Opasraportti

Courses in English for Exchange Students in Information Processing Science (2015 - 2016)

Courses in English for exchange students

This Weboodi Course Catalogue lists courses taught in English for exchange students at the Department of Information Processing Science during the academic year 2015-2016.

When planning your exchange studies and the required learning agreement please use the information provided under the **Courses** tab in this Study Guide. Please read carefully the information of each course you wish to take (language of instruction, target group, course content, timing, preceding studies, additional information etc.).

All exchange students must submit their exchange application through SoleMOVE.

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

Individual course codes include information on the level of course.
xxxxxP, xxxxxY = basic, introductory level courses
xxxxxA = for 2-3 year students, Bachelor level courses
xxxxxS = for 4-5 year students, Master level courses

All Master level courses are in English. However, the courses may have restrictions. In addition, this guide has some Bachelor level courses as they are well supported in English. Read course descriptions!

Any general questions about courses in English at the Department should be addressed to:

Juha Iisakka
international.itee {at} oulu.fi.

Further information on application process for incoming exchange students:
http://www.oulu.fi/english/studentexchange
international.office(at)oulu.fi

Tutkintorakenteisiin kuulumattomat opintokokonaisuudet ja - jaksot

813316A: Business Process Modeling, 5 op
815303A: Embedded Software Development Environments, 5 op
813626S: Emerging Technologies and Issues, 5 op
811600S: Emerging Trends in Software Engineering, 5 op
811601S: Emerging Trends in Software Testing, 5 op
812351A: Enterprise Systems, 5 op
   Pakollisuus
      812351A-01: Enterprise Systems, harjoitustyö, 0 op
      812351A-02: Enterprise Systems, luennon tentti, 0 op
817604S: ICT and Organizational Change, 5 op
813623S: Information Security Policy and Management in Organisations, 5 op
813625S: Information Systems Theory, 5 op
812331A: Interaction Design, 5 op
811375A: Käyttöliittymäohjelmointi, 5 op
812346A: Oliosuuntautunut analyysi ja suunnittelu, 6 op
815657S: Open Source Software Development, 5 op
817609S: Project Seminar, 3 op
815305A: Real Time Distributed Software Development, 5 op
813621S: Research Methods, 5 op
813620S: Software Business Management, 5 op
815662S: Software Engineering Management, Measurement and Improvement, 5 op
815663S: Software Engineering Research, 5 op
815312A: Software Production and Maintenance, 5 op
815311A: Software Quality and Testing, 5 op
817603S: System Design Methods for Information Systems, 5 op
811380A: Tietokantojen perusteet, 7 op

Opintojaksojen kuvaukset

Tutkintorakenteisiin kuulumattomien opintokokonaisuuksien ja -jaksojen kuvaukset

813316A: Business Process Modeling, 5 op

Voimassaolo: 01.08.2010 -
Opiskelumuoto: Aineopinnot
Laji: Opintojakso
Arvostelu: 1 - 5, hyv, hyl
Opettajat: Jukka Kontula
Opintokohteen kielet: englanti

  Laajuus:
  5 ECTS credits/134 hours of work

  Opetuskieli:
  English

Ajoitus:
The course unit is held in the spring semester, during period 4. It is recommended to complete the course in the second year of Bachelor studies.

Osaamistavoitteet:
After completing the course, students are able to model and develop business processes, as well as use a computer-based process modeling tool. The students are able to distinguish between business process change on the enterprise level, business process level and the implementation level, and to and evaluate these business process changes.

Sisältö:
Process architecture and how it can be fitted to the organisation, process modelling, process performance measurement, understanding process-related problems, process development, software tools for modelling and analysing processes, exercises.

Järjestämistapa:
Face-to-face teaching

Toteutustavat:
Lectures 30h, exercises 12h, course assignments 45h, problem-based learning 27h, exam 20h. The course assignments will be done as group work, the lecture reflections and the exam will be done as individual work.

Kohderyhmä:

Yhteydet muihin opintojaksoihin:
-
Oppimateriaali:
Harmon, Paul (2007). Business Process Change. A Guide for Business Managers and BPM and Six Sigma Professionals. Morgan Kaufmann Publishers.

Suoritustavat ja arviointikriteerit:
This course unit utilizes continuous assessment. Lectures are voluntarily, but participation is highly recommended. The students will write lecture reflections, a problem-based learning report, and will create a process model with a software tool. In addition, there will be an exam at the end of the course, which will be assessed. The assessment of the course unit is based on the learning outcomes of the course unit.
Lue lisää opintosuoritusten arvostelusta yliopiston verkkosivulta.

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

Vastuuhenkilö:
Karin Väyrynen
Työelämäyhteistyö:
No

815303A: Embedded Software Development Environments, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Aineopinnot
Laji: Opintojakso
Arvostelu: 1 - 5, hyv, hyl
Opettajat: Juustila, Antti Juhani
Opintokohteen kielet: englanti

Laajuus:
5 ECTS credits / 133 hours of work
Ajoitus:
1 st year of Master's and GS 3D studies, spring semester, period 4
Osaamistavoitteet:
After completing the course, a student is able to work with the essential software development tools of a selected embedded platform. The student is able to implement memory and power efficient applications by exploiting existing libraries and knowledge of the programming interfaces provided by the platform.
Sisältö:
The focus of the course is in the software development environments and tools for mobile and embedded platforms, such as Android, iOS, and Windows Phone. In addition, the course covers memory and power

management, core services of the platform, and the utilisation of existing libraries. One platform will be selected for deeper study, and the course introduces its essential software development tools and libraries. The emphasis is on application development for the platform as an exercise.

Järjestämistapa:
Blended teaching

Toteutustavat:
Lectures and exercises about 40 h, exercises and exercise work 93 h

Esitietovaatimukset:
Course "815309A Real-time Distributed Software Development", C/C++ and/or Java programming skills or similar knowledge obtained from other courses.

