations in model fitting and image registration
4. can explain the basics of 3D imaging and reconstruction

Contents:
1. Introduction, 2. Imaging and image representations, 3. Light and color, 4. Binary image analysis, 5. Texture, 6.
Local features, 7. Recognition, 8. Motion, 9. 2D models and transformations, 10. Perceiving 3D from 2D images,
11. 3D transformations and reconstruction.
Mode of delivery:
Online lectures and exercises, homework assignments.
Learning activities and teaching methods:
Lectures (24 h), exercises (16 h) and programming assignments (32 h), self-studying (61 h)
Target group:
Computer Science and Engineering students and other Students of the University of Oulu.
Prerequisites and co-requisites:
521467A Digital Image Processing or an equivalent course, basic Python programming skills.
Recommended optional programme components:
521289S Machine Learning. This course provides complementary knowledge on machine learning methods
needed in machine vision.
Recommended or required reading:
Lecture slides and exercise material. The following books are recommended for further information: 1) Shapiro, L.
G. & Stockman, G.C.: Computer Vision, Prentice Hall, 2001. 2) Szeliski, R.: Computer Vision: Algorithms and
Applications, Springer, 2011. 3) Forsyth, D.A. & Ponce, J.: Computer Vision: A Modern Approach, Prentice Hall,
2002.
Assessment methods and criteria:
The course is passed with final exam and accepted homework assignments.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Numerical grading scale 1-5. Zero stands for a fail.
Person responsible:
Janne Heikkilä
Working life cooperation:
No.
Other information:
Course is in Moodle: https://moodle.oulu.fi/course/view.php?id=4317

080922S: Microscopy and Spectroscopic Imaging, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Lassi Rieppo

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credit points /135 hours of work.
Language of instruction:
English
Timing:
The course is organized every second year (in uneven years) in spring semester during period 3, next time in spring 2021. It is recommendable to complete the course during Master studies.
Learning outcomes:
Upon completion of the course, the student can:
• Explain the physical and technical background of basic optical microscopy methods, confocal microscopy, hyperspectral imaging, and infrared- and Raman spectroscopic imaging
• describe the properties of grayscale image, RGB image and spectral image
• Perform microscopic and spectroscopic imaging in practice
• Perform basic quantitative analysis for microscopic images
• Perform univariate and multivariate analysis for spectral image data
Contents:
• Basics of optical microscopy
• Basics of optical microscopy
• Bright field microscopy and digital densitometry
• Polarized light microscopy
• Phase-contrast microscopy, differential interference contrast microscopy, and confocal microscopy
• Basic image analysis methods
• Hyperspectral imaging, infrared and Raman spectroscopic imaging
• Univariate and multivariate spectral analysis methods
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 20 h / Exercises 8 h / Demonstrations 6 h, Practical microscopy assignment 15 h / Self-study 86 h. Final exam.
Target group:
Master students of medical and wellness technology, biomedical engineering and physics (biomedical physics major and minor subject students). The course is also suitable for other interested students with adequate prerequisites.
Prerequisites and co-requisites:
Basic knowledge on physics, calculus, differential equations and matrix algebra is required. The ability to use Matlab software is recommended as it will be used in the exercises.
Recommended or required reading:
Material given during the course
Assessment methods and criteria:
Accepted practical assignment and written final exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail.
Person responsible:
Dr Lassi Rieppo
Working life cooperation:
The course does not contain working life cooperation.

060706A: Neurosurgery, 3 op

Voimassaolo: 01.08.2013 -

Opiskelumuoto: Intermediate Studies

Laji: Course
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Sami Tetri
Opintokohteen kielet: English

ECTS Credits:
3.5 ECTS credits
Language of instruction:
English
Timing:

Spring semester
Learning outcomes:
The student knows the clinical presentation, diagnostics and treatment of neurosurgical diseases and trauma. The student can evaluate the urgency of treatment of neurosurgical conditions and understands their debilitating and often life-threatening nature. The roles of prevention and rehabilitation are also stressed.
Contents:
The management of neurosurgical trauma and diseases with special emphasis on the clinical competence required of a general practitioner
Mode of delivery:
Blended teaching
Learning activities and teaching methods:

The neurosurgical course is based on full-time participation in all clinical activities of the department for a minimum of one week during February or March when the neurosurgical course is offered. Bedside learning and the importance of the patient-doctor relationship as well as work in an environment that fosters multi-professional teamwork are stressed. For ETCS credits a textbook-based final examination in April must be passed.

Target group:

For medical students in their final year of study or after passing Neurology course in their home University.
Prerequisites and co-requisites:

The required prerequisite is the completion of the following courses prior to enrolling for the course unit:
A passing grade in clinical neurology is required before enrollment in the neurosurgical course.

Recommended optional programme components:
None
Recommended or required reading:
K. W. Lindsay, I. Bone, G. Fuller. Neurology and Neurosurgery Illustrated, latest edition. Churchill Livingstone.
Assessment methods and criteria:
Participation with the guidance of an assigned doctor in the clinical and academic activities of the neurosurgical department, including small group learning sessions, clinical ward rounds, meetings, and observation of surgical procedures. ECTS credit requires passing a written final examination
Grading:
The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
Professor Sami Tetri
Working life cooperation:
No
Other information:
Maximum of four exchange students can be accepted to the course yearly.

