Opasraportti

FTech - Courses in English for exchange students, Field of Mechanical Engineering (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 in the Study Field of Mechanical Engineering at the Faculty of Technology during the Academic Year 2020-21

This Course Catalogue lists the Mechanical Engineering courses taught, or othervise available in English for exchange students during the academic year 2020-21.

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.

Course languages: Most of the Mechanical Engineering courses are lectured in Finnish, but there is an alternative method for completing the course in English: E.g. a book exam = the course has reading materials (self-study materials: books, lecture notes, etc.) available in English and these materials replace the lectures taught in Finnish. Possible practical exercises and final exams are taught/given in English.

Course availability: The listed courses are available for **exchange students hosted by the Faculty of Technology / Study Field Mechanical Engineering, if they have the previous knowledge requirements** of the course. Exchange students hosted by other University of Oulu faculties usually cannot take these courses especially if they do not have the required previous knowledge. They must contact the Exchange Coordinator of the Faculty of Technology (contact info below) to ask if it is possible to participate.

When preparing your proposed study plan (Learning Agreement) 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.).

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 **Instruction** tab. All exchange students are required to register to all courses.

Course schedules are **periodical**: Courses organized during **periods 1-2** are given on the **autumn** term (September-December), and respectively **periods 3-4** refer to courses given during the **spring** term (January-May).

Teaching periods for 2020-21
Autumn term 2020
Period 1: Sept 1 - Oct 25, 2020
Period 2: Oct 26 – Dec 18, 2020

Spring term 2021
Period 3: Jan 5 – March 14, 2021
Period 4: March 15 – May 9, 2021

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

Any questions on courses at the Field of Mechanical Engineering, the Faculty of Technology should be addressed to:

Marita Puikkonen
study.technology(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

900013Y: Beginners' Finnish Course 1, 3 op
900053Y: Beginners' Finnish Course 2, 5 op
461111S: Continuum mechanics, 5 op
900054Y: Conversational Skills in Finnish, 3 op
461106A: Dynamics, 5 op
461110S: Fluid mechanics, 5 op
462101A: Information technology and machines, 5 op
900015Y: Intermediate Finnish Course 1, 5 op
900016Y: Intermediate Finnish Course 2, 5 op
464124A: Internal combustion engines, 5 op
462105A: Machine Sensor Technology, 5 op
462104A: Machine automation, 5 op
464126S: Machine dynamics of piston engines, 5 op
462107A: Maintenance of machines, 5 op
461101A: Mathematical Analysis in Mechanical Engineering, 5 op
462106A: Precision engineering, 5 op
465103A: Principles of metal shaping and forming, 5 op
900027Y: Special Course in Finnish: Writing Skills, 3 op
461102A: Statics, 5 op
461103A: Strength of materials I, 5 op
900017Y: Survival Finnish, 2 op
461105A: Technical thermodynamics, 5 op

Opintojaksojen kuvaukset

Tutkintorakenteisiin kuulumattomien opintokokonaisuuksien ja -jaksojen kuvaukset

900013Y: Beginners' Finnish Course 1, 3 op

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay900013Y Beginners' Finnish Course 1 (OPEN UNI) 2.0 op

Proficiency level:
A1 (target level A1.2)
Status:
The course is intended for the international students in every faculty of Oulu University.
Required proficiency level:
A1.1, Completion of the Survival Finnish course (900017Y) or the equivalent language skills.
ECTS Credits:
3 ECTS credits
Language of instruction:
As much Finnish as possible; English will be used as a help language.
Timing:
-
Learning outcomes:
By the end of the course the student can understand and use some familiar and common everyday expressions relating to her/himself and everyday situations. S/he can interact in a simple way provided the other person talks slowly and clearly and is willing to help. The student is able to read short simple texts and messages dealing with familiar topics. S/he also deepens her/his understanding of the Finnish language and communication styles.
Contents:
This is lower elementary course which aims to help students to learn communication skills in ordinary everyday situations. During the course, students broaden their vocabulary and knowledge of grammar and principles of pronunciation. They also practise to understand easy Finnish talk about everyday subjects, and reading and writing short and simple texts/messages.

The topics and communicative situations covered in the course are: talking about oneself, one's family, studies and daily routines, as well as asking about these things from other person; expressing opinions; food, drink and transactions in the grocery; accommodation and describing it; colours and adjectives.

The structures studied are: verb types, basics of the change of the consonants k, p and t in verbs and nouns, basics of the partitive and genitive cases, possessive structure, some declension types for nouns (word types) and the basics of the local cases.
Mode of delivery:
Contact teaching and guided self study
Learning activities and teaching methods:
Lessons 2 times a week (26 h, including the final exam) and guided self study (55 h)
Target group:
International degree and post-graduate degree students, exchange students and the staff members of the University.
Prerequisites and co-requisites:
Completion of the Survival Finnish Course
Recommended optional programme components:
-
Recommended or required reading:
Kuparinen, K. & Tapaninen, T. Oma suomi 1 (chapter 2 - 5)
Assessment methods and criteria:
Regular and active participation in the weekly lessons (twice a week), homework assignments and written exam at the end of the course will be observed in assessment.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Grading scale is 1-5.
Person responsible:
Anne Koskela
Working life cooperation:

-

Other information:
Sign-up in WebOodi or Tuudo. The course will start right after the Survival Finnish course.

900053Y: Beginners' Finnish Course 2, 5 op

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay900053Y Beginners' Finnish Course 2 (OPEN UNI) 4.0 op

Proficiency level:
A1.3
Status:
International degree and post-graduate degree students, exchange students and the staff members of the University.
Students of the Oulu University of Applied Sciences (OAMK) students and OAMK's international and exchange students may also participate to this cross-institutional study. The quota principle is as follows: at least two OAMK students in a course and if there are more places, they are filled according to the queuing principle.
See more information for OAMK students https://www.oulu.fi/forstudents/crossinstitutionalstudy.
Required proficiency level:
A1.2, completion of the Beginners' Finnish course 1 (900013Y) or the equivalent language skills.
ECTS Credits:
5 ECTS credits
Language of instruction:
As much Finnish as possible; English will be used as a help language.
Timing:
-
Learning outcomes:
By the end of the course the student can understand and use some very common everyday expressions and sentences. S/he can communicate in easy and routine tasks requiring a simple and direct exchange of information on familiar everyday matters. The student understands different kinds of short texts. S/he can for example locate important information in them. In addition, s/he has acquired more detailed knowledge of the language and culture.
Contents:
This is a post-elementary course. During the course students learn more about communication in ordinary everyday situations in Finnish. They also extend their vocabulary and knowledge of grammar. Students practise understanding simple Finnish talk and short texts.