Oppimateriaali:
Course material, the documentation of selected technologies, and other related literature

Suoritustavat ja arviointikriteerit:
Exercise work

Arviointiasteikko:
1-5

Vastuuhenkilö:
Antti Juustila

813626S: Emerging Technologies and Issues, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Syventävät opinnot

Laji: Opintojakso

Arvostelu: 1 - 5, hyv, hyl

Opintokohteen kielet: englanti

Laajuus:
5 ECTS credits/134 hours of work

Opetuskieli:
English

Ajoitus:
1 st year of Master's and GS ^{3}D studies, autumn semester, period 2

Osaamistavoitteet:
After completing the course, the student is able to **:**

- Analyse the on-going changes in online and consumer behaviour, customer requirements, ICT markets and technological development;
- Evaluate key enabling web technologies and become an effective participant in web-enabled business endeavours and initiatives;
- Design ways for leveraging information and communication technologies to improve intra- and inter-organisational processes and enhance a firm's competitive position;
- Plan ways for searching innovations; and
- Develop his/her skills for building careers and taking advantage of entrepreneurial opportunities through emerging technologies, in particular related to the web.

Sisältö:
1. A shift in thinking about the web and emerging technologies
2. How to social web is transforming businesses, software design, our perception of people as well as skills required of us
3. How to accelerate innovation creation through web-based and other emerging technologies: Ecosystem thinking, strategies, core business values
4. Transformation of the social web into humanized web

Järjestämistapa:
Face-to-face teaching

Toteutustavat:
Lectures 24h, reflective personal exercises 30h, independent work (required reading) 80h.

Kohderyhmä:

Esitietovaatimukset
None

Yhteydet muihin opintojaksoihin:

Oppimateriaali:
Oinas-Kukkonen Harri & Oinas-Kukkonen Henry (2013) Humanizing the Web: Change and Social Innovation. Palmgrave Macmillan, Basingstoke, UK (required reading).
Suoritustavat ja arviointikriteerit:
Exam (only in English)

Arviointiasteikko:
1–5
Vastuuhenkilö:
Harri Oinas-Kukkonen
Työelämäyhteistyö:
No

811600S: Emerging Trends in Software Engineering, 5 op

Voimassaolo: 01.08.2011 -

Opiskelumuoto: Syventävät opinnot

Laji: Opintojakso

Arvostelu: 1 - 5, hyv, hyl

Opettajat: Mika Mäntylä

Opintokohteen kielet: englanti

Laajuus:
5 ECTS credits /133 hours of student work
Opetuskieli:
English
Ajoitus:
1.-2. year of Master's studies, period 1-2
Osaamistavoitteet:
The learning outcomes are defined based on course topic.
Sisältö:
Varies yearly.
Järjestämistapa:
Face-to-Face teaching.
Toteutustavat:
Lectures, exercises, design exercise, group work and seminars depending on the topic of the year. The implementation of the course will be informed separately. 133 hours of student work.
Kohderyhmä:
All Master's level, EMSE, and GS3D students
Esitietovaatimukset:
Will be defined based on the contents.
Yhteydet muihin opintojaksoihin:
No
Oppimateriaali:
Will be announced at the first lecture.
Suoritustavat ja arviointikriteerit:
Depends on the working methods.
Arviointiasteikko:
The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail.
Vastuuhenkilö:
Mika Mäntylä
Työelämäyhteistyö:
No

811601S: Emerging Trends in Software Testing, 5 op

Voimassaolo: 01.08.2011 -

Opiskelumuoto: Syventävät opinnot
Laji: Opintojakso
Arvostelu: 1 - 5, hyv, hyl
Opettajat: Mika Mäntylä
Opintokohteen kielet: englanti

Laajuus:
5 ECTS credits/136 hours of work

Opetuskieli:
 English
Ajoitus:
1st year of Master's studies, autumn semester, period 2
Osaamistavoitteet:
The student grasps the mathematical foundations of software testing and knows the current research areas related to software testing. The student is able to read research papers on software testing and can participate in academic discussions of those papers. The student can apply the software testing techniques in a test-driven fashion. .
Sisältö:
Finite state machines, data/ control flow graphs, data-flow testing, model-based testing, mutation/ search based testing, test case selection/ prioritization, security testing, test-driven development
Järjestämistapa:
Face-to-face teaching

Toteutustavat:
Lectures 24h, exercises/ assignments 24h, weekly study 48h, paper reading 40h
Kohderyhmä:

Esitietovaatimukset:
815311A (Software Quality and Testing).
Yhteydet muihin opintojaksoihin:

Oppimateriaali:
- Pezze M.,Young M., "Software Testing and Analysis: Process, Principles and Techniques", John Wiley&Sons, 2008
- Lasse Koskela, "Test Driven: Practical TDD and Acceptance TDD for Java Developers", Manning Publications, 2007

Suoritustavat ja arviointikriteerit:
 Active and regular attendance (mandatory) to lectures and exercises

Arviointiasteikko:
 The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail
Vastuuhenkilö:
 Mika Mäntylä
Työelämäyhteistyö:
No
Lisätiedot:
 It is not possible to complete the course remotely or with self-study options.

812351A: Enterprise Systems, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Aineopinnot
Laji: Opintojakso
Arvostelu: 1 - 5, hyv, hyl
Opettajat: Li Zhao
Opintokohteen kielet: englanti

Laajuus:

5 ECTS credits/134 hours of work
Opetuskieli:
English
Ajoitus:
1st year of Master's and GS3D studies, spring semester, period 3

Osaamistavoitteet:
After completing the course, the student:

- Understands how ERP, SCM, KM, CRM, global supply chain, inventory management, and online business systems operate;
- Understands how business processes integrate the internal functions of the enterprise and allow the enterprise to interact with its business environment (such as suppliers, business partners, and customers);
- Is able to recognize, model, and improve business processes to help enterprises achieve efficiency, effectiveness, and competitive advantage;
- Understands how to do research on enterprise information systems.