060720A: Obesity Minisymposium, 1 op

Voimassaolo: 01.08.2013 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Medicine

Arvostelu: 1 - 5, pass, fail
Opettajat: Olavi Ukkola
Opintokohteen kielet: English

Proficiency level:

-
Status:

-
Required proficiency level:

-
ECTS Credits:
1,2 ECTS/   h of student work
Language of instruction:
English
Timing:
The minisymposium is held in the autumn semester C10.
Learning outcomes:
To know what is the prevalence and trends of overweight and obesity in different parts of the world. Understand the underlying causes of obesity and its pathophysiology. Recognizing the diseases associated with excess body fat. Learn to evaluate obese subject in primary health care. Learn to define the optimal dietary approach and current available drug treatments to obesity.
Understand the theoretical backgrounds, indications, surgical techniques and complications of obesity surgery.
Contents:
Prevalence and trends of overweight and obesity. Underlying causes of obesity and its pathophysiology. Disease associated with obesity. Evaluation of obese subject in primary health care. Defining optimal dietary approach and current available drug treatments to obesity. Theoretical backgrounds, indications, surgical techniques and complications of obesity surgery.
Mode of delivery:
Preparing presentations using theoretical background on provided literature under the guidance of supervisors. Giving presentations and discussion in the minisymposium.
Learning activities and teaching methods:
Preparing presentations (?)
Minisymposium 6 h
Target group:
 Medical students
Prerequisites and co-requisites:
Basic knowledge of gastrointestinal tract anatomy and physiology of hormonal control of food intake.
Recommended optional programme components:
The study unit cannot be completed alternatively.
Recommended or required reading:
Provided literature and e-material.
Assessment methods and criteria:
Meetings with the supervisors, preparing the presentation, giving the presentation, answering questions raised by the presentation and participating discussions on other presentations.
Grading:
Pass-Fail. No numeric evaluation.
Person responsible:
Professor Olavi Ukkola
Docent Vesa Koivukangas
Working life cooperation:
No
Other information:
This course is recommended for those who plan on taking the course on Endocrinology.

060710A: Oncology and radiotherapy, 3 op

Voimassaolo: 01.08.2013 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Medicine

Arvostelu: 1 - 5, pass, fail

Opettajat: Turpeenniemi-Hujanen, Taina Marjatta

Opintokohteen kielet: English

Proficiency level:

-

Status:

-

Required proficiency level:

-

ECTS Credits:

3.5 ECTS credits

2.5 ECTS without exam

Language of instruction:

English

Timing:

September-December

Learning outcomes:

Upon completion of this curricular unit, student should be able to understand principles of cancer etiology, diagnosis, therapeutic modalities and their adverse events, and palliative care.

Contents:

 The diagnostics, oncological therapeutic modalities and monitoring of adult solid malignancies and lymphomas.

Mode of delivery:

Blended teaching.

Learning activities and teaching methods:

· Pre-examination (3 h, at home)

· Lectures / tutorials (10 h) concerning the entities of breast cancer, colorectal cancer, lymphomas, lung cancer and acute oncology

· Group work:

o Ward cases and palliative oncology (6 x 2 h)

o Demonstration of the planning of a CT-based radiotherapy and radiotherapy treatment (3 h)

· Final examination (2h)

Target group:

4-6th year medical students.

Prerequisites and co-requisites:

It is preferred that student has completed basic courses of pathology, clinical chemistry, radiology, internal medicine, and surgery prior to enrolling for the course unit.

Recommended optional programme components:

None

Recommended or required reading:

Jim Cassidy, Donald Bissett, Roy Spence, and Miranda Payne: Oxford Handbook of Oncology (latest edition)

http://www.oulu.fi/library/ -> Subject Guides -> E-books -> Oxford Medical Handbooks -> Oxford Handbook of Oncology (3 ed.)

Assessment methods and criteria:

Preliminary and final examinations must be passed. Preliminary examination and all other course units must be passed before participation in the final examination. Half of the maximum points should be gained in order to pass the exam. If maximum is 40 points then passing the exam requires 20 points.

Evaluation is based on final examination (essays).

Grading:

The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.

The grade is given only to the students who take the final examination.

Person responsible:

Professor Taina Turpeenniemi-Hujanen

Working life cooperation:

No

Other information:

The course will be organised only when there are at least five students.

090635A: Oral and craniofacial growth and development: genetic, epigenetic, clinical and experimental approach, 1 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Dentistry

Arvostelu: 1 - 5, pass, fail

Opettajat: Pirttiniemi, Pertti Mikael

Opintokohteen kielet: English

ECTS Credits:
Lectures 10 h (1 ECTS credit)
Language of instruction:
English
Timing:
Fall and Spring
Learning outcomes:
Upon completion of the course, the student will be able to explain normal and abnormal development of the teeth, oral structures and occlusal morphology in humans. In addition to this the student will be able to explain pre-, peri- and postnatal development of dentition and different oral structures, in specific the effect of disturbing factors during pregnancy and child's early development as well as genetic factors on the developing phenotype.
The student also knows how to quide mandibular growth, can explain the mechanism of regulation, influence of functional orthodontic appliances and growth of maxilla and neurocranium.
Having completed the course, the student is able to explain the interaction between facial structures and breathing function and also the expression and etiology of asymmetric growth.
Contents:
Within these lectures normal and abnormal development of the teeth, oral structures and occlusal morphology in humans is critically examined. Included are pre-, peri- and postnatal development of dentition and different oral structures, in specific the effect of disturbing factors during pregnancy and child's early development as well as genetic factors on the developing phenotype. Further, quiding of mandibular growth, mechanism of regulation, influence of functional orthodontic appliances, growth of maxilla and neurocranium are lectured. The interaction between facial structures and breathing function, and the expression and etiology of asymmetric growth are also the topics of lectures.
Mode of delivery:
Face-to–face-teaching
Learning activities and teaching methods:
Lectures 10 hours. Advanced studies available
Target group:
Dental Exchange Students
Assessment methods and criteria:
Taking part into the lectures. (Written exam)
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes verbal grading scale pass/fail.
Person responsible:
Professor Pertti Pirttiniemi
Working life cooperation:
No
Other information:
The courses given by the Institute of Dentistry within the Erasmus-project
Oral Development and Orthodontics