The topics and communicative situations covered in the course are: talking about weather, carrying out transactions in clothing stores and at the doctor's, asking about location, asking for help/favours, expressing how you are feeling, writing an invitation and email; talking about past, describing people and things; seasons, the names of the months, travelling, vehicles, body parts, adjectives, food, drink and parties.
The structures studied are: the local cases, more about the change of the consonants k, p and t, more declension types for nouns (word types), nominative plural (basic form plural), basics of the imperfect (past tense of verbs), basics of the object cases, some postposition structures, some sentence types (predicative and necessity sentences).

Mode of delivery:
Contact teaching and quided self study
Learning activities and teaching methods:
Lessons 2 times a week (52 h, including the tests) and guided self study (83 h)
Target group:
International degree and post-graduate degree students, exchange students and the staff members of the University.

Students of the Oulu University of Applied Sciences (OAMK) students and OAMK's international and exchange students may also participate to this cross-institutional study. The quota principle is as follows: at least two OAMK students in a course and if there are more places, they are filled according to the queuing principle.
See more information for OAMK students https://www.oulu.fi/forstudents/crossinstitutionalstudy.
Prerequisites and co-requisites:
Completion of the Beginners' Finnish Course 1 or the equivalent language skills.
Recommended optional programme components:
-
Recommended or required reading:
Kuparinen, K. & Tapaninen, T. Oma suomi 1 (chapters 6 - 10)
Assessment methods and criteria:
Regular and active participation in the weekly lessons (twice a week), homework assignments and tests will be taken into consideration in the assessment.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Grading scale is 1-5.
Person responsible:
Arja Haapakoski
Working life cooperation:
-
Other information:
Sign-up in WebOodi or Tuudo. Staff members in staff training portal.

461111S: Continuum mechanics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Mechanical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Koivurova Hannu

Opintokohteen kielet: Finnish

Leikkaavuudet:

461026S-01	Continuum Mechanics, examination	0.0 op
461026S-02	Continuum Mechanics, exercises	0.0 op
461026S	Continuum Mechanics	6.0 op

ECTS Credits:
5 ECTS credits / 90 hours of work
Language of instruction:
Finnish
Timing:
The course is held in the spring semester, during periods 3 and 4.
Learning outcomes:
The aim of the course is to provide the student with the basic knowledge, concepts and mathematical methods of modeling the behavior of a solid body under load that enables them to apply nonlinear models in elemental method analysis. The student is able to apply tensor computation and knows the most important characteristics of a symmetric second order tensor. He / she can explain the difference between linear and non-linear deformation and Euler and Lagrange's presentation. He / she is able to calculate the deformation of a part using the most important measures of the deformation state and can calculate the time derivatives of the measurements. The student recognizes stress measurements in different configurations, is able to convert them to different configurations and to calculate their objective velocity quantities. The student is able to explain objective observation and objective quantities. He / she can explain and present the concepts and mathematical representations of the second main rule of equilibrium and balance equilibrium and thermodynamics: mass balance, momentum and momentum balance, energy balance and entropy equation. The student is able to apply elastic and plastic material models to structural analysis and understands the related concepts.
Contents:

Fundamentals of tensor computation, concepts and theory of deformation and stress states in both linear and nonlinear cases, objectivity and time derivatives of quantities, survival theorems of continuum mechanics, methods of describing material properties, and introduction to nonlinear elastic materials and three-dimensional plastics.

Mode of delivery:
Face-to-face teaching

Learning activities and teaching methods:
Lectures 30 h / Exercise 30 h / Self-study 30 h.

Prerequisites and co-requisites:
Recommended: Materials Mechanics.

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:
Mase, G., Smelser, R., Mase , G. (2010) Continuum Mechanics for Engineers. CRC Press Inc. Oheiskirjallisuus: Malvern, L. (1969) Introduction to the mechanics of a continuous medium. Prentice-Hall, Englewood Cliffs; Holzapfel, G.A. (2000) Nonlinear solid mechanics - A continuum approach for engineering, Wiley; Bonet, Wood, (2008) Nonlinear Continuum Mechanics for Finite Element Analysis, 2.ed. Cambridge University Press.

Assessment methods and criteria:
The course is taken in the final exam. In addition, the students complete homework throughout the course, which is assessed. One-third of homework assignments must be counted as approved. You can take the exam only after you have successfully completed your homework. The assessment of the course is based on the learning outcomes of the course. More detailed assessment criteria can be found in Moodle's course pages.

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

Person responsible:
University Lecturer Hannu Koivurova

900054Y: Conversational Skills in Finnish, 3 op

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Proficiency level:
B1/B2 , according to the Common European Framework.

Status:
The course is intended for the international students in every faculty at the University of Oulu. Students of the Oulu University of Applied Sciences (OAMK) may also participate to this cross-institutional study. See courses, student quota and applying for OAMK students https://www.oulu.fi/forstudents/crossinstitutionalstudy.

Required proficiency level:
A2.2
Completion of Intermediate Finnish 2 (900016Y) or the equivalent language skills.

ECTS Credits:
3 ECTS credits

Language of instruction:
Finnish

Timing:
-

Learning outcomes:
By the end of the course the student can interact with a degree of fluency (and spontaneity) that makes regular interaction with native speakers quite possible. S/he can describe and explain (clearly and in detail) on a wide range of objects, experiences and events, dreams, hopes and ambitions. The student can bring out opinions, give reasons and explanations for them and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options. S/he is also able to give a (clear) prepared presentation and answer the questions posed by the audience.

Contents:
During the course students strengthen their communication skills in formal and informal situations. The goal is to activate the student's Finnish skills and encourage him/her to use them in different situations. There will be

various types of situational dialogue, conversation and listening exercises in the course. In addition, students will conduct a short survey which will also be reported to other students in the class.
Mode of delivery:
Contact teaching and guided self study
Learning activities and teaching methods:
Lessons twice a week (28-30 h), group work (15 h) and guided self study (36 h)
Target group:
International degree and post-graduate degree students, exchange students and the staff members of the University. Students of the Oulu University of Applied Sciences (OAMK) may also participate to this cross-institutional study. See courses, student quota and applying for OAMK students https://www.oulu.fi/forstudents/crossinstitutionalstudy.
Prerequisites and co-requisites:
Completion of Intermediate Finnish 2 (900016Y) or equivalent skills
Recommended optional programme components:
-
Recommended or required reading:
Will be provided during the course.
Assessment methods and criteria:
To pass the course, students must attend class on a regular basis and complete group work tasks and homework assignments.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Grading is on a pass/fail basis.
Person responsible:
Anne Koskela
Working life cooperation:
-
Other information:
Sign-up in WebOodi or Tuudo. Staff members in in staff training portal.

