Opasraportti

ITEE - Information Processing Science DP (2019 - 2020)

Tutkintorakenteet

Degree Programme in Information Processing Science, Master's Level Studies (120 ECTS) McS

Tutkintorakenteen tila: published

Lukuvuosi: 2019-20

Lukuvuoden alkamispäivämäärä: 01.08.2019

Common Studies (55 op)

813607S: IPS (TOL), Maturity Test for Master's Degree, 0 op
813613S: Master's Thesis, 30 op
813627S: Master's Thesis Seminar, 2 op
811371A: Preparatory Course for MSc Studies, 5 op
817609S: Project Seminar, 3 op
813621S: Research Methods, 5 op
817612S: Research and Development Project, 10 op

Orientation Studies: Choose one orientation (30 op)

For the master's studies, a student should choose either information systems or software engineering as his/her study orientation. The choice will be made at the end of the bachelor studies or at the latest at the beginning of the master's studies, by defining it explicitly as part of the personal study plan.

Software Engineering Orientation

811602S: Advanced Software Quality and Security, 5 op
811373A: Professional Software Engineering Processes and Human Factors, 5 op
811372A: Software Development, Maintenance and Operations, 5 op
811603S: Software Platforms and Ecosystems, 5 op
811604S: Software for Intelligent Systems and Artificial Intelligence (AI), 5 op
811605S: Software-Defined Products, Systems and Services, 5 op

Information Systems Orientation

813626S: Emerging Technologies and Issues, 5 op
812351A: Enterprise Systems, 5 op
817604S: ICT and Organizational Change, 5 op
813623S: Information Security Policy and Management in Organisations, 5 op

812331A: Interaction Design, 5 op
817603S: System Design Methods for Information Systems, 5 op

Specialisation Studies: Select at least one specialisation (30 op)

Optional studies must be at least 30 ECTS credit points. Optional courses can be chosen either in the advanced (Advanced Module) supply or the second specialisation option compulsory courses, or both. Also a minor, or carried out elsewhere in higher education approved elective courses.

Software Engineering Specialisation

811606S: Next Generation Software Engineering, 5 op
815663S: Software Engineering Research, 5 op

Human-Centered Design and User Experience Specialisation

812650S: Advanced Topics in Digital Cultures and Design, 5 op
812671S: User Experience (UX) and Usability Evaluation, 5 op

Persuasive Design Specialisation

812651S: ICT and Behaviour Change, 5 op
811607S: Persuasive Systems Design, 5 op

Optional studies (including possible Minor Subject) (25 op)

812649S: Advanced Research Methods, 5 op
811330A: Project management, 5 op
816630S: Scientific paper writing, 1 - 3 op
811610S: Special Course in Information Processing Science, 5 - 10 op
814601S: Work Experience in ICT responsibilities, 5 op

Master's Degree Programme in Software, Systems and Service Development (GS3D) (120 ECTS)

Tutkintorakenteen tila: published

Lukuvuosi: 2019-20

Lukuvuoden alkamispäivämäärä: 01.08.2019

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811371A: Preparatory Course for MSc Studies, 5 op
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817612S: Research and Development Project, 10 op

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811603S: Software Platforms and Ecosystems, 5 op
811604S: Software for Intelligent Systems and Artificial Intelligence (AI), 5 op
811605S: Software-Defined Products, Systems and Services, 5 op

Information Systems Orientation

813626S: Emerging Technologies and Issues, 5 op
812351A: Enterprise Systems, 5 op
817604S: ICT and Organizational Change, 5 op
813623S: Information Security Policy and Management in Organisations, 5 op
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811330A: Project management, 5 op
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811610S: Special Course in Information Processing Science, 5 - 10 op
814601S: Work Experience in ICT responsibilities, 5 op

Degree Programme in Information Processing Science, Bachelor Level Studies 2019-2020, LuK

Tutkintorakenteen tila: archived

Lukuvuosi: 2019-20

Lukuvuoden alkamispäivämäärä: 01.08.2019

General and Language Studies (15 op)

902165Y: English Communication for Information Processing, Oral Skills, 3 op
902164Y: English Communication for Information Processing, Reading for Academic Purposes, 2 op
030005P: Information Skills, 1 op
900105Y: Launch your career through communication, 5 op
810020Y: Orientation Studies, 2 op
901049Y: Second Official Language (Swedish), Oral Skills, 1 op
901048Y: Second Official Language (Swedish), Written Skills, 1 op

Introduction Module (20 op)

811102P: Devices and Data Networks, 5 op
811168P: Information Security, 5 op
810136P: Introduction to Information Processing Sciences, 5 op
811174P: Introduction to Software Business, 5 op

Software Development Module (30 op)

811319A: Data Modeling and Design, 5 op
811103P: Introduction to Software Engineering, 5 op
811391A: Requirements Engineering, 5 op
815345A: Software Architectures, 5 op
811301A: Software Modeling and Design, 5 op
811306A: Software Quality, 5 op

Programming Module (30 op)

811312A: Data Structures and Algorithms, 5 op
811325A: Databases, 5 op
811104P: Programming 1, 5 op
811322A: Programming 2, 5 op
811367A: Programming 3, 5 op
811368A: Programming 4, 5 op

Systems, Services and Human Aspects Module (30 op)

811379A: Basics of Human Computer Interaction, 5 op
813316A: Business Process Modeling, 5 op
811177P: Humans as Users and Developers of Information Technology, 5 op
812332A: Information Systems Design, 5 op
812305A: Information Systems in Organisations, 5 op
811167P: Introduction to Information Systems Design, 5 op