090618A: Oral and maxillofacial pathology, literature exam, 3 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Dentistry

Arvostelu: 1 - 5, pass, fail

Opettajat: Salo, Tuula Anneli

Opintokohteen kielet: English

ECTS Credits:
3 ECTS credits
Language of instruction:
English
Timing:
Fall and Spring
Mode of delivery:
Literature exam (4 h)
Learning activities and teaching methods:
Literature exam (4 h)
Target group:
Dental Exchange Students
Recommended or required reading:
Regezi JA, Sciubba J, Jordan RCK. Textbook: Oral & Maxillofacial Pathology: Clinical Pathologic Correlations. 7th edition. WB Saunders Co. Philadelphia, PA, 2008
Assessment methods and criteria:
Literature exam (4 h)
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
Professor Tuula Salo
Working life cooperation:
No
Other information:
The courses given by the Institute of Dentistry within the Erasmus-project
Diagnostics and Oral Medicine, Oral and Maxillofacial Pathology

090633A: Organisation of oral health care in Finland, 1 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Dentistry

Arvostelu: 1 - 5, pass, fail

Opettajat: Saujanya Karki, Marja-Liisa Laitala

Opintokohteen kielet: English

ECTS Credits:
1 ECTS credit
Language of instruction:
English
Timing:
Autumn and spring semesters
Learning outcomes:
Upon completion of the course, the student will be able to
- know implementation of oral health care services in Finland
- understand regulations of oral health care
- visit public oral health centre
Contents:
The administration, financing and regulations of (oral) health care services in Finland, organisation of primary and specialised oral health care.
Mode of delivery:
Lectures, self-study, visit to public oral health care clinic
Learning activities and teaching methods:

Lectures, self-study, visit to public oral health care clinic
Target group:
Exchange students
Prerequisites and co-requisites:
No
Recommended optional programme components:
No
Recommended or required reading:
Recommended literature: Niiranen, Widström & NiskanenOral health care reform in Finland – aiming to reduce inequity in care provision. BMC Oral Health 2008;8:3
Assessment methods and criteria:
The course utilizes verbal grading scale "Pass/ Fail"
Grading:
The course utilizes verbal grading scale "Pass/ Fail"
Person responsible:
PhD, DDS Marja-Liisa Laitala
Working life cooperation:
No
Other information:
The courses given by the Institute of Dentistry within the Erasmus-project

060704A-01: Orthopaedics and Traumatology, 4 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Intermediate Studies
Laji: Partial credit
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Juvonen, Tatu Sakari, Maarit Valkealahti
Opintokohteen kielet: English

Ei opintojaksokuvauksia.

090617A: Other studies given by the Institute of Dentistry within the Erasmus-project, 0 - 60 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Dentistry
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: English
Voidaan suorittaa useasti: Kyllä

Language of instruction:
English
Contents:
E.g. following our students clinical work (27 h = 1 ECTS credit) or other dental studies during the exchange
Target group:
Dental Exchange Students
Assessment methods and criteria:
Read more about assessment criteria at the University of Oulu webpage.

061001A: Paediatrics, 14 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opettajat: Terhi Tapiainen
Opintokohteen kielet: English

ECTS Credits:
14 ECTS

Language of instruction:
English
Timing:
Autumn semester
Learning outcomes:
Upon completion the student is able:
- to diagnose and treat the most common pediatric diseases as a general practitioner or as a first-year resident in a hospital
- to provide acute care to acutely and critically ill children
- to understand pediatric preventive health care and health education
Contents:
Growth and development, medical history and clinical examination of a child, allergology, endocrinology, diabetology, gastroenterology, hematology, infectious diseases, cardiology, pediatric surgery, pediatric neurology, nephrology, neonatology, oncology, emergency medicine

Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Theme-day 4 h

Seminars 16h

Lectures 65h

Small group teaching
-       Group teaching 39h
-       Ward rounds and learning at wards, following of the own patient 24h
-       Outpatient clinic learning 26 h
-       Attending to the paediatric emergency (including patient examinations and 7 case records) 12 hours

Student-visit 4 h

Practical training, 1 week in Oulu University Hospital (38h)

The admission exam 4h (web-based)

The patient exam 1 h

The final exam 4 h

Self-study 138h

Target group:
Medical Students
Prerequisites and co-requisites:
The prerequisites for the course unit are previous studies (C1-8 course units)
Recommended optional programme components:
No alternative course units.
Recommended or required reading:
Marcdante Karen J & Kliegman Robert M (edit.) Nelson Essentials of Pediatrics, Seventh Edition, 1 Elsevier (2015).

E-book available from the Oulu University Library.
Assessment methods and criteria:
The assessment of the course unit is based on the learning outcomes of the course unit.

Preliminary test is multiple choice test. Required literature: textbook. The preliminary test is evaluated from 0 to 50 points (the approval limit is 30 points). Exam should be passed during the first week of the course.

Attending to all compulsory teaching sessions (evaluated pass/ fail).