461106A: Dynamics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Mechanical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Koivurova Hannu

Opintokohteen kielet: Finnish

Leikkaavuudet:

461018A-01	Dynamics, examination	0.0 op
461018A-02	Dynamics, exercises	0.0 op
461018A	Dynamics	4.0 op

ECTS Credits:
5 ECTS credits / 120 hours of work
Language of instruction:
Finnish
Timing:
The course is held in the spring semester, during periods 3 and 4. It is recommended to complete the course at the 2st spring semester.
Learning outcomes:
The aim of this course is to provide students with the ability to examine the relationship between the forces on a solid body and the resulting motion, position, speed and acceleration of the body. Learning outcomes: Upon completing the required coursework, the student knows and is able to explain the fundamental quantities and the base laws of the classical mechanics. He/she is able to choose an appropriate coordinate system and analyze the motion - position, velocity, and acceleration - of the parts of a device. The student is able to draw a free body diagram of a moving system, and compose and derive the equations of motion for a system using the direct momentum method, the work-energy method, and the impulse-momentum method.

Contents:
Introduction; Kinematics of a particle; Plane kinematics of a rigid body; Kinetics of a particl;. Basics of mechanical vibrations; Kinetics of a system of particles; Plane kinetics of a rigid body.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 45 h / Exercise 30 h / Self-study 45 h.
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:
Salmi T., Virtanen S. (2006) Dynamiikka, Pressus;Salmi, T. (2003) Dynamiikka 1, kinematiikka, Pressus; Salmi, T. (2002) Dynamiikka 2, kinetiikka, 2. p., Pressus. Oheiskirjallisuus: Salonen, E.M. (2000) Dynamiikka I, 8. korj. p., Otatieto; Salonen, E.M. (1999) Dynamiikka II, 8. korj. p., Otatieto; Beer, F., Johnston, E.(2007) Vector Mechanics for Dynamics, 9.ed., McGraw-Hill
Assessment methods and criteria:
This course utilizes continuous assessment. During the course, there are three intermediate exams. In addition to this, the students will be asked to calculate homeworks, and theses homeworks will be assessed. The assessment of the course is based on the learning outcomes of the course. The more detailed assessment criteria are available on the Moodle Study Portal.
Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
University Lecturer Hannu Koivurova

461110S: Fluid mechanics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Mechanical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Koivurova Hannu

Opintokohteen kielet: Finnish

Leikkaavuudet:

461036S-01	Heat and Mass Transfer II, examination	0.0 op
461036S-02	Heat and Mass Transfer II, exercises	0.0 op
461036S	Heat and Mass Transfer II	3.5 op

ECTS Credits:
5 ECTS credits / 105 hours of work
Language of instruction:
Finnish
Timing:
The course is held in the autumn semester, during periods I and II.
Learning outcomes:
The aim of the course is to get acquainted with the basic concepts of flow technology, terminology, techniques for solving the main flow phenomena and flow problems and their application. After completing the course, the student will be able to use the terminology of flow mechanics and will be able to explain what the basic concepts of flow mechanics mean, what principles are the basic equations of flow mechanics and how the equations can be simplified. The student can explain the basic idea of dimensional analysis and apply it in flow mechanics, for example, to scale test results. The student will be able to solve simple flow problems, such as determining the volume flow, pressure drop or pump lift height of the piping and determining the forces and moments affecting the parts based on the flow velocities.
Contents:
Special features of fluids, statics of fluids, application of the ideal flow or Bernoulli equation, global equations of flow, ie flow rate equations, local flow equations and viscous flow, tube flow and its special features and dimensional analysis.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:

Lectures 30 h / Exercise 30 h / Self-study 45 h.
Prerequisites and co-requisites:
Recommended: Thermodynamics, dynamics and statics.
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:
Nakayama, Boucher, Introduction to Fluid Mechanics, Bathsworth-Heideman, 2000; Gerhart, Gerhart, Hochstein, Munson's fluid mechanics, John Wiley & Sons, Inc 2017; Munson, Rothmayer, Okiishi, Huebsch: Fluid mechanics, Wiley 2013. 7th ed.
Assessment methods and criteria:
The course is taken in the final exam. In addition, students complete homework throughout the course, which is assessed. One-third of homework assignments must be counted as approved. You can take the exam only after you have successfully completed your homework. The assessment of the course is based on the learning outcomes of the course. More detailed assessment criteria can be found in Moodle's course pages.
Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
University Lecturer Hannu Koivurova

462101A: Information technology and machines, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Mechanical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Liedes, Toni Mikael

Opintokohteen kielet: Finnish

ECTS Credits:
5 cr / 133 hours of work
Language of instruction:
Finnish
Timing:
The course is held in the spring semester, during periods 3 and 4. It is recommended to complete the course at the 2nd spring semester.
Learning outcomes:
Upon completion of the course, the student will be able to explain how the information technology is utilized in modern machines. The student is able to describe how the modern machines are developed from purely mechanical systems to multi-disciplinary systems. The student is able to sort out the electrical, information technological and mechanical features of modern machines. He/she is also able to describe the interaction and interfaces of the aforementioned features. In addition to this, the student is able to separate the digital and analog domains. The student is able to create a simple computer program for machine control. He/she is able to name the sensors and actuators being used in automated machines. Furthermore, the student is able to list examples of machines taking advantage of modern information technology.
Contents:
History of mechanical engineering and information technology; Information technology as an enabler of the development of machines; Requirements and boundary conditions for automatisation of machines; Concepts of information technology and electronics; Basics of programming and logical reasoning; Examples of machine applications taking advantage of modern information technology.
Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Lectures 20 h / Group work 12 h / Self-study 101 h
Target group:
Bachelor's degree students of mechanical engineering
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 notes. Other material is in the beginning of the course.
Assessment methods and criteria:

This course utilizes continuous assessment. During the course there are exercises and intermediate exams. The exercises and the exams will be assessed. The assessment of the course is based on the learning outcomes of the course.
Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
Lecturer Toni Liedes

900015Y: Intermediate Finnish Course 1, 5 op

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay900015Y Intermediate Finnish Course 1 (OPEN UNI) 4.0 op

Proficiency level:
A2.1
Status:
The course is intended for the international students in every faculty at the University of Oulu.
Required proficiency level:
A1.3, Completion of the Beginners' Finnish course 2 (900053Y) or the equivalent language skills.
ECTS Credits:
5 ECTS credits
Language of instruction:
Mainly Finnish
Timing:
-
Learning outcomes:
By the end of the course the student can communicate in ordinary everyday situations when the topics are familiar or connected with everyday matters. S/he can search for and locate key informational content in different kinds of texts. The student can also identify the topic and some details of the discussion around her/him. S/he can describe activities and personal experiences both orally and in writing and s/he also knows the difference between spoken/colloquial and written/standard language. The student knows how things can be expressed with different degrees of politeness and can apply that information in her/his own communication.
Contents:
The course is a lower intermediate course. During the course students strengthen their communication skills in ordinary everyday situations and acquire a wider vocabulary and more thorough knowledge of grammar. In addition, students practise understanding and producing Finnish talk and reading newspaper articles.