Capstone Module (25 op)

813307A: IPS (TOL), Maturity Test for Bachelor 's Degree, 0 op
811383A: Bachelor Thesis, 7 op
811370A: Bachelor's Seminar, 3 op
811393A: Introduction to research work, 5 op
811366A: Project Work, 10 op

Optional Studies (including possible Minor Subject and Exchance Period) (30 op)

Optional Studies (including possible Minor
Subject and Exchance Period)

Opintojaksojen kuvaukset

Tutkintorakenteisiin kuuluvien opintokohteiden kuvaukset

813607S: IPS (TOL), Maturity Test for Master's Degree, 0 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

813613S: Master's Thesis, 30 op

Voimassaolo: 01.08.2011 -
Opiskelumuoto: Advanced Studies
Laji: Diploma thesis
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: English

Ei opintojaksokuvauksia.

813627S: Master's Thesis Seminar, 2 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Henrik Hedberg
Opintokohteen kielet: English

Required proficiency level:

ECTS Credits:
2 ECTS credits / 53 hours of work (1 ECTS / 27 hours of work for selected students)
Language of instruction:
English
Timing:
The course is held throughout the study year, in all periods. It is recommended to start the course during the 1st study year of the Master's studies, before Master's Thesis.
Learning outcomes:
By completing this course the student can
- plan a scientific study,
- present own research in various stages, and
- give feedback of peers' research plans and results.
Contents:

The course consists of three phases following the structure and progress of a Master's Thesis work:
* previous research and initial research methods (research plan),
* data gathering and analysis, as well as
* discussions and conclusions (thesis).
In each phase, a student is required to participate first as a peer reviewer, and then present his/her own research.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Planning and presenting the student's own research and giving feedback of peers' plans and results 53 h (27 h for selected students receiving 2 cr)
Target group:
 MSc students
Recommended optional programme components:
813613S Master's Thesis.
Recommended or required reading:
 Guidelines to producing a Master's thesis.
Assessment methods and criteria:
Active participation in at least nine (six for selected students) seminar sessions. One session lasts about three hours and they are arranged during the semesters according to the plan published on the website.
Grading:
Pass or fail.
Person responsible:
Henrik Hedberg

811371A: Preparatory Course for MSc Studies, 5 op

Voimassaolo: 01.01.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

ECTS Credits:
2 ECTS credits / 53 hours of work
Language of instruction:
English
Timing:
The course is held in the autumn semester, during period 1. It is recommended to complete the course in the 1st autumn semester of the Master's studies.
Learning outcomes:
After completing the course, the student is able to participate in courses requiring basic knowledge of project work. The student is able to apply the basic concepts of project work, act in different roles in projects and is able to describe the significance of the different project outcomes, such as project plan, mid-reports and final reports. The student is able to define the principles of project coordination and communication with the project interest groups. Additionally, the student is able to consider the principles of referenced and scientific writing. The student will be familiar with APA referencing.
Contents:
The course consists of two parts: project management and scientific writing. In the project part we focus on the people, process and tools of projects in the information technology field. Course covers the basic principles of project management, planning, coordination and communication within the project as well as outside the project. Course presents the different outcomes of the project, related to internal and external communication – project plans, mid-report, final reports and other project specific outcomes, as well as internal reports, memos and non-written communication and coordination techniques in a project. The latter include unofficial and official meetings held within the project as well as among the external interest groups of the project (for example, customers and the project steering group). In the scientific writing part, the course presents the basics of written referenced and scientific communication – how to use references, how to acknowledge work of others, how to format an article and what is plagiarization and how to avoid plagiarization.
Mode of delivery:
Blended teaching
Learning activities and teaching methods:

Lectures and exercises 20 h, independent learning methods 34 h
Target group:
Msc students
Prerequisites and co-requisites:
The required prerequisite is that the student has completed BSc degree
Recommended optional programme components:
Especially recommended to take before Master's level project courses.
Recommended or required reading:
All material is provided during the course.
Assessment methods and criteria:
Active participation in the lectures and exercises; learning diary.
Grading:
Pass or fail
Person responsible:
Arto Lanamäki
Other information:
HUOMIO; Preparatory on ollut aiemmin 2 opintopistettä, mutta 2019 syksyn toteutuksessa se on viisi (5) opintopistettä. Kurssi on tästä lähtien kaikille (myös suomalaiset / AMK / toinen tieteenala) ulkopuolelta tuleville pakollinen.

817609S: Project Seminar, 3 op

Voimassaolo: 01.08.2013 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Tonja Molin-Juustila

Opintokohteen kielet: English

ECTS Credits:
3 ECTS credits / 80 hours of work.
Language of instruction:
English.
Timing:
The timing of the course is dependent on the Research and Development Project course and must be taken at the same time with it. The course is held in the spring semester, during period 4. It is recommended to complete the course in the 2nd spring semester of the Master's studies.
Learning outcomes:
After completing the course, the students will be able to:
* demonstrate abilities to gain academic expertise in some challenging topic area of an ICT project,
* search research articles and literature on a ICT topic (review),
* apply research articles and other new knowledge like an academic expert in a selected topic of a project ("Research and Development Project" course),
* analyse and report practical experiences gained during the project as experience-based new data on the topic to peer students,
* 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, as well as
* act as reflective, independent academic expert in ICT project.
Contents:
Starting lecture, independent analysis and reporting of the expertise on the selected project topic and an expert seminar (2 full days) with the presentations of each topic.
Mode of delivery:
Blended teaching.
Learning activities and teaching methods:
Attendance at the starting lecture (4 h) and the expert seminar (2 full days) is mandatory. Independently writing the seminar paper and preparing the seminar presentation (abt. 60 h).
Target group:
MSc students.