Patient cases exam (evaluated from 0 to 20. approval limit is 5 points). Grading pass/fail.

The final exam (evaluated from 0-60 points, approval limit is 35 points. Grading 1-5/ fail.

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

Grading:
The course unit utilizes a numerical grading scale 1 – 5. In the numerical scale zero stands for a fail.

The final grade of the course is formed of final exam (85%) and patient cases exam (15%).
Person responsible:
Mika Rämet
Terhi Tapiainen
Working life cooperation:
Yes. Each student will follow the work of pediatricians taking care of patients for one week in Oulu University Hospital.
Other information:
-

090620A: Pediatric Dentistry for Erasmus Exchange Students, 1 - 3 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Dentistry
Arvostelu: 1 - 5, pass, fail
Opettajat: Päivi Rajavaara
Opintokohteen kielet: Finnish

ECTS Credits:
3 ECTS credits
Language of instruction:
English
Timing:
Fall and Spring Semester
Learning outcomes:
Textbook: Welbury, Duggal, Hosey (eds.) Paediatric Dentistry, 4th ed. Oxford University Press 2012.
Contents:
Textbook: Welbury, Duggal, Hosey (eds.) Paediatric Dentistry, 4th ed. Oxford University Press 2012.
Mode of delivery:
Written exam
Learning activities and teaching methods:
Written exam
Target group:
Dental Exchange Students
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
Textbook: Welbury, Duggal, Hosey (eds.) Paediatric Dentistry, 4th ed. Oxford University Press 2012.

Assessment methods and criteria:
Written exam
Grading:
Pass/fail
Person responsible:
Senior lecturer Päivi Rajavaara
Working life cooperation:
No
Other information:
The courses given by the Institute of Dentistry within the Erasmus-project
Cariology, Endodontology and Paediatric Dentistry

090631A: Periodontal instrumentation, phantom training, 0,3 - 1 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Dentistry

Arvostelu: 1 - 5, pass, fail

Opettajat: Syrjälä, Anna-Maija Hannele

Opintokohteen kielet: Finnish, English

ECTS Credits:
8 hours of student working, 0,3 ECTS credits
Language of instruction:
English
Timing:
Periodontal phantom training is organized during spring semester
Learning outcomes:
The aim of the study module is that student manage basic principles of periodontal instrumentation with hand instruments and ultrasonic scalers
Contents:
Study module includes basic principles of periodontal instrumentation with hand instruments and ultrasonic scalers
Mode of delivery:
Study module includes reading independently before training chapters dealing with periodontal instrumentation in textbook of periodontology and during phantom training information of basic principles of periodontal instrumentation with hand instruments and ultrasonic scalers and phantom training
Learning activities and teaching methods:
Independent reading of textbook of periodontology 4 hours and phantom training 4 hours
Target group:
Dental Exchange Students
Prerequisites and co-requisites:
Not applicable
Recommended or required reading:
Carranza`s Clinical Periodontology, 12th edition, pages 480-514, 621-627
Assessment methods and criteria:
Presence during phantom training
Grading:
The course unit utilizes verbal grading scale pass/fail.
Person responsible:
Anna-Maija Syrjälä, Senior research fellow
Working life cooperation:
Not applicable
Other information:
The courses given by the Institute of Dentistry within the Erasmus-project
Periodontology and Geriatric Dentistry

090628A: Periodontology: Clinical diagnosis, risk assessment, prognosis and treatment plan, literature exam, 1 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Dentistry

Arvostelu: 1 - 5, pass, fail

Opettajat: Pekka Ylöstalo

Opintokohteen kielet: English

ECTS Credits:
1 ECTS credit
Language of instruction:
English
Timing:
Autumn and spring semester
Learning outcomes:
After completing the course, the student have sufficient knowledge for make clinical diagnosis, risk assessment, and determine prognosis and make treatment plan.
Contents:
The course offer basic knowledge on clinical diagnosis, risk assessment, prognosis and treatment plan of periodontal patients.
Mode of delivery:
Written exam
Learning activities and teaching methods:
Independent learning method: book examination 27 h of studying
Target group:
Dental exchange students
Prerequisites and co-requisites:
No prerequisites
Recommended or required reading:
Newman and Carranza' Clinical Periodontology, 13th edition, chapters 31-43
Assessment methods and criteria:
Written exam
Read more about assessment criteria at the University of Oulu webpage.

Grading:
The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail.
Person responsible:
Professor Pekka Ylöstalo
Working life cooperation:
The course does not contain working life cooperation
Other information:
The courses given by the Institute of Dentistry within the Erasmus-project
Periodontology and Geriatric Dentistry

090630A: Periodontology: Periodontal surgery, literature exam, 1,5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Dentistry

Arvostelu: 1 - 5, pass, fail

Opettajat: Pekka Ylöstalo

Opintokohteen kielet: English

ECTS Credits:
1,5 ECTS credits/40 hours of work
Language of instruction:
English

Timing:
Autumn and spring semester
Learning outcomes:
After completing the course, the student have knowledge of periodontal surgical treatment and periodontal-restorative interrelationships.
Contents:
The course offer basic theoretical knowledge on periodontal surgical treatment and periodontal-restorative interrelationships.
Mode of delivery:
Written exam
Learning activities and teaching methods:
Independent learning method: book examination 40 h of studying
Target group:
Dental exchange students
Prerequisites and co-requisites:
No prerequisites
Recommended or required reading:
Newman and Carranza' Clinical Periodontology, 13th edition, chapters 57-70
Assessment methods and criteria:
Written exam
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail.
Person responsible:
Professor Pekka Ylöstalo
Working life cooperation:
The course does not contain working life cooperation
Other information:
The courses given by the Institute of Dentistry within the Erasmus-project
Periodontology and Geriatric Dentistry