The topics and communicative situations covered in the course are: requesting different kinds of requests, expressing politeness, making appointments with friends, giving directions, doing the shopping, talking about the past and talking about his/her future plans, hobbies, transactions e.g. in the doctor's and post office.

The structures studied are: more about the imperative, the verb rections, the deverbal noun (-minen), passive present tense, part of the plural declension of nouns, the third infinitive (ma-infinitive), more about sentence types, perfect tense, more about object cases.
Mode of delivery:
Contact teaching and guided self-study.
Learning activities and teaching methods:
Lessons 2 times a week (52 h, including the tests) and guided self-study (83 h)
Target group:
International degree and post-graduate degree students, exchange students and the staff members of the University
Prerequisites and co-requisites:
Completion of the Beginners' Finnish Course 2
Recommended optional programme components:

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Recommended or required reading:
Gehring, S. & Heinzmann, S.: **Suomen mestari 2,** (chapters 1 - 5)
Assessment methods and criteria:
Regular and active participation in the weekly lessons (twice a week), homework assignments and the tests will be taken into consideration in the assessment.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Grading scale is 1-5.
Person responsible:
Anne Koskela
Working life cooperation:
-
Other information:
Sign-up in WebOodi or Tuudo.

900016Y: Intermediate Finnish Course 2, 5 op

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Proficiency level:
A2.2
Status:
The course is intended for the international students in every faculty at the University of Oulu.
Also students of the Oulu University of Applied Sciences (OAMK) may also participate to this cross-institutional study. See courses, student quota and applying for OAMK students https://www.oulu.fi/forstudents/crossinstitutionalstudy.
Required proficiency level:
A2.1, Completion of the Intermediate Finnish course 1 (900015Y) or the equivalent language skills.
ECTS Credits:
5 ECTS credits
Language of instruction:
Finnish
Timing:
-
Learning outcomes:
By the end of the course the student can communicate in various informal situations in Finnish. The student understands the main points of messages and talk around her/him. S/he can produce simple connected text on topics which are familiar or of personal interest and describe experiences and also report heard content to others.
Contents:
The course is an upper intermediate course. During the course students learn the necessary written and oral skills to be able to cope in informal situations arising during everyday life, work and study. In the course, students practise understanding more Finnish talk and written texts, and finding information and talking about it to other people. In the classes the main stress is on oral exercises and group work.
The topics and communicative situations covered in the course are: transactions e.g. in clothes shops and on the phone, Finnish small talk, reacting in different situations, information and facts about Finnish celebrations and features of colloquial/spoken language.
The structures studied are: the perfect and pluperfect, revision of all the verb tenses, comparison of adjectives, conditional, more about the plural declension of nouns (particularly the plural partitive case), more about object and predicative cases, the passive imperfect.
Mode of delivery:
Contact teaching and guided self-study
Learning activities and teaching methods:
Lessons (52 h, including the tests) and guided self-study (83 h).
Target group:

International degree and post-graduate degree students, exchange students and the staff members of the University.
Students of the Oulu University of Applied Sciences (OAMK) students and OAMK's international and exchange students may also participate to this cross-institutional study. The quota principle is as follows: at least two OAMK students in a course and if there are more places, they are filled according to the queuing principle.
See more information https://www.oulu.fi/forstudents/crossinstitutionalstudy.
Prerequisites and co-requisites:
Completion of the Intermediate Finnish Course 1 or equivalent skills
Recommended optional programme components:
-
Recommended or required reading:
Gehring, S. & Heinzmann, S.: **Suomen mestari 2 (chapters 6 - 8).**
Assessment methods and criteria:
Regular and active participation in the weekly lessons (twice a week), homework assignments and the tests will be taken into consideration in the assessment.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Grading scale is 1-5.
Person responsible:
Anne Koskela
Working life cooperation:
-
Other information:
Sign-up in WebOodi or Tuudo.

464124A: Internal combustion engines, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Mechanical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Miro-Tommi Tuutijärvi

Opintokohteen kielet: Finnish

Leikkaavuudet:

460073A-01	Internal Combustion Engines I, examination	0.0 op
460073A-02	Internal Combustion Engines I, exercises	0.0 op
460073A	Internal Combustion Engines I	3.5 op

ECTS Credits:
5 ects cr/ 133 hours of student's work
Language of instruction:
Finnish
Timing:
Lectures and exercises during periods 3.-4. Practical work and laboratory, periods 3.-4.
Learning outcomes:
The aim of the course is to provide students with general conception of vehicle and machinery engines, operating principles, main dimensioning methods, thermodynamic work cycles, environmental issues and maintenance. The other main aim of this course is to familiarize the student with experimental research methods in engine laboratory, measuring and data acquisition methods, measuring technology, systematic planning and implementation of measurements, discussion of experimental results, reporting and quality systems of laboratory measurements as well as product development activities. The student is capable of accounting for working principles of a piston engine. The student is able to explain mixture formation, factors affecting cylinder filling and burning processes, exhaust gas emission formation and methods of maintenance. The student is able to perform basic dimensioning of charged and naturally aspirated piston engines and thermodynamic calculations as well as draw up characteristic drawings. The student is capable of using international standards related to measurements of internal combustion engines and quality systems with expertise. The student is able to account for operating

principles and requirements of engine load device, measuring device and data acquisition system. The student is able to draw up measuring plans, perform measurements, write measuring reports and perform a critical analysis of the results.

Contents:

Structural systems and basics of piston engines; Mixture formation and cylinder filling; Engine fuels; Exhaust gas emission formation; Ignition, fuel and control systems; Main dimensioning methods for piston engines; Theoretical work cycles and efficiencies; Charging methods; Technical measurements for engines Measuring and data acquisition systems of engine laboratory; Measurements of experimental room conditions; Engine braking units; Engine load cycles; Power; torque and speed of rotation; Measuring air quantity; Measuring fuel mass; Determining the air coefficient; Lambda sensor; Exhaust gas emission analyzers; Combustion pressure sensor of a cylinder; Experiments: determining engine load cycles; Characteristic fuel consumption with various loadings; Determining exhaust gas emissions with various tests cycles.; Testing exhaust gas catalytic converter; Reporting experimental measurements

Mode of delivery:

Face-to-face teaching.