Prerequisites and co-requisites:
It is required that the student is taking the Research and Development Project at the same time.
Recommended or required reading:
Research articles and materials are to be independently collected and studied by the students.
Assessment methods and criteria:
Expertise in the topic area will be reported on the seminar paper. Seminar presentation will also be evaluated. Assessment criteria in detail will be given at the starting lecture and in the web-based learning environment for the course.

Grading:
Numerical scale 1-5 or fail.
Person responsible:
Tonja Molin-Juustila
Working life cooperation:
Seminar topics are related to the Master's students projects all of which are authentic project works in unique R&D project assignments from real customers (univerisity, companies and organizations like schools, library etc.).

Other information:
Enrollment by contacting the responsible person of the course and outlining a draft of the seminar paper before the starting lecture of the course, i.e. until the end of the period 3.

813621S: Research Methods, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Leikkaavuudet:

521146S	Research Methods in Computer Science	5.0 op

ECTS Credits:
5 ECTS credits / 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 in the 1st spring semester of the Master's studies.
Learning outcomes:
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 processing sciences. The student is able to identify and describe the main research approaches and methods in information processing sciences, 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.
Contents:
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.
Mode of delivery:
Face-to-face teaching, lecture videos.
Learning activities and teaching methods:
Lectures 40 h, exercises 30 h and individual work 65 h. Learning diary is written about the lectures and exercises. Exercises include group work.
Target group:
MSc students
Prerequisites and co-requisites:
The required prerequisite is that the student has completed BSc degree as well as has basic knowledge on Software Engineering and Information Systems

Recommended or required reading:
Lecture slides and specified literature.
Assessment methods and criteria:
Accepted learning diary, active participation
Grading:
Pass or fail.
Person responsible:
Arto Lanamäki

817612S: Research and Development Project, 10 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Tonja Molin-Juustila

Opintokohteen kielet: English

ECTS Credits:
10 ECTS credits / 267 hours of work.
Language of instruction:
English
Timing:
The course is held in the autumn semester, during periods 1 and 2. It is recommended to complete the course in the 2nd autumn semester.
Learning outcomes:
After completing the course, the students should demonstrate their abilities to work on a challenging ICT project. Students will learn to acquire and apply professional expertise in the topic of the project. Students will also demonstrate their skills to conduct an ICT project in a professional way. By completing this course, students are able to act as independent professional members of an ICT project and have advanced professionalism in project work and management. The topics for the course can be anything from the ICT field. As a professional expert conducting a successful project in a managed way, the student is able to: collectively produce, monitor and update the plan of the project (project with fixed time and human resources); search up to date information on the subject matter of the project in order to build professional expertise on the topic and apply this in the project work; build professional working knowledge and skills focused in the subject area of the project (e.g. software development, user experience evaluation); develop analytical and creative skills for successful completion of the project; monitor and communicate the status (time & human resources used) of the project in real time within the project team (weekly/daily meetings); use systematic means (e.g. ICT tools) to enable communication and transparency of the project work; develop skills to communicate with the customer in a professional context; manage a successful project review with the steering group/project team organization; report and explain the status (progress, results and future estimations of the project) to the steering group to support the decision making and problem resolution concerning the project's future; work as responsible project team member; as an expert and/or project manager; work as a project team member with people from different technical and/or cultural backgrounds; produce a realistic outcome in relation to the project time and human resources (ok, good, excellent); reflect the relationship between the process model(s) selected for the project (waterfall, evolutionary, agile etc.) and the management practices followed in the project. management practices followed in the project.
Contents:
Starting lecture, where the steps of carrying out the course will be described together with other important information. Allocation of the project teams will immediately follow the starting lecture. The project work will take two periods (one semester).
Mode of delivery:
Blended teaching.
Learning activities and teaching methods:
Project work 260 h per student. Working hours reported during the project. Attendance at the starting lecture (4 h) is mandatory. Praparing a project portfolio in the end (3 h).
Target group:
MSc students.
Prerequisites and co-requisites:
Mandatory: B.Sc. degree or other equivalent degree. Students enrolling directly to the Master's programme should take the "Preparatory course for MSc studies (811392A)" course first (see the timetable for the autumn semester,

period 1) or otherwise master the basics of project work and management as in Pressman, R.S. Software Engineering: A Practitioner's Approach, the chapters related to project management. The expertise gained during this project course will be further elaborated during the "Project Seminar (817609S)" course, which will immediately follow this course during spring semester, period 3.

Recommended or required reading:
Unique project material provided by the customer of the project and / or material to be collected and studied by the project team.

Assessment methods and criteria:
Skills will be reported by a project portfolio. Details about the assessment criteria will be given at the starting lecture and they will also be available in the web-based learning environment.

Grading:
Numerical scale 1-5 or fail.

Person responsible:
Tonja Molin-Juustila

Working life cooperation:
Learning by doing, i.e. managing authentic, resource-limited project work and integrating the practices of an academic expert into the unique project assignment.

Other information:
Enrollment for the course is well beforehand, i.e. until the end of July between 1st and 2nd study year.

811602S: Advanced Software Quality and Security, 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Mika Mäntylä
Opintokohteen kielet: English

Ei opintojaksokuvauksia.

811373A: Professional Software Engineering Processes and Human Factors, 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: English

Ei opintojaksokuvauksia.