090629A: Periodontology: Periodontal therapy, literature exam, 1 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Dentistry
Arvostelu: 1 - 5, pass, fail
Opettajat: Pekka Ylöstalo
Opintokohteen kielet: English

ECTS Credits:
1 ECTS credit
Language of instruction:
English
Timing:
Autumn and spring semester
Learning outcomes:
After completing the course, the student have theoretical knowledge of non-surgical periodontal treatment.
Contents:
The course offers basic knowledge on non-surgical periodontal treatment.
Mode of delivery:
Written exam
Learning activities and teaching methods:
Independent learning method: book examination 27 h of studying
Target group:
Dental exchange students
Prerequisites and co-requisites:
No prerequisites
Recommended or required reading:
Newman and Carranza' Clinical Periodontology, 13th edition, chapters 44-55

Assessment methods and criteria:
Written exam
Read more about [assessment criteria](#) at the University of Oulu webpage.
Grading:
The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail.
Person responsible:
Professor Pekka Ylöstalo
Working life cooperation:
The course does not contain working life cooperation.
Other information:
The courses given by the Institute of Dentistry within the Erasmus-project
Periodontology and Geriatric Dentistry

080917S: Project in Biomedical Technology, 5 - 10 op

Voimassaolo: 01.08.2012 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Lassi Rieppo

Opintokohteen kielet: Finnish

Proficiency level:
-
Status:
-
Required proficiency level:
-
ECTS Credits:
5 – 10 ECTS credit points / 135 - 270 hours of work
Language of instruction:
Finnish / englanti
Timing:
The course can be taken in Master phase in autumn or spring semester, or during the summer period
Learning outcomes:
Upon completion of the course, the student will be able to solve a research or development problem and report it in writing and in oral presentation.
Contents:
Performing a small-scale research or development project.
Mode of delivery:
Independent work

Learning activities and teaching methods:
The student participates in a research project within or outside the university. The student prepares a personal project plan according to separate specifications and presents the plan in seminar. The student participates in seminars of other students at least once. At the end of the project, the student prepares a written research report and presents it in a seminar.
Target group:
Degree students of Biomedical Engineering

Prerequisites and co-requisites:
-
Recommended optional programme components:
The course is an independent entity
Recommended or required reading:
-
Assessment methods and criteria:

The student participates in a research project within or outside the university. The student prepares a personal project plan according to separate specifications and presents the plan in seminar. The student participates in seminars of other students at least once. At the end of the project, the student prepares a written research report and presents it in a seminar.

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

Grading:

The course utilizes grading scale pass or fail

Person responsible:

Dr Lassi Rieppo

Working life cooperation:

A company or another organization can commission project. In such case, the student agrees on the topic and supervision with the client.

Other information:

-

080919S: Project in Health Technology, 5 - 10 op

Voimassaolo: 01.08.2012 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

Proficiency level:

-

Status:

-

Required proficiency level:

-

ECTS Credits:

5 – 10 ECTS credit points / 135 - 270 hours of work

Language of instruction:

Finnish / English

Timing:

The course can be taken in Master phase in autumn or spring semester, or during the summer period

Learning outcomes:

Upon completion of the course, the student will be able to solve a research or development problem and report it in writing and in oral presentation.

Contents:

Performing a small-scale research or development project.

Mode of delivery:

Independent work

Learning activities and teaching methods:

The student participates in a research project within or outside the university. The student prepares a personal project plan according to separate specifications and presents the plan in seminar. The student participates in seminars of other students at least once. At the end of the project, the student prepares a written research report and presents it in a seminar.

Target group:

Degree students of Biomedical Engineering

Prerequisites and co-requisites:

-

Recommended optional programme components:

The course is an independent entity

Recommended or required reading:

-

Assessment methods and criteria:

The student participates in a research project within or outside the university. The student prepares a personal project plan according to separate specifications and presents the plan in seminar. The student participates in seminars of other students at least once. At the end of the project, the student prepares a written research report and presents it in a seminar.

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

Grading:

The course utilizes grading scale pass or fail

Person responsible:

Professor Timo Jämsä

Working life cooperation:

A company or another organization can commission project. In such case, the student agrees on the topic and supervision with the client.

Other information:

-

080918S: Project in Medical Imaging, 5 - 10 op

Voimassaolo: 01.08.2012 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Simo Saarakkala

Opintokohteen kielet: Finnish

Proficiency level:

-

Status:

-

Required proficiency level:

-

ECTS Credits:

5 – 10 ECTS credit points / 135 - 270 hours of work

Language of instruction:

Finnish / English

Timing:

The course can be taken in Master phase in autumn or spring semester, or during the summer period.

Learning outcomes:

Upon completion of the course, the student will be able to solve a research or development problem and report it in writing and in oral presentation.

Contents:

Performing a small-scale research or development project.

Mode of delivery:

Independent work

Learning activities and teaching methods:

The student participates in a research project within or outside the university. The student prepares a personal project plan according to separate specifications and presents the plan in seminar. The student participates in seminars of other students at least once. At the end of the project, the student prepares a written research report and presents it in a seminar.