Sisältö:
1. Principles of enterprise systems, and business processes that integrate the internal functions of the enterprise and connect the enterprise with its business environment;
2. Manage enterprises' intellectual capital to achieve competitive advantage;
3. Enterprise resource planning (ERP);
4. Supply chain management (SCM);
5. Global supply chain & inventory management systems
6. Knowledge management systems;
7. Customer relationship management (CRM);
8. Internet-based Business and Marketing Systems;
9. Enterprise application integration (EAI)

Toteutustavat:
The overall workload for each student in this course is 134 hours. Lectures (24h), exercises (16h), homework (25h), essay (35 h), examination (34h)
Kohderyhmä:

Esitietovaatimukset:
Understanding of the business process modeling helps.

Yhteydet muihin opintojaksoihin:

Oppimateriaali:
Refer to the course webpages
Suoritustavat ja arviointikriteerit:
Exercises, assignments, essay, and examination.

Arviointiasteikko:
1–5
Vastuuhenkilö:
Li Zhao
Työelämäyhteistyö:
No

Pakollisuus

812351A-01: Enterprise Systems, harjoitustyö, 0 op

Opiskelumuoto: Aineopinnot
Laji: Oj-osa
Arvostelu: 1 - 5, hyv, hyl
Opintokohteen kielet: englanti

812351A-02: Enterprise Systems, luennon tentti, 0 op

Opiskelumuoto: Aineopinnot
Laji: Oj-osa
Arvostelu: 1 - 5, hyv, hyl
Opettajat: Li Zhao
Opintokohteen kielet: englanti

Ei opintojaksokuvauksia.

817604S: ICT and Organizational Change, 5 op

Voimassaolo: 01.08.2010 -
Opiskelumuoto: Syventävät opinnot
Laji: Opintojakso
Arvostelu: 1 - 5, hyv, hyl
Opettajat: Minna Isomursu
Opintokohteen kielet: englanti

Laajuus:
5 ECTS credits/134 hours of work
Opetuskieli:
English
Ajoitus:
2nd year, autumn semester, periods 1+2
Osaamistavoitteet:
After completing the course the student is:

- Able to distinguish various levels of organisational activities and their relations;
- Able to discuss about the role of information technology in various levels of change of organisation and its context;
- Able to analyse ICT-based organizational change process.

Sisältö:
The course studies organisations at four levels: individuals, practices, organizational structures and transformations, and the societal context of organisations. The organizational role of ICT and the relation between ICT and knowledge are also discussed. A method for analysing organisations as networks of activity systems is presented. The role of power, trust and control in the change process is discussed. The different aspects of change agents are presented and analysed.
Järjestämistapa:
Face-to-face teaching
Toteutustavat:
Introductory lectures 20h, seminar sessions 14h, individual work 100h (for a review and analysis of selected course materials and making a presentation for the seminar).
Esitietovaatimukset:
B.Sc. or other equivalent degree and course Information Systems in Organisations (812304A) or equivalent knowledge.

Yhteydet muihin opintojaksoihin:

Oppimateriaali:
A list of research articles will be provided for the lectures and assignments. Readings for the background and theoretical framework are:
- Gareth R. Jones (2010) Organizational Theory, Design, and Change: Global Edition (6. Ed.) Chapters 1-3, 10-12, Prentice Hall.
- K. Kuutti (1996) Activity Theory as a potential framework for human-computer inter-action research, in Context and Consciousness: Activity Theory and Human Com-puter Interaction, B. Nardi, Editor. 1996, MIT Press: Cambridge. p. 17-44.
- Frank Blackler (1995) Knowledge, knowledge work and organizations: an overview and interpretation.

Organization studies, 1995. Pp. 1021-1046
• Frank Blackler et al. (2000) Organizing Processes in Complex Activity Networks. Organization, vol. 7 no. 2. Pp. 277-300.

Suoritustavat ja arviointikriteerit:
Lecture and seminar participation, assignment (literature review, analysis, seminar presentation). Alternatively by examination and personal assignment report.
Lue lisää opintosuoritusten arvostelusta yliopiston verkkosivulta.

Arviointiasteikko:
1-5

Vastuuhenkilö:
Minna Isomursu

Työelämäyhteistyö:
No

813623S: Information Security Policy and Management in Organisations, 5 op

Voimassaolo: 01.08.1950 -

Opiskelumuoto: Syventävät opinnot

Laji: Opintojakso

Arvostelu: 1 - 5, hyv, hyl

Opettajat: Seppo Pahnila, Petri Puhakainen

Opintokohteen kielet: englanti

Laajuus:
5 ECTS credits/134 hours of work

Opetuskieli:
English

Ajoitus:
2nd year of Master's and GS3D studies, autumn semester, period 2 + 3

Osaamistavoitteet:
After completing the course, the student is able to:

• Develop BPC;
• Develop organisation specific information security policies and sub-policy systems in organisations;
• Improve employees' compliance with the information security procedures through training, campaigning and other measures;
• Carry out risk management in practice;
• Estimate the economical investment in information security;
• Understand the strengths and weaknesses of information security management stan-dards;
• Understand the certifications in the area of information security management;
• Design information security policies at organisations.

Sisältö:
1. BCP;
2. Development of organisation specific information security policies and sub-policy systems at organisations;
3. Measuring employees' compliance with information security policies;
4. Improving employees' compliance with the information security procedures through training, campaigning and other means;
5. Information security risk management in practice, estimation of economical investment in information security;
6. Information security management standards;
7. Certifications related to information security.

Järjestämistapa:
Face-to-face teaching

Toteutustavat:
Lectures 30h, exercises 18h, student preparation and reading for exercises and examination 86h.

Kohderyhmä:

Esitietovaatimukset:
Bachelor degree or other equivalent degree and course "811168P Introduction to Information Security" or principles of information security, or similar knowledge obtained from other courses.