811372A: Software Development, Maintenance and Operations, 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Mika Mäntylä
Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work
Language of instruction:

English
Timing:
The course is held in the autumn semester, during period 1. It is recommended to complete the course at the 1st autumn semester of the Master's studies.
Learning outcomes:
After completing the course, the student is able to:
- explain and utilize theories of software evolution
- utilize the processes, techniques and tools for software deployment, and operations
- utilize the processes, techniques and tools for software maintenance
- utilize the processes, techniques and tools to better understand and maintain large code bases
Contents:
Software Evolution. Principles and practices of software maitenance. Software operations and Devops. Software Product line engineering: Commonality and Variation.
Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Lectures 28 h, exercises 24 h, homework 60 h, independent study 31 h
Target group:
MSc students
Prerequisites and co-requisites:
Basics on software engineering. Basic programming skills.
Recommended or required reading:
Software Evolution and Maintenance, Priyadarshi Tripathy, Kshirasagar Naik, ISBN: 978-0-470-60341-3, 416 pages, January 2015. TODO Maëlick add the DevOps book we are currently using
DevOps: A Software Architect's Perspective (SEI Series in Software Engineering), Len Bass, Ingo Weber, Lining Zhu (ISBN: 978-0134049847), May 2015
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. Software Evolution and Maintenance, Priyadarshi Tripathy, Kshirasagar Naik, ISBN: 978-0-470-60341-3, 416 pages, January 2015
Assessment methods and criteria:
Assignments and exercises
Grading:
Numerical scale 1-5 or fail
Person responsible:
Mika Mäntylä

811603S: Software Platforms and Ecosystems, 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Minna Isomursu, Juustila, Antti Juhani
Opintokohteen kielet: English

Ei opintojaksokuvauksia.

811604S: Software for Intelligent Systems and Artificial Intelligence (AI), 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Minna Isomursu

Opintokohteen kielet: English

Ei opintojaksokuvauksia.

811605S: Software-Defined Products, Systems and Services, 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Tero Päivärinta
Opintokohteen kielet: English

Ei opintojaksokuvauksia.

813626S: Emerging Technologies and Issues, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Piiastiina Tikka, Oinas-Kukkonen, Harri Ilmari
Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English
Timing:
The course is held in the autumn semester, during period 2. It is recommended to complete the course at the 1st spring semester of the Master's studies.
Learning outcomes:
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-based and other information 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.
Contents:
* A shift in thinking about the web and emerging technologies
* How the social web is transforming businesses, software design, our perception of people as well as skills required of us
* How to accelerate innovation creation through web-based and other emerging technologies: Ecosystem thinking, strategies, core business values
* Transformation of the social web into humanized web
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 24 h, exercises 8 h, reflective personal exercises 21 h, independent work and exam (required reading) 80 h.

Target group:
 MSc students

Recommended optional programme components:

Recommended or required reading:
Oinas-Kukkonen H. & Oinas-Kukkonen H.: Humanizing the Web: Change and Social Innovation. Palgrave Macmillan, Basingstoke, UK, 2013 (required reading).

Assessment methods and criteria:
Exam.

Grading:
Numerical scale 1-5 or fail.
Person responsible:
Harri Oinas-Kukkonen

812351A: Enterprise Systems, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English
Timing:
 E-exam
Learning outcomes:
After completing the course, the student understands Enterprise Resource Planning (ERP), Supply Chain Management (SCM), Inventory
Management, CRM, Knowledge Management, Online Business systems, Marketing systems, etc., and also understands the intellectual capital and
organizational competitive advantage. The student should be able to describe how processes integrate the internal functions of the firm and allow the firm to interact with its environment, and be able to recognize, model, and improve processes to help the firm achieve efficiency and effectiveness.
Contents:
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)
Mode of delivery:
 E-exam
Target group:
 MSc students
Prerequisites and co-requisites:
Understanding of the business process modeling helps.

Recommended optional programme components:

Assessment methods and criteria:

Grading:
Numerical scale 1-5 or fail.
Person responsible:
Michael Oduor
Working life cooperation:
No

817604S: ICT and Organizational Change, 5 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Karin Väyrynen

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English
Timing:
The course is held in the spring semester, during period 3. It is recommended to complete the course at the 2nd spring semester of the Master's studies.
Learning outcomes:
After completing the course, the student is able to:
* distinquish various roles of information and communication technology (ICT) in change of organization and its context, and
* analyze the role of ICT in relation with change taking place in an organization.
Contents:
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. The role of power, trust and control in the change process is discussed. The different aspects of change agents are presented and analysed. Students familiarize themselves with 7 organizational theories.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures 28 h, individual work 105 h (for self-studying for weekly in-class exams - or optionally a traditional exam), and a review and analysis of selected course materials and writing a case analysis).
Target group:
MSc students
Prerequisites and co-requisites:
Recommended to take Emerging Technologies and Issues before this course.
Recommended optional programme components:

Recommended or required reading:
A list of research articles will be provided for the lectures and assignments.
Assessment methods and criteria:
Week exams and weekly case analysis (or traditional exam at end of the course), course assignment (literature review, case analysis).
Grading:
Numerical scale 1-5 or fail.
Person responsible:
Karin Väyrynen