Target group:

Degree students of Biomedical Engineering

Prerequisites and co-requisites:

-

Recommended optional programme components:

The course is an independent entity

Recommended or required reading:

-

Assessment methods and criteria:

The student participates in a research project within or outside the university. The student prepares a personal project plan according to separate specifications and presents the plan in seminar. The student participates in seminars of other students at least once. At the end of the project, the student prepares a written research report and presents it in a seminar.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes grading scale pass or fail

Person responsible:
Professor Simo Saarakkala
Working life cooperation:
A company or another organization can commission project. In such case, the student agrees on the topic and supervision with the client.
Other information:
-

060723A: Research project, 1 - 30 op

Voimassaolo: 01.08.2014 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Medicine
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish, English

ECTS Credits:
1.0-30.0 ECTS credits
Language of instruction:
English
Timing:
1st-6th year
Learning outcomes:
The research project / thesis in the degree programmes of Medicine, Dentistry, Nursing and Medical Technology is a scientific work which shows the student's ability to scientific thinking and research. The student gets acquainted with scientific research and is able to evaluate research publications, the student is capable of independent and responsible work as part of a scientific community, develops his/her problem solving skills as well as critical and ethical thinking, and increases his/her readiness to scientific communication.
Mode of delivery:
Writing a study plan which includes a research plan. Supervised research work and writing a thesis or a scientific paper (student as first or second writer).
Learning activities and teaching methods:
Formulation of research plan and independent research work under the supervision of a named person. Writing a thesis and in some cases oral presentation.
Target group:
Students of Medicine, Dentistry, Nursing and Medical Technology
Prerequisites and co-requisites:
None.
Recommended optional programme components:
None.
Recommended or required reading:
Will be agreed with a supervisor.
Assessment methods and criteria:
Accepted research plan, accepted thesis or scientific paper, in some cases oral presentation. Thesis can be also assessed at home university.
Grading:
Pass / fail.
Person responsible:
Depends on the project.
Working life cooperation:
No.
Other information:

Some knowledge of research work and/or studies of research methods is advisable.

521279S: Signal Processing Systems, 5 op

Voimassaolo: 01.08.2012 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Pekka Sangi

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 135 hours of work
Language of instruction:
English
Timing:
The course is held in the autumn semester, during period II. For master students of Computer Science and Engineering specializing in Computer Engineering, it is recommended to complete the course at the first autumn semester.
Learning outcomes:
Learning outcomes of the course are:
1. The student understands common real number formats used in digital signal processing.
2. The student can implement a digital filter using fixed-point computations. He can optimize word lengths so that the required performance goals are fulfilled.
3. The student knows the CORDIC algorithm and can utilize it in the implementation of function and transform (e.g. DCT) computations.
4. The student knows the principles, which allow computationally efficient implementation of decimation and interpolation operations. Related to this, he can implement narrow-band digital filters.
5. The student can explain how a modulated filter bank works and knows its polyphase decomposition based implementation.
6. The student can implement convolution for long data sequences and filters. He also knows, how the same principles are used in the implementation of correlation.
7. The student can explain the general operational principles of adaptive filters and knows some of their applications. He knows operation of some common adaptive algorithms. He can study behaviour of adaptive filters with simulation.

Some exercise tasks of the course are done in the Matlab environment utilizing also its Simulink tool. The student learns how it can be used in the modelling of signal processing systems.

Contents:
Fixed-point and floating-point arithmetics, fixed-point filter implementation, CORDIC, DCT, FFT, polyphase decomposition, multirate signal processing, modulated filter banks, sectioning, adaptive filters and algorithms, Matlab and Simulink tools in DSP modelling.
Mode of delivery:
The tuition will be implemented as face-to-face teaching and web-based teaching. Moodle is used as the learning environment.
Due to Covid-19 pandemic, teaching in Autumn 2020 will be implemented remotely. Details of arrangement can be found from the course web page, which will be available from October 16 in Moodle.
Learning activities and teaching methods:
Lectures 28 h / Group work 42 h / Self-study 65 h. The group work consists of six weekly design tasks.
Target group:
The course is primarily targeted to the students of Computer Science and Engineering specializing to Computer Engineering.
Prerequisites and co-requisites:
A recommended prerequisite is the completion of "521337A Digital Filters".
Recommended optional programme components:
The course is an independent entity and does not require additional studies carried out at the same time.
Recommended or required reading:

The course provides lecture notes for reading. In addition, the following books provide useful information:
E.C. Ifeachor, B.W. Jervis. Digital Signal Processing - A Practical Approach. Second Edition. Prentice-Hall, 2002.

W.T. Padgett, D.V. Anderson. Fixed-Point Signal Processing. Morgan&Claypool Publishers, 2009.

Assessment methods and criteria:
The course uses continuous assessment, which is based on evaluation of the weekly group works and exams arranged during lectures.

Grading:
The course utilizes a numerical grading scale 0-5. In the numerical scale zero stands for a fail.

Person responsible:
Pekka Sangi

Working life cooperation:
The course does not contain working life cooperation. There may be guest lectures.

Other information:

The web page of the course arranged at Autumn 2020 will be https://moodle.oulu.fi/course/view.php?id=3212

521348S: Statistical Signal Processing 1, 5 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Electrical Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Janne Lehtomäki, Juntti, Markku Johannes

Opintokohteen kielet: Finnish

Leikkaavuudet:

  521484A   Statistical Signal Processing   5.0 op

ECTS Credits:
5 ECTS

Language of instruction:
English

Timing:
The course is held in the autumn semester, during period 1. It is recommended to complete the course at the 1st semester of the master studies.