Yhteydet muihin opintojaksoihin:

Oppimateriaali:
Articles (to be announced later)
Suoritustavat ja arviointikriteerit:
Examination.
Lue lisää opintosuoritusten arvostelusta yliopiston verkkosivulta.
Arviointiasteikko:
1–5
Vastuuhenkilö:
Petri Puhakainen ja Seppo Pahnila
Työelämäyhteistyö:
No

813625S: Information Systems Theory, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Syventävät opinnot

Laji: Opintojakso

Arvostelu: 1 - 5, hyv, hyl

Opintokohteen kielet: englanti

Laajuus:
5 ECTS credits/134 hours of work
Opetuskieli:
English
Ajoitus:
2nd year of Master's studies, autumn semester, periods 1 + 2

Osaamistavoitteet:
After completing the course, the student:

• Will have a good knowledge and understanding of a broad array of research topics and themes within the field of information systems;
• Will have good knowledge and understanding of information systems research and the process by which that research is produced;
• Can publish critical IS research articles in some of the leading academic journals and conference proceedings;
• Can critically analyse and synthesise academic sources;
• Can verbally present arguments in an academic fashion;
• Can write a literature review on an IS research topic.
Sisältö:
1. Information Systems Research Overview
2. A contemporary selection of IS research themes, such as:
• Information systems success and failure;
• Information systems development;
• Understanding the end-user;
• Risk management;
• Cultural Issues in information systems.

Järjestämistapa:
Face-to-face teaching
Toteutustavat:
Lectures 1.5 ECTS credits (40.5 hours of work), class preparation 1.5 ECTS (40.5 hours of work), and exercises 2 ECTS (53 hours of work).
Kohderyhmä:
Master's level students
Esitietovaatimukset:
Bachelor degree or other equivalent degree and **"Research Methods"** course (813621S). 813624S is a substantive overview of research in information systems not a methods course, and students should be familiar with research methods prior enrolling to 813624S.
Yhteydet muihin opintojaksoihin:

Oppimateriaali:
To be announced during the course implementation
Suoritustavat ja arviointikriteerit:
Paper summary and its presentation, class quizzes, and research essay are assessed. Note that there is <u>no final exam</u>.
Arviointiasteikko:
1–5
Vastuuhenkilö:
Netta Iivari
Työelämäyhteistyö:
No
Lisätiedot:
Course material can be found at OPTIMA e-learning environment, Urkund is used for course work submissions.

812331A: Interaction Design, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Aineopinnot

Laji: Opintojakso

Arvostelu: 1 - 5, hyv, hyl

Opettajat: Netta Iivari

Opintokohteen kielet: englanti

Laajuus:
5 ECTS credits/133 hours of work
Opetuskieli:
English
Ajoitus:
1st year of Master's studies, autumn semester period 1
Osaamistavoitteet:
Objective: The course explains the role of human interaction with IT products, systems, and services, explains the factors and problems related to it to motivate interaction design, and teaches some user-centered methods for analysis, evaluation and design of interactions.
Learning Outcomes: After completing the course, the student can assess the role of human interaction with IT products, systems, and services and identify factors and problems related to it within a practical design case. The student is able to:
- use methods for analysis and evaluation of existing interfaces;
- understand the role of requirements, plan and conduct a simple requirements collection and analysis;
- use basic principles of usability and user experience for user interface design;
- use interaction design methods in designing for target user experiences.
Sisältö:
The course provides an overview of interaction design, introducing the terminology and fundamental concepts, the main activities, and the importance of user involvement in the design process. The course addresses establishing requirements for IT products, systems, and services. The focus is on usability and user experience from the viewpoint of the intended users, their tasks and the context of use. The course covers user-centered methods for designing for and evaluating usability and user experience of IT products, systems, and services. All the main activities of interaction design are carried out in a practical design case.
Järjestämistapa:
Face-to-face teaching, self-study
Toteutustavat:
Lectures (20 h), exercises and seminar (25 h), individual and group assignments (88 h), or self-study: an opening lecture (2 h), one larger assignment (110 h) and individual tasks (21 h).
Kohderyhmä:
Master's level students of the IS Oriented Module (compulsory), Master's level students of the SE Oriented Module (optional) and GS ^{3}D students (optional).
Esitietovaatimukset:
Basic knowledge on human-computer interaction with usability and user-centered design.
Yhteydet muihin opintojaksoihin:
Basic knowledge on human-computer interaction with usability and user-centered design.
Oppimateriaali:

Rogers, Sharp and Preece (2011, 3rd edition) *Interaction Design: Beyond Human-Computer Interaction* and related lecture and assignment materials

Suoritustavat ja arviointikriteerit:
Accepted assignments and individual tasks

Arviointiasteikko:
1-5
Vastuuhenkilö:
Netta Iivari
Työelämäyhteistyö:
No

811375A: Käyttöliittymäohjelmointi, 5 op

Voimassaolo: 01.08.2010 -
Opiskelumuoto: Aineopinnot
Laji: Opintojakso
Arvostelu: 1 - 5, hyv, hyl
Opettajat: Lappalainen, Jouni Esko Antero
Opintokohteen kielet: suomi

Laajuus:
5 op/134 tuntia opiskelijan työtä

Opetuskieli:
Suomi
Ajoitus:
3. vsk, syyslukukausi, periodit 1+2
Osaamistavoitteet:
Opintojakson suoritettuaan opiskelija osaa toteuttaa graafisen käyttöliittymän sisältävän ohjelman, jossa on sovellettu käytäntöön käytettävyyden suunnittelun periaatteita kehitysprosessin alusta asti.