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

Voimassaolo: 01.08.1950 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English
Timing:
The course is held in the spring semester, during period 4. It is recommended to complete the course at the 2nd spring semester of the Master's studies.
Learning outcomes:
After completing the course, the student is able to:
* develop BCM (Business Continuity Management) and SA (Systems Availability) strategy;
* develop organization specific information security policies in organizations;
* conduct Information Security (and risk) Analysis;
* conduct Information Security Audits;
* understand information security standards, regulations, and policies;
* improve employees' compliance with the information security procedures through training, campaigning and other means;
* describe certifications related to information security (such as ISO27001); as well as
* describe public-key infrastructure (PKI), Digital signature, & Certification authority (CA).
Contents:
* Business Continuity Management (BCM) and Systems Availability (SA)
* Information Security Life Cycle
* Conduct Information Security (and risk) Analysis;
* Information security standards, regulations, and policies
* Information security investment management
* Insider threats in information security management
* Security Audits (Active Security Assessment)
* Information Security Certification (ISO27001) & Certification authority (CA)
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures (24 h), exercises (23 h), homework (30 h), essay (20 h), examination (36 h).
Target group:
 MSc students
Prerequisites and co-requisites:
Understanding of information security issues, principles, techiniques, or similar knowledge, is helpful.

Recommended optional programme components:

Recommended or required reading:
Raggad, Bel G.: Information security management, Concepts and practice, CRC Press 2010, Chapters 1, 2.7. – 2.13, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, and 15.
Assessment methods and criteria:
Examination.
Grading:
Numerical scale 1-5 or fail.
Person responsible:
Nataliya Shevchuk

812331A: Interaction Design, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Netta Iivari

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English
Timing:
The course is held in the autumn semester, during period 1. It is recommended to complete the course at the 1st autumn semester of the Master's studies.
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.
Contents:
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.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures 20 h, exercises and seminar 25 h, individual and group assignments 90 h; or self-study: an opening lecture 2 h, one larger
assignment 110 h and individual tasks 21 h.
Target group:
MSc students
Prerequisites and co-requisites:
Basic knowledge on human-computer interaction with usability and user-centered design.
Recommended or required reading:
Sharp et al. (2015) Interaction Design, chapters 1-2, 4-5, 7-13 (pages 1-64, 100-157, 226-473).
Assessment methods and criteria:
Accepted assignments.

Grading:
Numerical scale 1-5 or fail.
Person responsible:
Netta Iivari
Working life cooperation:
Invited lectures, assignments.

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

Voimassaolo: 01.08.2011 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Pasi Karppinen

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:

English
Timing:
E-exam
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 information systems design (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 particular, with socio-technical methods (e.g., SSM) 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. The student is also able to assess and give arguments which method is suitable for an ISD project in an organization.
Contents:
Information Systems Strategy, Information Systems Development Life Cycle (SDLC), Information systems success, Soft Systems Methodology (SSM), Socio-Technical Approach, Evolutionary development, Agile methodologies.
Target group:
 MSc students
Prerequisites and co-requisites:
Bachelor studies recommended.
Recommended optional programme components:

Assessment methods and criteria:
E-exam
Grading:
Numerical scale 1-5 or fail.
Person responsible:
Pasi Karppinen

811606S: Next Generation Software Engineering, 5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Mika Mäntylä

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work
Language of instruction:
English
Timing:
The course is held in the spring semester, during period 4. It is recommended to complete the course at the 1st spring semester of the Master's studies.
Learning outcomes:
After completing the course, the student understands the new trends in software engineering. The student is able to perform computer supported trend mining to discover new trends of any given topic. The student is able to critically think about the trends.
Contents:
- Software engineering trends (varies)
- Automated trend mining from online databases
- Writing, arguing and discussing about the trends
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 24 h, exercises 18 h, essays 30 h, project 30 h, independent study 31 h
Target group:
MSc students
Prerequisites and co-requisites:
The required prerequisite is that the student has completed BSc degree as well as has basic knowledge on Software Engineering
Recommended or required reading:

Articles + lectures
Assessment methods and criteria:
Active lecture participation, exercises, assignments, essays
Grading:
Numeerinen asteikko 1-5 tai hylätty
Person responsible:
Mika Mäntylä

815663S: Software Engineering Research, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Oivo, Markku Tapani

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English
Timing:
The course is held in the spring semester, during period 3. It is recommended to complete the course in the 1st spring semester of the Master's studies.
Learning outcomes:
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.
Contents:
State of the art research methods and topics in software engineering.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures and seminars 28 h, exercises / assignments 78 h, weekly study 42 h.
Target group:
MSc students
Prerequisites and co-requisites:
The required prerequisite is that the student has completed BSc degree as well as has basic knowledge on Software Engineering
Recommended or required reading:

Assessment methods and criteria:
Active participation in lectures and attendance. Final grade is composed of attendance, assignments and term paper. No remote participation or distance learning.
Grading:
Numerical scale 1-5 or fail.

Person responsible:
Markku Oivo

812650S: Advanced Topics in Digital Cultures and Design, 5 op

Voimassaolo: 01.08.2011 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Dorina Rajanen

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work
Language of instruction:
  English
Timing:
The course is held in the spring semester, during period 3. It is recommended to complete the course at the 1st spring semester of the Master's studies.

Learning outcomes:
After completing the course, the student is able to:
* describe state-of-the-art research results related to digital cultures and design;
* understand the strengths and limitations of various methods and frameworks used;
* show competence in critiquing research articles published in some of the leading academic journals and conference proceedings;
* show competence in critical thinking, and analysis and synthesis of academic sources;
* show competence in verbally presenting arguments in an academic fashion;
* write a literature review on a relevant research topic;
* acquire knowledge and critically read relevant research articles on digital culture and design related research topics; as well as
* describe ethical aspects involved with work related to digital cultures and design.