Learning outcomes:
Upon completion the student
1. knows the key tools of linear algebra and quadratic optimization and can apply them in solving signal processing problems.
2. understands how to handle complex valued random variables and processes.
3. understands the key concepts in estimation theory such as the classical and Bayesian philosophies.
4. masters the most important estimation principles such as minimum variance, maximum likelihood, least squares and minimum mean square error estimators.
5. can derive an estimator for a given criterion and basic data models.
6. can use the methodology of estimation theory to analyze the performance of estimators and compare to performance benchmarks such as the Cramer-Rao lower bound.
7. understands the basics of detection and classification theory: hypothesis testing, receiver operating characteristics (ROC), the Neyman-Pearson and Bayesian detectors.

Contents:
Review of probability, complex valued random variables and stochastic processes; linear algebra, eigenvalue decomposition, SVD (Singular value decomposition), use of Matlab; estimation theory, minimum variance unbiased estimator, Cramer-Rao lower bound, linear models, general minimum variance unbiased estimation, best linear unbiased estimators, maximum likelihood estimation, least squares estimation, Bayesian estimation, linear Bayesian estimation; statistical decision theory, receiver operating characteristics, hypothesis testing, matched filter.

Mode of delivery:
Face-to-face teaching and e-learning tool usage

Learning activities and teaching methods:
Face-to-face-teaching (lectures and exercises) 50h, Matlab simulation exercises in groups 30 h, independent work & passed assignment 50 h.

Target group:
Electrical, communications and computer science and engineering students.

Prerequisites and co-requisites:
The required prerequisite is the completion of the following courses prior to enrolling for the course: 031080A Signal Analysis, 031021P Probability and Mathematical Statistics, 031078P Matrix Algebra, 521330A. The recommended prerequisite is the completion of Telecommunication Engineering.
Recommended optional programme components:
521323S Wireless communications I and 031051S Numerical Matrix Analysis are recommended to be taken in parallel.
Recommended or required reading:
Parts from books:
1. Steven M Kay, "Fundamentals of statistical signal processing: estimation theory."vol 1 Prentice Hall 1993.
2. Steven M. Kay, "Fundamentals of statistical signal processing: Detection theory, vol. 2." Prentice Hall 1999.
3. Peter Selinger, "Matrix Theory and Linear Algebra", Creative Commons.
4. Paolo Prandoni & Martin Vetterli, Martin, "Signal Processing for Communications", CRC Press 2008.
5. Other literature, lecture notes and material.
Assessment methods and criteria:
Completing the simulation project tasks, and a mid-term exam during the course. The mid-term exams can be retaken by a final exam later. In the final grade of the course, the weight for the examination is 0.7 and that of project report 0.3.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero (0) stands for a fail.
Person responsible:
Janne Lehtomäki and Markku Juntti
Working life cooperation:
No
Other information:
Lecture materials etc. can be found on Moodle https://moodle.oulu.fi/course/view.php?id=4203.

090619A: The principles of endodontics, literature exam, 2 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Dentistry
Arvostelu: 1 - 5, pass, fail
Opettajat: Kristiina Oikarinen-Juusola
Opintokohteen kielet: English

ECTS Credits:
2 ECTS credits
Language of instruction:
English
Timing:
The course unit is held in the Fall and Spring semester.
Learning outcomes:
The student is expected to master the basics of endodontics which is evaluated by a written exam.
Contents:
The Principles of Endodontics
Mode of delivery:
Literature exam
Learning activities and teaching methods:
Literature exam (2 hours)
Target group:
Dental Exchange Students
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
More information from the course director Kristiina Oikarinen-Juusola

Assessment methods and criteria:
Literature exam (2 hours)
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
Kristiina Oikarinen-Juusola
Working life cooperation:
No
Other information:
The courses given by the Institute of Dentistry within the Erasmus-project
Cariology, Endodontology and Paediatric Dentistry

080915S: Tissue Biomechanics, 5 op

Voimassaolo: 01.08.2012 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Health Sciences

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Proficiency level:
-
Status:
-
Required proficiency level:
-
ECTS Credits:
5 ECTS, 135 hours of work
Language of instruction:
English
Timing:
The course is held in the autumn semester, during period 2. It is recommended to complete the course during Master studies.
Learning outcomes:
The student can describe the main biomechanical characteristics of different tissues and cells as well as failure mechanisms of tissues.
Student understands relationship between biomechanical properties and tissue composition and structure.
The student can perform practical biomechanical experiments, analyze measurement data, interpret results, and report them using good scientific reporting practice.
The student understand how numerical modeling can be used to solve problems in tissue biomechanics.
Contents:
Introduction to tissue biomechanics. Most important biomechanical parameters and material models. Experimental measurements of biomechanical properties of tissues. Structure, composition and mechanical properties of different tissues. Cell biomechanics. Biomechanical modeling of tissues.
Mode of delivery:
Blended teaching.
Learning activities and teaching methods:
Lectures 20h, Calculation assignment 10h, interactive lecture and group work 4 h, assignment 8h and preparing report 18h and self-study 75h.

Target group:
Master students of Biomedical Engineering. The course is also suitable for other interested degree and postgraduate students with adequate prerequisites.
Prerequisites and co-requisites:
It is recommended that the student has basic knowledge of anatomy and physiology, mechanics, differential equations, and matrix algebra.
Recommended optional programme components:
The course is an independent entity and does not require additional studies carried out at the same time. Motion biomechanics will be studied in the course 080916S Biomechanics of Human Movement.