Learning activities and teaching methods:

Lectures (26 hours) and calculation exercises(20 hours). The course consists of lectures and calculation exercises. There will also be exercises and laboratory experiments in the course. Engine technical measurements will be performed at the OAMK automotive vehicle and engine laboratory. Grades will be determined by an exam, exercises and laboratory experiments. 87 hours of student's independent work

Recommended or required reading:

Lecture notes and the material will be handed out during the lectures. Aumala; Mittaustekniikan perusteet. 359, Otatieto..1989. Bosch Automotive Handbook 8th edition, Robert bosch Gmbh 2011

Additional literature:

Heywood, John B.,Internal Combustion Engine Fundamentals. McGraw-Hill Book Company. 1988. Stone, R., Introduction to Internal Combustion Engines. 3rd Edition. 1999. SAE. Pulkrabek, W., Engineering Fundamentals of the Internal Combustion Engine. 2nd Edition. 2004. Baines,N.C., Fundamentals of Turbocharging. 2005. Concepts NREC.USA.. van Basshuysen, R.,Schäfer,F., Internal Combustion Engine Handbook. SAE.2004. Heisler, H., Advanced Engine Technology. 2003. Butterworth-Heinemann. Merker, G.P., Stiesch,G., Technische Verbrennung. Motorische Verbrennung. 1999. B.G.Teubner Dietzel,F., Wagner, W., Technische Wärmelehre. 7. Auflage.1998. Vogel- Buchverlag. Zhao,H., Ladommatos,N., Engine Combustion Instrumentation and Diagnostics. 2001. SAE. Standardit EC 80/1269, ISO 1585, ISO 8178. JIS D 1001 , SAE J 1349 , DIN 70020. Plint,M., Martyr A., Engine Testing. Theory and Practice. 2nd Edition. Butterworth- Heinemann Blair. G.,P., Design and Simulation of Four- Stroke Engines. 1999. SAE

Assessment methods and criteria:

The final grade is based on the combined points from the exam (grade 0.4) and exercises (grade 0.6).

Grading:

Numerical grading scale 1-5.

Person responsible:

Miro-Tommi Tuutijärvi

462105A: Machine Sensor Technology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Mechanical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Liedes, Toni Mikael

Opintokohteen kielet: Finnish

Leikkaavuudet:

462053A Sensor Technology of Machine Automation 5.0 op

ECTS Credits:

5 cr / 133 hours of work

Language of instruction:

Finnish

Timing:

The course is held in the autumn semester, during periods 1 and 2. It is recommended to complete the course at the 3rd autumn semester.

Learning outcomes:
Upon completion of the course, the student will be able identify, classify and bring into use the most common sensor types used in machine automation. The student is able to choose sensors for typical automation applications. In addition to this, the student is able to design a common analog and digital signal transmission and conditioning chain.
Contents:
Basics measuring systems; Classification of sensors; Characteristics of analog and digital domain; Analog to digital conversion; Basics of analog signal conditioning: amplification, attenuation and filtering; Operating principle of digital sensors; Examples of typical sensors used in mechanical engineering and civil engineering;
Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Lectures 32 h / Group work 16 h / Self-study 85 h
Target group:
Bachelor's degree students of mechanical engineering
Prerequisites and co-requisites:
The recommended prerequisite is the completion of the following courses prior to enrolling for the course: Actuators in Machine Automation
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:
de Silva, Clarence W. Mechatronics: An Integrated Approach. CRC Press, 2005, 1312 p. Chapters 4-7; Lecture notes.
Assessment methods and criteria:
This course utilizes continuous assessment. The assessment can be based on learning diary, exercises, seminars and exam.
Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
Lecturer Toni Liedes

462104A: Machine automation, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Mechanical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Louhisalmi, Yrjö Aulis

Opintokohteen kielet: Finnish

Leikkaavuudet:

462022S-01	Machine Automation II, examination	0.0 op
462022S-02	Machine Automation II, exercise work	0.0 op
462022S	Machine Automation II	5.0 op

ECTS Credits:
5 cr / 133 hours of work
Language of instruction:
Finnish
Timing:
The course is held in the autumn semester, during periods 1 and 2. It is recommended to complete the course at the 3rd autumn semester.
Learning outcomes:
Upon completion of the course, the student will be able to explain the basic principles and structures of a typical machine automation system. The student is able to divide an automation system into basic elements and explain their role and significance in the system. The student can apply the basic digital technology and logic methods in designing a typical machine automation system. In addition to this, the student knows the operating principles of

programmable logic controllers (PLCs) and is able to implement a logic control for a typical application. Furthermore, the student is able to explain the basic principles of fieldbuses. The students also knows the basics of machine automation safety design.
Contents:
Basics of automation; Basics of digital technology and logic; Description of operation sequences; Architecture of programmable logic controllers and their programming; Distributed systems and fieldbuses.
Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Lectures 32 h / Group work 16 h / Self-study 85 h
Target group:
Bachelor's degree students of mechanical engineering
Prerequisites and co-requisites:
The recommended prerequisite is the completion of the following courses prior to enrolling for the course: Actuators in Machine Automation, Elementary Programming
Recommended optional programme components:
The course is an independent entity and does not require additional studies carried out at the same time. However, it is recommended to complete the course Machine Sensor Technology simultaneously.
Recommended or required reading:
Lecture material. Other material is in the beginning of the course.
Assessment methods and criteria:
This course utilizes continuous assessment. The assessment can be based on learning diary, homework, exercises, seminars and exam.
Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
University teacher Yrjö Louhisalmi

464126S: Machine dynamics of piston engines, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Field of Mechanical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Miro-Tommi Tuutijärvi

Opintokohteen kielet: Finnish

Leikkaavuudet:

460074S-01	Internal combustion engines II, examination	0.0 op
460074S-02	Internal combustion engines II, exercises	0.0 op
460074S	Internal Combustion Engines II	5.0 op

ECTS Credits:
5 ects cr/ 133 hours of student's work
Language of instruction:
Finnish
Timing:
Lectures and exercises during periods 1.-2. Practical work and laboratory, periods 1.-2.
Learning outcomes:
The student will become familiar with mechanical dynamics and vibrations of piston engines and basis for dimensioning of mechanical elements of crankshaft mechanism.The student is capable of determining kinematics and characteristic drawings. The student will be familiar with mass, gas, tangential and bearing force diagrams. Student is able to determine balancing method of mass forces and vibration damping method of the crankshaft mechanism. In addition to this, the student is able to determine dimensions of machine elements and analyze them using methods applicable for engine design
Contents:
The kinematics and kinetics of crankshaft mechanism; Gas, mass and bearing forces; Tangential force and torque; Mass forces balancing methods; Vibration mechanics of crank shaft mechanism; Dimensioning methods for machine elements of crank shaft mechanism; Analysis methods of piston engines

Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures (40 hours) and calculation exercises(20 hours). The grades will be determined by an exam, exercises and laboratory experiments. 73 hours of student's independent work.
Prerequisites and co-requisites:
464124A Internal Combustion Engine
Recommended or required reading:
Lecture notes and the material will be handed out during the lectures. Additional literature: Heywood, John B., Internal Combustion Engine Fundamentals. McGraw-Hill Book Company. 1988. Stone, R., Introduction to Internal Combustion Engines. . 3rd Edition 1999. Pulkrabek, W., Engineering Fundamentals of the Internal Combustion Engine. 2nd Edition. 2004. Baines,N.C., Fundamentals of Turbocharging. 2005. Concepts NREC. van Basshuysen, R.,Schäfer,F., Internal Combustion Engine Handbook. SAE.2004. Heisler, H., Advanced Engine Technology. 2003. Butterworth-Heinemann. Merker, G.P., Kessen,U., Technische Verbrennung Verbrennungsmotoren. 1999.Teubner , Hoag,K., L., Vehicular Engine Design. SAE.2006. . Blair. G.,P., Design and Simulation of Four-Stroke Engines. 1999. SAE.
Assessment methods and criteria:
The final grade is based on the combined points from the exam (grade 0.5) and exercises (grade 0.5).
Grading:
Numerical grading scale 1-5.
Person responsible:
Miro-Tommi Tuutijärvi

462107A: Maintenance of machines, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Mechanical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Jouni Laurila

Opintokohteen kielet: Finnish

Leikkaavuudet:

464087A-01	Maintenancy Technology, examination	0.0 op
464087A-02	Maintenancy Technology, exercise work	0.0 op
464087A	Maintenancy Technology	5.0 op

ECTS Credits:
5 ECTS credits / 135 hours of work
Language of instruction:
Finnish
Timing:
The course is held in the spring semester, during period 4. It is recommended to complete the course at the 3rd spring semester.
Learning outcomes:
After completing the course, the student will be familiar with the principles and most common methods of implementing fitness based maintenance. They are able to explain the importance of running in production and apply the most important standards in the field of maintenance. different types of maintenance and can tell you what aspects of choosing a maintenance strategy. The student knows how to name the most common machine failure methods and the consequences of failure and can tell how to prevent failure in typical situations. The student recognizes the effects of wear and lubrication on the condition of machines and is able to explain the basic concepts related to lubricant analysis. The student knows how to use the most common methods used in machine condition monitoring and how to use them. He / she can explain the basics of vibration measurements and can choose appropriate measurement and analysis methods to identify the most common machine failures. The student knows the importance of running in production and is able to apply the most important standards in the field of maintenance.
Contents:

Condition based maintenance, failure, wear and lubrication, common condition monitoring methods, basics of performing vibration measurements, analyzing and signal processing, common rotating machine failure detection, vibration intensity estimation, rotor dynamic balancing, machine design and condition, machine design and condition management. failure, wear and lubrication, machine condition monitoring basics and common methods.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 24 h / group work 50 h / self-study 61 h
Target group:
Bachelor's degree students in the mechanical engineering
Prerequisites and co-requisites:
The recommended prequisite is the completion of the following course: 462103A Introduction to Maintenance
Recommended optional programme components:
The course is an independent entity
Recommended or required reading:
Luentomoniste ja muu kurssin aikana jaettava materiaali. Oheiskirjallisuus: Järviö, J. & Lehtiö. T., Kunnossapito: tuotanto-omaisuuden hoitaminen. Helsinki, KP-Media Oy 2012. Antila, K., et al., Teollisuusvoitelu, KP-Media Oy, 2003. Mikkonen, H. (toim.), Kuntoon perustuva kunnossapito, KP-Media Oy, 2009.
Assessment methods and criteria:
Final examination and the other graded assignments
Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
Jouni Laurila

461101A: Mathematical Analysis in Mechanical Engineering, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Mechanical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Laukkanen, Jari Jussi

Opintokohteen kielet: Finnish

Leikkaavuudet:

460084P-01	Mathematical Analysis in Mechanical Engineering, examination	0.0 op
460084P-02	Mathematical Analysis in Mechanical Engineering, exercises	0.0 op
460084P	Mathematical Analysis in Mechanical Engineering	7.0 op

ECTS Credits:
5 ects /135 hous of work
Language of instruction:
Finnish
Timing:
The lectures and weekly exercises are held during periods 1. - 2.
Learning outcomes:
Students can identify and solve various differential equations and they have knowledge on basic solvability of differential equations.
Contents:
Vectors, various differential equations, knowledge on basic solvability of differential equations.
Mode of delivery:
Face-to-face
Learning activities and teaching methods:
This course will be based on lectures 45 h and exercises 40 h and 45 h self-study during periods 1 – 2. Students are required to take a final exam or mid-term exams.
Recommended or required reading:
Grossman, S.I.: Multivariable Calculus, Linear Algebra and Differential Equations, 3rd ed., Saunders College Publishing, 1995 or 2nd ed, 1986, Glyn James, G.: Advanced Modern Engineering Mathematics, Addison-Wesley Publishing Company, 1993.

Assessment methods and criteria:
The grade of the course is based on midterm exams or a final examination. The student must pass the exercises before taking the examination.
Grading:
Numerical grading scale 1-5.
Person responsible:
University Teacher Jari laukkanen

462106A: Precision engineering, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Mechanical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Louhisalmi, Yrjö Aulis

Opintokohteen kielet: English

Leikkaavuudet:

462038A-01	Precision Engineering, examination	0.0 op
462038A-02	Precision Engineering, exercise work	0.0 op
462038A	Precision Engineering	3.5 op