Contents:
The content of the course will change with time. The initial set of current themes include: User experience as an object of analysis and design, Participatory design, end-user-design and living labs, Information ecologies and infrastructures, Design for all, Iterative and incremental design and development, The impact of human-centred design, Current development contexts such as: Open source software development, Game development, Development of ICT for children, Ubiquitous computing

Mode of delivery:
Face-to-face teaching.

Learning activities and teaching methods:
Lectures 20 h, assignments 107 h, seminars 6 h.

Target group:
  MSc students
Prerequisites and co-requisites:
The required prerequisite is that the student has completed BSc degree as well as has basic knowledge on Software Engineering and Information Systems

Recommended optional programme components:

Recommended or required reading:
Selected scientific articles.
Assessment methods and criteria:
Assignments

Grading:
  Numerical scale 1-5 or fail
Person responsible:
  Mikko Rajanen

812671S: User Experience (UX) and Usability Evaluation, 5 op

Voimassaolo: 01.08.2011 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Mikko Rajanen

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work.

Language of instruction:
English
Timing:
The course is held in the spring semester, during periods 3 and 4.

Learning outcomes:
Students can: Design and follow through a UX/usability evaluation process; Design test scenarios and tasks; Select participants; Plan and follow through the evaluation in laboratory or in the field; Analyse and report the findings from the evaluations.
Contents:
Basic terms and types of UX and usability testing, usability and UX tests process, usability and UX test tasks and scenarios, test subjects, following through a usability and UX tests, analysing usability and UX test material, reporting the findings from usability and UX tests.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 24h, assignment tutoring 13h, assignment 90h, seminar 7h.
Target group:
 MSc students

Prerequisites and co-requisites:
The required prerequisite is that the student has completed BSc degree as well as has basic knowledge on Software Engineering and Information Systems
Recommended optional programme components:

Recommended or required reading:
"Dumas, J. S. & Redish, J. C. (1993): A Practical Guide to Usability Testing. Ablex Publishing Corporation. Rubin, J. (1994): Handbook of
Usability Testing: How to Plan, Design, and Conduct Effective Tests. Chichester: John Wiley & Sons, Inc."
Assessment methods and criteria:

Assessment of the course is based on the learning outcomes of the course based on the written usability test plan, supervised usability tests, written usability test report and oral seminar presentation
Grading:
 Pass or fail
Person responsible:
Mikko Rajanen
Working life cooperation:
Students learn how to collaborate with real customers
Other information:

812651S: ICT and Behaviour Change, 5 op

Voimassaolo: 01.08.2011 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Piiastiina Tikka

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work

Language of instruction:
English

Timing:
The course is held in the spring semester, during period 4. It is recommended to complete the course at the 1st spring semester of the Master's studies.

Learning outcomes:
After completing the course, the student is able to:
* grasp the core theories of behaviour change and how they are/can be applied in goal-oriented behaviour change,
* understand ethical concerns inherent in behaviour change and persuasive systems, and
* understand the possible negative effects of ICT use not only as regards persuasive systems, but also with social media and other use.
Contents:
The focus of the course is role of ICT in supporting people with their endeavours to change their habits or lifestyles. The course introduces the main theories and models regarding behaviour change in order to provide students with a solid base for understanding how behaviour change can also work through ICT. The course also introduces some of the more problematic topics in ICT and behaviour, such as the dark side of ICT use and ethics of persuasion.
The course aims at providing existing knowledge and theoretical starting points to the development and use of persuasive systems. With such base, the student will be able to review the field from a broad perspective with the view to applying appropriate theories and approaches when analysing or developing persuasive systems.
Mode of delivery:
Face-to-face teaching

Learning activities and teaching methods:
Lectures 14 h, seminars 20 h, individual and group assignments 100 h; or in self-study mode opening lecture 2 h, assignments 132 h

Target group:
MSc students

Prerequisites and co-requisites:
The required prerequisite is that the student has completed BSc degree as well as has basic knowledge on Software Engineering and Information Systems
Recommended optional programme components:
The MSc courses "Persuasive Systems Design" and "Emerging Technologies and Issues" would be helpful, but is not required.

Recommended or required reading:
Research articles to be announced more specifcally during the course implementation

Assessment methods and criteria:
Research articles to be announced more specifcally during the course implementation

Grading:
Numerical scale 1-5 or fail

Person responsible:
Harri Oinas-Kukkonen

Working life cooperation:
-

811607S: Persuasive Systems Design, 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Oinas-Kukkonen, Harri Ilmari

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work
Language of instruction:
English
Timing:
The course is held in the spring semester, during period 3. It is recommended to complete the course at the 1st spring semester of the Master's studies.
Learning outcomes:
As learning outcomes of this course, the students will be better equipped to
• Analyze methods and techniques employed by persuasive systems
• Apply such methods in an ethical manner as design guidelines for developing persuasive ICT solutions
• Apply gamification as persuasive design principles for serious games and other similar solutions.
Contents:
Attitudinal theories from social psychology have been quite extensively applied to the study of user intentions and behaviour. These theories have been developed mostly for predicting user acceptance of information technology rather than for providing systematic analysis and design methods for developing software solutions that aim at attitude or behaviour change. At the same time a growing number of information technology systems and services are being developed for these purposes.
This course will focus on persuasive technology. It will address the process of designing and evaluating persuasive systems, the types of content and software functionality in such systems, the underlying assumptions behind these, methods for analysing the persuasion context, and principles for persuasive system design. The course also looks into the methods and techniques of gamifying persuasive content.
The course is primarily geared towards analysis and design tasks using the Persuasive Systems Design model as the main approach. Gamification forms another segment of the course, introducing topics in the role of games and game-like experiences in supporting persuasion.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 20 h, readings before lectures 14 h, personal reflective exercises 14 h, supervisory meetings 14 h, project assignment 71 h.
Target group:
MSc students
Prerequisites and co-requisites:
The required prerequisite is that the student has completed BSc degree as well as has basic knowledge on Software Engineering and Information Systems
Recommended optional programme components:
This course offers good groundwork for ICT and Behaviour Change course, but is not compulsory.
Recommended or required reading:
Research articles to be announced more specifcally during the course implementation
Assessment methods and criteria:
Participation in lectures, personal reflection reports, course assignments.
Grading:
Numerical scale 1-5 or fail
Person responsible:
Harri Oinas-Kukkonen