Recommended or required reading:
Material and reading given during the course.
Assessment methods and criteria:
Mandatory parts of the course: accepted assignment with written report and written final exam.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail. Course grade is based on score of the final exam.

Possibility to earn additional points from mathematical exercises.
Person responsible:
University lecturer Mikko Finnilä
Working life cooperation:
-
Other information:
-

521156S: Towards Data Mining, 5 op

Voimassaolo: 01.08.2017 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Computer Science and Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Satu Tamminen

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits
Language of instruction:
English
Timing:
Autumn, period I.
Learning outcomes:
After completing this course, student can recognize data types and perform required pre-processing steps before further analysis:
1. Student can design and implement a data collection process
2. Student can combine data from different sources
3. Student can normalize and transform data, and handle missing or incorrect values
4. Student can ensure generalizability of the results
Contents:
Course provides good ability to start Master's Thesis or graduate studies. Topics at the course include data mining process in general level, data gathering and different data types, quality and reliability of the data, data preparation including the processing of missing values, outliers, and privacy issues, combination of signals from several sources, utilization of data bases in data mining process, and normalization and transformation of data and interdependence of the observations and their distributions. Additionally, topics concerning the generality of the results are covered, as well as, the principles of data division, for example, train-test-validate, cross-validation and leave-one-out methods.
Mode of delivery:
Lectures, independent work, group work
Learning activities and teaching methods:
16 h lectures, 16 h exercises, independent studying.
Target group:
The course is suitable for Master level students in Computer science and engineering study programmes, for minor subject studies or for doctoral students.
Prerequisites and co-requisites:
031021P Probability and Mathematical Statistics or similar
Recommended optional programme components:
The course is an independent entity and does not require additional studies carried out at the same time.
Recommended or required reading:

Lecture hand-out and exercise material will be provided. The course book will be announced in the beginning of the course. The material is mostly in English.

Assessment methods and criteria:
Weekly pre-lecture assignment + exercise submissions, and final exam. Half of the grade will be based on the submissions and half on the final exam.
Read more about assessment criteria at the University of Oulu webpage.

Grading:
Numerical grading scale 1-5; zero stands for a fail.

Person responsible:
Tamminen Satu

Working life cooperation:
-

Other information:
Moodle: https://moodle.oulu.fi/course/view.php?id=1679
Towards Data Mining 521156S:3

764327A: Virtual measurement environments, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Health Sciences

Arvostelu: 1 - 5, pass, fail

Opettajat: Jämsä, Timo Jaakko

Opintokohteen kielet: Finnish

Leikkaavuudet:

764627S   Virtual measurement environments   5.0 op

Proficiency level:
-
Status:
-
Required proficiency level:
-
ECTS Credits:
5 ECTS, 135 hours of work

Language of instruction:
Finnish (or English)
Timing:
Bachelor studies, autumn term, 2nd period

Learning outcomes:
The student will learn how to construct software environments for measurements and data analysis important in biomedical engineering and physics
Contents:
The course gives basic skills to use measuring and analyzing programmes applied not only in academic research but also in R&D of the companies, and their programming environments (Matlab, LabView).

Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 12 h, project work 65 h, self-study 58 h
Target group:
Bachelor students of Medical and Wellness Technology and Physics. Also for other students of the University of Oulu.
Prerequisites and co-requisites:
Basics / basic skills in programming
Recommended optional programme components:
The course is independent entity and does not require additional studies carried out at the same time. The course can also be completed as a part of advanced studies with the course code 764327S.

Recommended or required reading:
Lecture and exercise notes, other given material
Assessment methods and criteria:
Completion of projects. Read more about assessment criteria at the University of Oulu webpage.
Grading:
The course utilizes a numerical grading scale 1-5 or fail. In the numerical grading scale zero stands for a fail.
Grading is made based on the projects.
Person responsible:
Professor Timo Jämsä
Working life cooperation:
-
Other information:
-

521097S: Wireless Measurements, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Electrical Engineering DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Christian Schuss

Opintokohteen kielet: English

Leikkaavuudet:

  521114S   Wireless Measurements   4.0 op

  521114S-01   Wireless Measurements, exam   0.0 op

  521114S-02   Wireless Measurements, exercise work   0.0 op

ECTS Credits:
5 ECTS credits / 128h
Language of instruction:
In English
Timing:
Period 3.
Learning outcomes:
1. can tell and justifying argument the benefits and challenges of using wireless measurement solutions
2. can apply the most important standards when designing wireless measurement solutions
3. can apply wireless technologies in industrial, traffic, environmental, home and healthcare measurements
Contents:
Basics of wireless measurement technologies and standards, wireless sensors and sensor networks, wireless building and smart home applications, wireless measurement applications in traffic, wireless environmental measurements and wireless human health monitoring.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures 22h. Seminars 6-12h depending on the number of students participating the course. The students prepare seminar presentations about contemporary topics selected by themselves or proposed by the teacher and give 10 minutes presentation to other students in the seminars.
Target group:
Master level students regardless of master's programme.
Prerequisites and co-requisites:
No prerequirements, but basics of measurements systems are recomended.
Recommended optional programme components:
The course replaces previous courses with same name, but different credits and code.
Recommended or required reading:
Lecture notes and seminar reports is Optima.
Assessment methods and criteria:
The course is passed with a written final exam (70 %) and a contemporary seminar (30 %).
Read more about assessment criteria at the University of Oulu webpage.

Grading:
Grade is on numerical scale 1-5.
Person responsible:
Christian Schuss
Working life cooperation:
No.