Sisältö:
Käyttöliittymän elementit, Ohjelmoinnin käyttöliittymäkirjastojen käytön perusteet, Käyttöliittymän suunnitteluperiaatteita, Käyttöliittymän taitto, Käyttöliittymien suhde ohjelmisto-arkkitehtuuriin, tapahtumaohjattu ohjelmointi, Web-käytettävyys, käyttöliittymien rakentaminen www-ympäristöön, web-ohjelmointi.
Järjestämistapa:
Monimuoto-opetus

Toteutustavat:
Harjoitukset 33 h, harjoitustyö 75 h, itsenäinen materiaaliin perehtyminen 26 h. Opintojakson suoritukseen edellytetään annetut vaatimukset hyväksyttävästi täyttävän harjoitustyön tekeminen.
Kohderyhmä:

Esitietovaatimukset:
Pakollisina edeltäjinä kurssille ovat olio-ohjelmoinnin
perustiedot ja –taidot sekä käyttöliittymän suunnittelun perustiedot.

Yhteydet muihin opintojaksoihin:
Suositeltavina edeltävinä opintoina Käyttöliittymien perusteet (811379A) ja ohjelmointikurssi (Johdatus ohjelmointiin C-kielellä (811192P), tietokantojen perusteet (811380A), olio-ohjelmointi (812347A)).

Oppimateriaali:
Tekstimuotoisena kurssin www-sivulla. Lisäksi esim. Kosonen, Peltomäki & Silander (2005). Java 2 ohjelmoinnin peruskirja. Docendo.
Lisäksi Lauesen, S. 2005. User Interface Design: A Software Engineering Perspective.

Suoritustavat ja arviointikriteerit:
Kurssi suoritetaan hyväksytyllä harjoitustyöllä, joka määritellään tarkemmin kurssin aikana.
Lue lisää opintosuoritusten arvostelusta yliopiston verkkosivulta.

Arviointiasteikko:
1-5, hylätty
Vastuuhenkilö:
Jouni Lappalainen
Työelämäyhteistyö:
Ei

812346A: Oliosuuntautunut analyysi ja suunnittelu, 6 op

Voimassaolo: 01.08.2011 -
Opiskelumuoto: Aineopinnot
Laji: Opintojakso
Arvostelu: 1 - 5, hyv, hyl
Opintokohteen kielet: suomi

Ei opintojaksokuvauksia.

815657S: Open Source Software Development, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Syventävät opinnot
Laji: Opintojakso
Arvostelu: 1 - 5, hyv, hyl
Opettajat: Henrik Hedberg
Opintokohteen kielet: englanti

Laajuus:
5 ECTS credits / 133 hours of work
Ajoitus:
1 st year of Master's studies, periods 1+2
Osaamistavoitteet:
After passing the course, a student will be able to

- define the historical background and the ideology of Open Source Software (OSS),

- participate in OSS development project,

- evaluate the impact of the usage of OSS and OSS licenses on software development and exploitation, and

- view the phenomenon through the essential scientific research.

Sisältö:
The course introduces OSS development paradigm and current topics in OSS research. OSS affects both the way to produce software and the decisions of user organizations. It can be understood, for example, from different social, legal, economical, software engineering and data security viewpoints. The aim is to study from different perspectives, for example, what OSS is and what it is not, the history and organisation of OSS projects, methods of OSS development and usage, as well as licensing models and possible risks. The emphasis on research work.

Järjestämistapa:
Mostly face-to-face teaching but some parts are implemented as distance learning
Toteutustavat:
 Lectures and seminars about 40 h, exercises and peer reviews about 20 h, seminar article and presentation about 70 h
Esitietovaatimukset:
Compulsory prerequisites are Bachelor degree or other equivalent degree and basic knowledge on software engineering and research work. The course allows passing Project following the OSS development principles, or writing Master's thesis on a OSS topic.
Oppimateriaali:

Fogel, K. (2005): Producing Open Source Software - How to Run a Successful Free Software Project, O'Reilly Media; Rosen L. (2004): Open Source Licensing: Software Freedom and Intellectual Property Law, Prentice Hall; scientific articles covering the topic.
Suoritustavat ja arviointikriteerit:
Active participation, seminar article and other assignments
Arviointiasteikko:
1-5
Vastuuhenkilö:
Henrik Hedberg

817609S: Project Seminar, 3 op

Voimassaolo: 01.08.2013 -

Opiskelumuoto: Syventävät opinnot

Laji: Opintojakso

Arvostelu: 1 - 5, hyv, hyl

Opettajat: Tonja Molin-Juustila

Opintokohteen kielet: englanti

Laajuus:
3 ECTS credits / 70 hours of work
Opetuskieli:
English.
Ajoitus:
The timing of this course is dependent on the "Research and Development Project (817612S)" course and will immediately follow the project in the next semester: 2nd year, period 3.
Osaamistavoitteet:
After completing the course, the students should demonstrate their abilities to work as academic experts in challenging ICT projects. Students will learn to acquire and apply research articles and other new knowledge like an academic expert in a selected topic of their project ("Research and Development Project (817612S)" course). Students will also learn to analyse and report their experience-based new knowledge on the topic to peer students. By completing this course, students are able to act as reflective, independent academic experts in ICT projects and have learnt expertise in some topic area of their project.
As an expert in the selected topic area, the student is able to
- Search research articles and literature on the topic (review);
- Report practical experiences gained during the project on the topic;
- Evaluate the results of the project and reflect the practical experiences against previous literature and research on the topic;
- Disseminate the (increased) expertise in the topic in a credible way to peers both by a written report and orally.
Sisältö:
Starting lecture, independent analysis and reporting of the expertise on the selected project topic and an expert seminar (1-2 days) with the presentations of each topic.
Järjestämistapa:
Face-to-face teaching during the starting lecture and the seminar, private supervisor for each topic, and web-based learning environment.
Toteutustavat:
70h per student. Attendance at the starting lecture and the expert seminar is mandatory.
Kohderyhmä:
Master's level students. Optional for the students of the Master's degree programme on Software, Systems, and Service Development (GS3D).
Esitietovaatimukset:
Mandatory: Research and Development Project (817612S) during the previous two periods. This course will immediately follow the project course on the project topics. For the students of the Master's degree programme on Software, Systems, and Service Development (GS3D), Software Factory Project Course (817611S) is mandatory before this course.