812649S: Advanced Research Methods, 5 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Faculty of Information Technology and Electrical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Netta Iivari

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 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 2nd spring semester of the Master's studies.
Learning outcomes:
After completing the course, the student is able to:
* describe the background, philosophical assumptions and guiding principles of quantitative, qualitative and design science research, their role in information systems and software engineering research and the variety involved in them;
* evaluate the strengths and weaknesses of the research approaches and methods in relation to her or his research topic as well as select the suitable approach and methods;
* use more advanced data analysis methods;
* prepare a research plan for a research project, including formulating research problems, specifying research designs and choosing appropriate data collection and analysis methods for solving the problems;
* describe state-of-the-art ways of reporting the results;
* evaluate the methodological quality of her or his research and research publications more generally; as well as
* search more information on research methods from scientific literature as well as to adapt and refine methods for her or his research problems and interests.
Contents:
Introduction to qualitative, quantitative and design science research in information systems and software engineering, their scientific background,
philosophical assumptions and guiding principles, variety involved in them, relationships between the research approaches and associated frameworks, methods, processes and practices, advanced data analysis methods, reporting and evaluating research within the approaches.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 16 h, exercises 12 h, seminar 18 h, individual and group assignments 100 h
Target group:
MSc students, PhD students
Prerequisites and co-requisites:
The required prerequisite is that the learning outcomes of the following courses are accomplished: Research Methods. In addition, the student must have a preliminary thesis topic.
Recommended optional programme components:
Recommended to take before Master's thesis.
Recommended or required reading:
Selected scientific articles or research method books.
Assessment methods and criteria:
Assignments
Grading:
Pass or fail
Person responsible:
Netta Iivari

811330A: Project management, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS
Timing:

Learning outcomes:
Upon the successful completion of the course, the student is able to
* split a project into phases and tasks,
* resource and schedule the tasks,
* gather information on the progress of a project and based on it, make project related decisions,
* apply theory on project management in practice,
* recognise risks of software projects and prepare for them,
* work as a project manager, and
* communicate with stakeholders by using both written and spoken language.
Target group:
Master students
Assessment methods and criteria:
Practical work in a real-life SW project as a project manager 130h
Person responsible:
Kari Liukkunen

816630S: Scientific paper writing, 1 - 3 op

Voimassaolo: 01.08.2008 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Henrik Hedberg

Opintokohteen kielet: English

Person responsible:
Henrik Hedberg

811610S: Special Course in Information Processing Science, 5 - 10 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Minna Isomursu

Opintokohteen kielet: English

Person responsible:
Minna Isomursu

814601S: Work Experience in ICT responsibilities, 5 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Advanced Studies

Laji: Practical training

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Tonja Molin-Juustila

Opintokohteen kielet: Finnish

ECTS Credits:
3-5 ECTS credits / 2–4 months of full time work

Language of instruction:
Finnish or English.
Timing:
Timing of this course is free. Recommended to take as a summer course. The course is also suitable for the supported work placement studies. In that case, it is recommended to search for the work placement and apply for the support already at the turn of the year.
Learning outcomes:
After completing the course, the student:
- will master certain part of professional ICT work in enterprises or public organisations
- can analyse and reflect on the work experience with Information Processing Science studies
- can write an informative report on his/her work experience.

Contents:
Working from two to four months in professional ICT responsibilities that require university level studies.

Mode of delivery:
The student is responsible for making the needed arrangements for the internship: search for the work placement, negotiate job contract, prepare the support application when needed, follow the agreed labor agreement, work within the agreed responsibilities as well as study independently the needed professional skills and knowledge. In addition, the student documents his/her internship according to the course requirements.
Learning activities and teaching methods:
Search for the work placement, job contract negotiation, work within the professional ICT responsibilities and reflecting the work experience and learning by reporting; possibly also applying support, planning and weekly reporting the internship experience.
Target group:
 MSc students
Prerequisites and co-requisites:
Information Processing Science or related studies, which enable their practical application in the context of professional ICT responsibilities.
Recommended or required reading:
Studies and selected course materials related to the internship in professional ICT responsibilities.
Assessment methods and criteria:
Working in professional ICT responsibilities from two to four months. Work experience can be realized in several periods, which all are processed as independent internship periods. The work experience is proved by delivering a signed letter of reference from the employer(s). The letter of reference contains details of the internship period and the student's primary duties and responsibilities. After the internship period, experiences are reported as soon as possible. An internship report consists of description of realized work and analysis of learning outcomes in relation to the studies taken in Information Processing Science. The studies are proved by delivering an up-to-date transcript of records. Proposals to develop Information Processing Science studies are included in the report as well. Based on the internship period, student will gain 3-5 ECTS credits (2 months = 3, 3 months = 4, 4 months = 5). In addition to above, student may also document his/her personal plan and learning goals for the internship period as well as report weekly implementation status of those plans and goals. In this case, 5 ECTS credits will be gained already from 2 months' internship period. For applying the financial support, this documentation is mandatory.