ECTS Credits:
5 cr / 133 hours of work
Language of instruction:
English
Timing:
The course is held in the spring semester, during periods 3 and 4. It is recommended to complete the course at the 3rd or 4th spring semester.
Learning outcomes:
Upon completion of the course, the student can analyze structures and components used in precise engineering products, can explain working principles of them and can design new qualified and easily manufactured precise engineering products.
Contents:
Introduction, design of precision mechanical devices, enclosure and usability of devices, fixed and removable joints, implementation of rotary and linear motion, and the most common precision and micromechanical manufacturing methods.
Mode of delivery:
Blended teaching. The course is lectured in English, possible exercises are taught face to face. Final exam in English.
Learning activities and teaching methods:
Lectures 28 h / group working 15 h / independent studying 90 h
Target group:
Bachelor's Degree students in Mechatronics and machine diagnostics and Master's degree students of Mechanical engineering.
Recommended optional programme components:
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 notes (in Finnish). Additional literature: Krause, W.: Grundlagen der konstruktion, elektronik, elektrotechnik, feinwerktechnik, 7 aufl., Hanser, 1994; Ullman, D.: The mechanical design process, 3. ed., Mac-Graw-Hill, 2003.
Assessment methods and criteria:
The course uses continuous assessment. The overall grade may be determined, for example, by the weighted average of the learning diary, homework, assignments, seminars, and exam.
Grading:
The course utilizes numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
University teacher Yrjö Louhisalmi

465103A: Principles of metal shaping and forming, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Mechanical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Jari Larkiola

Opintokohteen kielet: Finnish

Leikkaavuudet:

465095A-01	Sheet Metal Forming	0.0 op
465095A-02	Sheet Metal Forming, literature review	0.0 op
465095A	Sheet Metal Forming	3.5 op

ECTS Credits:
5 / 135 h total study time
Language of instruction:
Finnish
Timing:
Autumn semester, periods 1 & 2. Recommended for the third study year.
Learning outcomes:
The student understands the basics of hot and cold forming of metals and their effects on the mechanical properties and usability of metals in different loading environments. After completing the course, the student will be able to evaluate the various shaping and shaping methods and make the right choices for the effective manufacturing of the desired product. The student is able to compare different methods.
Contents:
The forming processes include hot forming methods such as rolling, forging, extrusion, rod and wire drawing, and cold forming of thin sheets. In addition, it is taught how to incorporate the results of metal material testing tests into the models presented in plasticity theories. The theory of plasticity explores the most common constitutive material models and their application to different metals.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures, literature study and examination
Target group:
Compulsory in the Bachelor's stage for all Mechanical Engineering students majoring in Materials Engineering.
Prerequisites and co-requisites:
Before registering for this course the student must have successfully completed the following courses: 465101A An Introduction to Materials for Mechanical Engineering, 465102A Materials for Mechanical Engineering
Recommended or required reading:
Lecture notes, Korhonen, A. and Larkiola, J., Ohutlevyjen muovauksen perusteet, Actaoulu C1 2012, 207p
Assessment methods and criteria:
Final grade assessed on the basis of a final examination (80%) and literature work (20%).
Grading:
Examination scale 0-5 ja literature work 0-2. Grade 0 fail.
Person responsible:
Jari Larkiola.

900027Y: Special Course in Finnish: Writing Skills, 3 op

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Proficiency level:
B1/B2, according to the Common European Framework.
Status:
Course is intended for the international students in every faculty at the University of Oulu.
Students of the Oulu University of Applied Sciences (OAMK) students and OAMK's international and exchange students may also participate to this cross-institutional study. The quota principle is as follows: at least two OAMK students in a course and if there are more places, they are filled according to the queuing principle.See more information https://www.oulu.fi/forstudents/crossinstitutionalstudy.
Required proficiency level:
A2.2 Completion of the Finnish for Advanced Students (900020Y) or the equivalent language skills.
ECTS Credits:
3 ECTS credits
Language of instruction:
Finnish
Timing:
-
Learning outcomes:
By the end of the course the student can write coherent and detailed descriptions and summaries about various matters. S/he is able to summarize text and justify his/her own statements of opinions. In addition, the student knows the steps of the writing process and understands the significance of a text's function and target audience. S /he can also differentiate between formal and informal writing styles.
Contents:
During the course students develop their writing skills in Finnish and are guided in the drafting of different text types and documents needed in studies and work. In the course students learn how to write informal and formal letters, an argument-essay, a summary, a job application and a report.
Mode of delivery:
One contact lesson at the beginning of the course and guided independent studying using online
Learning activities and teaching methods:
The course will be held online using a Moodle environment.
Target group:
Course is intended for the international students in every faculty at the University of Oulu.
Students of the Oulu University of Applied Sciences (OAMK) students and OAMK's international and exchange students may also participate to this cross-institutional study. The quota principle is as follows: at least two OAMK students in a course and if there are more places, they are filled according to the queuing principle.See more information https://www.oulu.fi/forstudents/crossinstitutionalstudy.
Prerequisites and co-requisites:
Completion of the Intermediate Finnish Course 2
Recommended optional programme components:
-
Recommended or required reading:
Web based material in Moodle.
Assessment methods and criteria:
To pass the course, the student must complete all the required writing assignments.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Grading is on a pass/fail basis.
Person responsible:
Anne Koskela
Working life cooperation:
-
Other information:
Sign-up in WebOodi or in Tuudo. Staff members in staff training portal.

461102A: Statics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Mechanical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Lahtinen, Hannu Tapio

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay461102A Statics (OPEN UNI) 5.0 op
461016A-01 Statics, examination 0.0 op
461016A-02 Statics, exercises 0.0 op
461016A Statics 5.0 op

ECTS Credits:
5 ETCS / 149 hours of work
Language of instruction:
Lectures in finnish, foreign students follow the course by reading independently the books in english and taking part to the exercises and exams where all material is given in english.
Timing:
The course is held in the autumn semester, during periods 1 and 2. It is recommended to complete the course at the 1st autumn semester.
Learning outcomes:
After the course, the student can calculate forces and moments of loaded structures using equations of vector algebra and trigonometry. He/she can draw a free body diagram of the force system and then solve the unknown forces by using equations of equilibrium. He/she can determine resultants from uniformly distributed loads and apply Coulomb's law of friction in the problem equilibrium. The student can solve problems of internal and external forces of particle systems and rigid body systems in case of static equilibrium. Especially, he/she can draw shear force and bending moment diagrams for beam structures.
Contents:
Fundamental laws and concepts in statics. Force systems and their treatment. Equilibrium of particles and rigid bodies. Static forces in isostatic structures such as beams, frames, cables and trusses. Friction.
Mode of delivery:
Implemented as Face-to-face -teaching.
Learning activities and teaching methods:
Lectures 55 h / exercises 42 h / independent work of solving homework problems 52 h.
Target group:
Compulsory for candidate degree students of mechanical engineering programme.
Prerequisites and co-requisites:
Now prerequisites required.
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:
Salmi, T.: Statiikka, Pressus Oy, Tampere 2005; Beer, F., Johnston, R.: Vector Mechanics for Engineers, Statics, McGraw-Hill Book Company, 1996.
Assessment methods and criteria:
In the course acceptable homework and midterm exams / final exam are required. This course utilizes continuous assessment. There are four midterm exams, of which the last one is at the same time a final exam. Homework contain every week three problems that are marked. The student is allowed to participate to a final exam, when the homework is accepted.
Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
University teacher Hannu Lahtinen
Other information:
The course gives ability for understanding static equilibrium, ability for determining force balance in structures and readiness for later studies.