Oppimateriaali:
Research articles and material to be collected and studied by the students.
Suoritustavat ja arviointikriteerit:

Expertise in the topic area will be reported on the seminar paper. Seminar presentation will also be evaluated. Assessment criteria will be given at the starting lecture and in the web-based learning environment of the course. Lue lisää opintosuoritusten arvostelusta yliopiston verkkosivulta.

Arviointiasteikko:
Every member of the student group will get the same grade. The grade (scale 1-5) will be based 75% on the expertise in the topic and 25% on the oral presentation.

Vastuuhenkilö:
Tonja Molin-Juustila
Työelämäyhteistyö:
No

815305A: Real Time Distributed Software Development, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Aineopinnot

Laji: Opintojakso

Arvostelu: 1 - 5, hyv, hyl

Opettajat: Petri Pulli

Opintokohteen kielet: englanti

Laajuus:
5 ECTS credits/135 hours of work
Ajoitus:
1 st year of Master's studies, autumn semester, periods 1 + 2
Osaamistavoitteet:
After completing the course, the student:

- Is able to analyse the characteristics of real-time distributed systems;
- Is able to acquire an object-oriented, model-based approach to solve the design problems found in real-time systems;
- Is able to detect and derive specific problems facing the real-time software designer, and to suggest design patterns to solve those problems.

Sisältö:
Introduction
1. Characteristics of real-time systems;
2. Resource management;
3. Safety and reliability;
4. Time constraints;
5. Concurrency;
6. Scheduling;
7. Interrupts

Characteristics of Distribution
1. Distribution architectures
2. Concept of time;
3. Synchronisation;
4. Latency and jitter;
5. Quality of service;
6. Service discovery;
7. Networking primitives

Real-Time UML Modelling Methodology
Real-Time Design Patterns
Design Examples: Embedded, Ubiquitous, Mobile, Web/Internet
Järjestämistapa:
Face-to-face teaching
Toteutustavat:
Lectures 40h, design exercises 15h, student project 80h.
Esitietovaatimukset:

Student understands computer architecture, object-oriented analysis and design (UML), programming language C and/or Java.
Oppimateriaali:
Lecture notes based on reference books
- Douglass B.P. (2009) Real-Time Design Patterns – Robust Scalable Architecture for Real-Time Systems. Addison-Wesley ISBN 0-201-69956-7. 500 p.

Suoritustavat ja arviointikriteerit:
Exam and project evaluation
Arviointiasteikko:
1-5
Vastuuhenkilö:
Petri Pulli

813621S: Research Methods, 5 op

Opiskelumuoto: Syventävät opinnot

Laji: Opintojakso

Arvostelu: 1 - 5, hyv, hyl

Opettajat: Arto Lanamäki

Opintokohteen kielet: englanti

Leikkaavuudet:

521146S   Tietotekniikan tutkimusmenetelmät   5.0 op

Laajuus:
5 ECTS credits/134 hours of work

Opetuskieli:
English
Ajoitus:
The course starts in autumn and continues to spring semester (periods 2 and 3). It is recommended that the course is completed during the first year of Master's studies.

Osaamistavoitteet:
Having completed the course, the student is able to explain the general principles of scientific research and the practices of scientific methodology. The student is also able to generate research problems in information systems and software engineering. The student is able to identify and describe the main research approaches and methods in information systems and software engineering and choose the appropriate approach and method for a research problem. The student is also able to evaluate the methodological quality of a research publication. After the course the student is able to choose and apply the proper approach and method for his or her Master's thesis and find more information on the method from scientific literature.
Sisältö:
Introduction to general scientific principles, scientific research practices and quality of scientific publications, qualitative research approaches and selected research methods, quantitative research approaches and selected research methods, design science research and selected methods, requirements and examples of Master's theses, evaluation of research.

Järjestämistapa:
Face-to-face teaching and independent studying.

Toteutustavat:
Lectures 40h, exercises 30h and individual work 65h. Learning diary is written about the lectures and exercises. Exercises include group work.

Kohderyhmä:

Esitietovaatimukset:
Completion of Bachelor's studies

Yhteydet muihin opintojaksoihin:

Oppimateriaali:
Lecture slides and specified literature

Suoritustavat ja arviointikriteerit:
Accepted learning diary

Lue lisää opintosuoritusten arvostelusta yliopiston verkkosivulta.
Arviointiasteikko:
Pass/fail
Vastuuhenkilö:
Arto Lanamäki
Työelämäyhteistyö:
No
Lisätiedot:
-

813620S: Software Business Management, 5 op

Voimassaolo: 01.08.2011 -

Opiskelumuoto: Syventävät opinnot

Laji: Opintojakso

Arvostelu: 1 - 5, hyv, hyl

Opettajat: Marianne Kinnula

Opintokohteen kielet: englanti

Laajuus:
5 ECTS credits/134 hours of work

Opetuskieli:
 English

Ajoitus:
1 st–2 nd year of Master's studies, autumn semester, period 3

Osaamistavoitteet:
Upon completion of the course, the student
- will be able to assess the main problem areas in software business management and is able to describe how to manage these problems;
- will be able to find, when needed, different kinds of tools for managing this diverse and ambiguous environment;
- will be able to describe how to manage competent and creative persons who often have strong personalities;
- will be able to analyse a company situation in a continually changing, unpredictable and even hostile environment, and is able to make well-grounded recommendations for the company courses of action;

Sisältö:
The software business environment and context is complex and under continuous change. Competences and creativity of company employees are needed for creating value and growth to the company. Managing a software business is a challenging task as traditional, rational management models are often inadequate for the needs of the managers. This course provides an overview of the management of the software business in a software company. Aspects of management of SME companies are discussed as well as significance of IT management in an organisation.

Järjestämistapa:
Face-to-face teaching

Toteutustavat:
Lectures and exercises 35h, group work 30h, course assignments and independent work 69h.

Esitietovaatimukset:
Basic knowledge of academic writing technique is needed. Basic understanding of the software business is an advantage.

Yhteydet muihin opintojaksoihin:

Oppimateriaali:
Course material and related literature.
Suoritustavat ja arviointikriteerit:

Participation in lectures/exercises, group work, course assignments.
Arviointiasteikko:
1-5
Vastuuhenkilö:
Marianne Kinnula
Työelämäyhteistyö:
No

815662S: Software Engineering Management, Measurement and Improvement, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Syventävät opinnot

Laji: Opintojakso

Arvostelu: 1 - 5, hyv, hyl

Opettajat: Oivo, Markku Tapani

Opintokohteen kielet: englanti

Laajuus:
5 ECTS credits/134 hours of work
Ajoitus:
2 nd year of Master's and GS ^{3}D studies, autumn semester, period 2
Osaamistavoitteet:
After completing the course the student understands the fundamental principles of software processes and their development in professional software engineering. The course extends the quality understanding based on individual techniques (e.g. reviews) so that after completing the course the student is able to:

- Evaluate different methods and techniques;
- Select from them appropriate ones for different software engineering environments;
- Have capabilities to participate in systematic efforts for improvement in software companies.

Sisältö:
The course covers the most fundamental process centred software quality improvement and management approaches, methods and latest research results, as well as approaches to software measurement. The topics of the course include: traditional waterfall, agile (extreme programming, scrum, rational unified process, crystal, feature driven development, adaptive software development, dynamic systems development method) and lean methods, process improvement approaches, software process and product measurement, agile and lean practices, process improvement at the enterprise level and practical examples from software industry.
Järjestämistapa:
Face-to-face teaching
Toteutustavat:
Lectures 18h, study group working 25h, paper reading 25h, seminar 20h, report writing 20h
Esitietovaatimukset:
 B.Sc. or other equivalent degree and basic knowledge of software engineering
Oppimateriaali:
- CMMI: Guidelines for Process Integration and Product Improvement. Mary Beth Chrissis, Mike Konrad, Sandy Shrum. Addison-Wesley, ISBN 032-115496-7, 2004.
- Agile Project Management with Scrum. Ken Schwaber, Microsoft Press, ISBN 0-7356-1993-X. 2004.
- Dingsøyr T., Dybå T., Moe N.B., Agile Software Development: Current Research and Future Directions, Springer, 2010
- C. Jones, Applied Software Measurement: Global Analysis of Productivity and Quality, 3rd ed. McGraw-Hill Osborne Media, 2008.
- Craig Larman and Bas Vodde, Scaling Lean & Agile Development: Thinking and Organizational Tools for Large-Scale Scrum, Addison-Wesley, 2009

Suoritustavat ja arviointikriteerit:
Active and regular participation to lectures and seminars AND report evaluation AND seminar presentations

Arviointiasteikko:
1-5
Vastuuhenkilö:
Markku Oivo

815663S: Software Engineering Research, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Syventävät opinnot
Laji: Opintojakso
Arvostelu: 1 - 5, hyv, hyl
Opettajat: Burak Turhan
Opintokohteen kielet: englanti

Laajuus:
5 ECTS credits/132 hours of work
Opetuskieli:
5 ECTS credits/132 hours of work
Ajoitus:
2 nd year of Master's studies, autumn semester, period 1+2

Osaamistavoitteet:
After completing the course the student will know the current research areas in software engineering and the most important software engineering research methods. The student understands academic research and publishing in software engineering, and is able to critically analyse scientific articles from the viewpoint of the content and research methods used in the article. The student is able to present academic research and actively participate in an academic discussion of research papers and research results.
Sisältö:
Empirical research methods for software engineering: experiments, case studies, surveys, systematic literature reviews and replications in software engineering. Research topics in empirical software engineering.
Järjestämistapa:
Face-to-face teaching
Toteutustavat:
Lectures and seminars 33h, assignments and paper reading 33h, weekly study 66h.
Esitietovaatimukset:
B.Sc. or other equivalent degree
Oppimateriaali:
  - Wohlin C., Runeson P., Höst M., Ohlsson M., Regnell B., Wesslen A., Experimentation in Software Engineering, Springer, 2012,.
  - Per Runeson, Martin Host, Austen Rainer, Bjorn Regnell: Case Study Research in Software Engineering: Guidelines and Examples, Wiley, 2012.

Suoritustavat ja arviointikriteerit:
Active and regular attendance (mandatory) to lectures and seminars.
Arviointiasteikko:
The course unit utilizes a numerical grading scale 1-5. In the numerical scale zero stands for a fail

Vastuuhenkilö:
Burak Turhan
Lisätiedot:
It is not possible to complete the course remotely or with self-study options.

815312A: Software Production and Maintenance, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Aineopinnot
Laji: Opintojakso
Arvostelu: 1 - 5, hyv, hyl

Opettajat: Saukkonen, Samuli

Opintokohteen kielet: englanti

Laajuus:
5 ECTS credits/133 hours of work
Ajoitus:
1 st year of Master's and GS ^{3}D studies, spring semester, period 3
Osaamistavoitteet:

After completing the course, the student:

- Can apply the framework of product line engineering in large scale software production;
- Can apply the maintenance process and techniques in software production.

Sisältö:
Product line engineering
1. Product line variability;
2. Domain engineering;
3. Application engineering;
4. Transition strategies and organisational issues.
Software maintenance
1. Categories of maintenance;
2. Corrective maintenance;
3. Other forms of maintenance.

Järjestämistapa:
Face-to-face teaching
Toteutustavat:
Lectures 20h, study group working and weekly discussion sessions with the teacher on 8 assignments, together with report writing, 113h.
Esitietovaatimukset:
 Basic knowledge of software engineering and software architectures.
Oppimateriaali:
- Pohl, K., Böckle, G., van der Linden, F. Software Product Line Engineering. Foundations, Principles, and Techniques, Springer-Verlag, 2005; chapters 1-5, 10, 15, 19-20.
- Chastek G.J., Donohoe P., McGregor J.D., Formulation of a Production Strategy for a Software Product Line, Technical Note CMU/SEI-2009-TN-025, Carnegie Mellon, 2009
- Gopalaswamy, R., Ramesh, B., Software maintenance: effective practices for geographically distributed environments, Tata McGraw-Hill, 2006 - Computers - 456 pages; chapters 1-6.