461103A: Strength of materials I, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Mechanical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Lahtinen, Hannu Tapio

Opintokohteen kielet: Finnish

Leikkaavuudet:

461010A-01 Strength of Materials I, examination 0.0 op

461010A-02 Strength of Materials I, exercises 0.0 op

461010A Strength of Materials I 7.0 op

ECTS Credits:
5 ETCS / 149 hours of work
Language of instruction:
Lectures in Finnish, foreign students follow the course by reading independently the books in English and taking part to the exercises and exams where all material is given in English.
Timing:
The course is held in the spring semester, during periods 3 and 4. It is recommended to complete the course at the 1st spring semester.
Learning outcomes:
After the course, the student can determine stresses and strains of structures under loading. He/she can change the general stress and strain states from one coordinate system to another and can also apply constitutive equations in calculations. The student can dimension typical structures such as tension and compression bars, torsion bars and straight beams.
Contents:
Purpose and goals of strength of materials. Experimental elastic properties and strength of steel. Tension and compression of straight bars. Round torsion bar under shear force and torsion loads. Stresses and deflection curves in straight beams under bending moments. Stress state, strain state and constitutive equations, principal stresses, Mohr's circle. Stress hypotheses.
Mode of delivery:
Implemented as Face-to-face -teaching.
Learning activities and teaching methods:
Lectures 55 h / exercises 42 h / independent work of solving homework problems 52 h.
Target group:
Compulsory for Bachelor's degree students of mechanical engineering programme.
Prerequisites and co-requisites:
The recommended preceding course is 461102A Statics.
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:
Salmi, T., Pajunen, S.: Lujuusoppi, Pressus Oy, Tampere, 2010, Pennala, E.: Lujuusopin perusteet, Moniste 407, Otatieto 2002; Karhunen, J. & al.: Lujuusoppi, Otatieto 2004; Beer, F., Johnston, E., Mechanics of materials , McGraw-Hill, 2011; Gere, J.M., Timoshenko, S.P., Mechanics of Materials, Chapman&Hall, 1991.
Assessment methods and criteria:
In the course acceptable homework and midterm exams / final exam are required. This course utilizes continuous assessment. There are four midterm exams, of which the last one is at the same time a final exam. Homework contain every week three problems that are marked. The student is allowed to participate to a final exam, when the homework is accepted.
Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
University teacher Hannu Lahtinen
Other information:
The course looks into the most important principal concepts of strenght of materials and gives ability for dimensioning of simple structures such as straight bars in tension, compression or torsion loads and straight beams under bending moments.

900017Y: Survival Finnish, 2 op

Voimassaolo: 01.08.1995 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay900017Y Survival Finnish Course (OPEN UNI) 2.0 op

Proficiency level:
A1.1
Status:
The course is intended for the international students in every faculty at the University of Oulu.
Required proficiency level:
No previous Finnish studies.
ECTS Credits:
2 ECTS cr
Language of instruction:
Finnish and English.
Timing:
-
Learning outcomes:
By the end of the course the student can understand and use some very common everyday expressions and phrases, and s/he can locate informational content in simple texts and messages. The student also knows the basic characteristics of Finnish language and Finnish communication styles.
Contents:
This is an introductory course which aims to help students to cope with the most common everyday situations in Finnish. During the course, students learn some useful everyday phrases, some general features of the vocabulary and grammar, and the main principles of pronunciation.

The topics and communicative situations covered in the course are: general information about the Finnish language, some politeness phrases (how to greet people, thank and apologize), introducing oneself, giving and asking for basic personal information, numbers, some time expressions (how to tell and ask the time, days of the week, time of day), food, drink and asking about prices.

The structures studied are: personal pronouns and their possessive forms, forming affirmative, negative and interrogative sentences, the conjugation of some verbs, the basics of the partitive singular and some local cases for answering the ‘where'-question.
Mode of delivery:
Contact teaching, on-line learning and independent work. There will be organized also one on-line group in each semester.
Learning activities and teaching methods:
Lessons 2 times a week (26 h, including the final exam) and guided self study (24 h).
Target group:
International degree and post-graduate degree students, exchange students and the staff members of the University.
Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
Will be provided during the course.
Assessment methods and criteria:
Regular and active participation in the weekly lessons (twice a week), homework assignments and written exam at the end of the course will be observed in assessment.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Grading scale is on a pass/fail basis.
Person responsible:
Arja Haapakoski
Working life cooperation:
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Other information:
Sign-up in WebOodi or in Tuudo.

461105A: Technical thermodynamics, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Field of Mechanical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Lahtinen, Hannu Tapio

Opintokohteen kielet: Finnish

Leikkaavuudet:

461035A Heat and Mass Transfer I 3.5 op

ECTS Credits:
5 ETCS / 120 hours of work
Language of instruction:
Lectures in finnish, foreign students follow the course by reading independently the books in english and taking part to the exercises and exams where all material is given in english.
Timing:
The course is held in the autumn semester, during periods 1 and 2. It is recommended to complete the course at the 2nd autumn semester.
Learning outcomes:
After the course, the student can explain the principal laws of thermodynamics and their impact on energy conversions. Student can apply the energy balance equations for closed and open systems in the calculation of properties and path functions of different processes. The student can explain the theoretical foundations of combustion engines, gas and vapor power plants, and refrigerators and heat pumps. In addition, student can solve problems regarding fluid flow in pipes and heat and moisture transfer.
The course gives fundamental information of thermodynamics and its applications.
Contents:
Heat and moisture transfer and fluid flow in pipes; Principal laws in thermodynamics and basic concepts involved; Applications in production, transformation, transfer and use of energy.
Mode of delivery:
Implemented as Face-to-face -teaching.
Learning activities and teaching methods:
Lectures 30 h / exercises 30 h / independent work of solving homework problems 60 h.
Target group:
Compulsory for candidate degree students of mechanical engineering programme.
Prerequisites and co-requisites:
Now prerequisites required.
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:
Cengel, Y.A. & Boles, M.A., Thermodynamics; An Engineering Approach, Fifth edition in SI-units, 2006; Cengel, Y. A., Heat Transfer; A Practical Approach, Second edition, 2003.
Assessment methods and criteria:
The course is passed by midterm exams or by a final exam. During the course two midterm exams are arranged. Every week exercises are organized, and part of the exercise problems are left for independent work.
Grading:
The course utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Person responsible:
University teacher Hannu Lahtinen