Suoritustavat ja arviointikriteerit:
 Active participation: 8 weekly assignments to be assessed separately. The final grade will be the sum of all assignments. "Conventional" participation: written exam.
Arviointiasteikko:
1-5
Vastuuhenkilö:
Samuli Saukkonen

815311A: Software Quality and Testing, 5 op

Voimassaolo: 01.08.2011 -

Opiskelumuoto: Aineopinnot

Laji: Opintojakso

Arvostelu: 1 - 5, hyv, hyl

Opettajat: Burak Turhan

Opintokohteen kielet: englanti

Leikkaavuudet:

ay815311A   Software Quality and Testing (OPEN UNI)   5.0 op

Laajuus:
5 ECTS credits/134 hours of work

Opetuskieli:
English
Ajoitus:
1 st year of Master's studies, autumn semester, period 1
Osaamistavoitteet:
The student understands different views on software quality and the role of reviews, inspection and testing as a part of software engineering and defect removal techniques. The student can conduct the review as part of review team and use an appropriate supporting tool. The student knows testing levels, strategies and techniques, can create test cases and conduct unit testing with appropriate testing tools. The student knows the possibilities of test driven development, test automation and models for reviewing.
Sisältö:
Software quality and quality assurance. Software reviews and inspection. Fundamental concepts of software testing. Software testing techniques. Test-driven development. Test automation.
Järjestämistapa:
Face-to-face teaching
Toteutustavat:
Lectures 32h, study group working 24h, paper reading 24h, exercises 24h, report writing 30 h
Kohderyhmä:

Esitietovaatimukset:
Basic knowledge of software engineering, knowledge of Java programming language.
Yhteydet muihin opintojaksoihin:

Oppimateriaali:
To be announced during the course implementation but initially planned to be:
• Pezze M.,Young M., "Software Testing and Analysis: Process, Principles and Tech-niques", John Wiley&Sons, 2008
• A. P. Mathur, "Foundations of Software Testing", Prentice Hall, 2008
• Paul Ammann, Jeff Offutt, "Introduction to Software Testing", Cambridge University Press, 2008
• Kent Beck, "Test-Driven Development by Example", Addison-Wesley, 2002
• Lasse Koskela, "Test Driven: Practical TDD and Acceptance TDD for Java Devel-opers", Manning Publications, 2007
• Galin D., "Software Quality Assurance: From theory to implementation", Addison-Wesley, 2004
Suoritustavat ja arviointikriteerit:
Report and exercise evaluation, active and regular attendance to lectures and exercises.
Lue lisää opintosuoritusten arvostelusta yliopiston verkkosivulta.
Arviointiasteikko:
1–5
Vastuuhenkilö:
Burak Turhan
Työelämäyhteistyö:
No

817603S: System Design Methods for Information Systems, 5 op

Voimassaolo: 01.08.2011 -
Opiskelumuoto: Syventävät opinnot
Laji: Opintojakso
Arvostelu: 1 - 5, hyv, hyl
Opettajat: Li Zhao
Opintokohteen kielet: englanti

Laajuus:
5 credits/134 hours of work

Opetuskieli:
English
Ajoitus:

1 st year of Master's Studies, autumn semester, period1.

Osaamistavoitteet:
Objective: The objective of the course is to widen students' understanding of methodologies and techniques for information systems development (ISD) and provide students with skills in using the variety of techniques.

Learning Outcomes: After the course the student understands the complexity of business, organizational, technical, and human aspects that affect ISD and the selection of methods in ISD. The student also understands the defects of traditional waterfall model and how other methods aim to answer to these defects and to other challenges in ISD. In particular, with socio-technical methods (e.g., SSM, ETHICS) and their techniques the student is able to re-plan and develop the sub-systems (automated and non-automated) of organization into a coherent whole and to take into account job satisfaction issues in addition to efficiency demands in ISD and in planning workflows in organization. The student is also able to assess and give arguments which method is suitable for an ISD project in an organization.

Sisältö:
What is information systems development (ISD), waterfall method, socio-technical methods like SSM and ETHICS, miscellaneous methods or frameworks like evolutionary approach, prototyping, rapid application development, Agile development, XP, business process re-engineering, process innovation, stakeholders analysis, and critical success factors, as well as how to select ISD methods.

Järjestämistapa:
Face-to-face teaching

Toteutustavat:
Lectures 20h, exercises 24h, homework 30h, essay 30h, examination 30h.

Kohderyhmä:

Esitietovaatimukset:
Bachelor studies recommended

Yhteydet muihin opintojaksoihin:

Oppimateriaali:
Avison, D., Fitzgerald, G. (2006) Information Systems Development, methodologies, techniques & tools. Fourth Edition. London: McGraw-Hill.
Research articles (to be announced during the course implementation).

Suoritustavat ja arviointikriteerit:
Exercises, assignments, essay, and examination.

Arviointiasteikko:
1-5

Vastuuhenkilö:
Li Zhao

Työelämäyhteistyö:
No

811380A: Tietokantojen perusteet, 7 op

Opiskelumuoto: Aineopinnot

Laji: Opintojakso

Arvostelu: 1 - 5, hyv, hyl

Opettajat: Iisakka, Juha Veikko

Opintokohteen kielet: suomi

Leikkaavuudet:

811318A	Johdatus tiedonhallintaan	9.0 op
811318A-02	Johdatus tiedonhallintaan, luennon tentti	0.0 op
811318A-01	Johdatus tiedonhallintaan, harjoitustyö	0.0 op

Ei opintojaksokuvauksia.