Grading:
Pass/fail
Person responsible:
Tonja Molin-Juustila
Working life cooperation:
Working on professional ICT responsibilities.

Other information:
Documenting guidelines and templates are available in the course materials. Before the internship starts, the support application must be recorded in the university systems with the copy of the internship agreement. The letter of reference from the employer(s) will be recorded together with the credits.

813607S: IPS (TOL), Maturity Test for Master's Degree, 0 op

Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

813613S: Master's Thesis, 30 op

Voimassaolo: 01.08.2011 -
Opiskelumuoto: Advanced Studies
Laji: Diploma thesis
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: English

Ei opintojaksokuvauksia.

813627S: Master's Thesis Seminar, 2 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Henrik Hedberg
Opintokohteen kielet: English

Required proficiency level:

ECTS Credits:
2 ECTS credits / 53 hours of work (1 ECTS / 27 hours of work for selected students)
Language of instruction:
English
Timing:
The course is held throughout the study year, in all periods. It is recommended to start the course during the 1st study year of the Master's studies, before Master's Thesis.
Learning outcomes:
By completing this course the student can
- plan a scientific study,
- present own research in various stages, and
- give feedback of peers' research plans and results.
Contents:
The course consists of three phases following the structure and progress of a Master's Thesis work:
* previous research and initial research methods (research plan),
* data gathering and analysis, as well as
* discussions and conclusions (thesis).
In each phase, a student is required to participate first as a peer reviewer, and then present his/her own research.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Planning and presenting the student's own research and giving feedback of peers' plans and results 53 h (27 h for selected students receiving 2 cr)
Target group:
 MSc students
Recommended optional programme components:
813613S Master's Thesis.
Recommended or required reading:
 Guidelines to producing a Master's thesis.
Assessment methods and criteria:

Active participation in at least nine (six for selected students) seminar sessions. One session lasts about three hours and they are arranged during the semesters according to the plan published on the website.
Grading:
Pass or fail.
Person responsible:
Henrik Hedberg

811371A: Preparatory Course for MSc Studies, 5 op

Voimassaolo: 01.01.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

ECTS Credits:
2 ECTS credits / 53 hours of work
Language of instruction:
English
Timing:
The course is held in the autumn semester, during period 1. It is recommended to complete the course in the 1st autumn semester of the Master's studies.
Learning outcomes:
After completing the course, the student is able to participate in courses requiring basic knowledge of project work. The student is able to apply the basic concepts of project work, act in different roles in projects and is able to describe the significance of the different project outcomes, such as project plan, mid-reports and final reports. The student is able to define the principles of project coordination and communication with the project interest groups. Additionally, the student is able to consider the principles of referenced and scientific writing. The student will be familiar with APA referencing.
Contents:
The course consists of two parts: project management and scientific writing. In the project part we focus on the people, process and tools of projects in the information technology field. Course covers the basic principles of project management, planning, coordination and communication within the project as well as outside the project. Course presents the different outcomes of the project, related to internal and external communication – project plans, mid-report, final reports and other project specific outcomes, as well as internal reports, memos and non-written communication and coordination techniques in a project. The latter include unofficial and official meetings held within the project as well as among the external interest groups of the project (for example, customers and the project steering group). In the scientific writing part, the course presents the basics of written referenced and scientific communication – how to use references, how to acknowledge work of others, how to format an article and what is plagiarization and how to avoid plagiarization.
Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Lectures and exercises 20 h, independent learning methods 34 h
Target group:
Msc students
Prerequisites and co-requisites:
The required prerequisite is that the student has completed BSc degree
Recommended optional programme components:
Especially recommended to take before Master's level project courses.
Recommended or required reading:
All material is provided during the course.
Assessment methods and criteria:
Active participation in the lectures and exercises; learning diary.
Grading:
Pass or fail
Person responsible:
Arto Lanamäki
Other information:

HUOMIO; Preparatory on ollut aiemmin 2 opintopistettä, mutta 2019 syksyn toteutuksessa se on viisi (5) opintopistettä. Kurssi on tästä lähtien kaikille (myös suomalaiset / AMK / toinen tieteenala) ulkopuolelta tuleville pakollinen.

817609S: Project Seminar, 3 op

Voimassaolo: 01.08.2013 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Tonja Molin-Juustila

Opintokohteen kielet: English

ECTS Credits:
3 ECTS credits / 80 hours of work.
Language of instruction:
English.
Timing:
The timing of the course is dependent on the Research and Development Project course and must be taken at the same time with it. The course is held in the spring semester, during period 4. It is recommended to complete the course in the 2nd spring semester of the Master's studies.
Learning outcomes:
After completing the course, the students will be able to:
* demonstrate abilities to gain academic expertise in some challenging topic area of an ICT project,
* search research articles and literature on a ICT topic (review),
* apply research articles and other new knowledge like an academic expert in a selected topic of a project ("Research and Development Project" course),
* analyse and report practical experiences gained during the project as experience-based new data on the topic to peer students,
* 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, as well as
* act as reflective, independent academic expert in ICT project.
Contents:
Starting lecture, independent analysis and reporting of the expertise on the selected project topic and an expert seminar (2 full days) with the presentations of each topic.
Mode of delivery:
Blended teaching.
Learning activities and teaching methods:
Attendance at the starting lecture (4 h) and the expert seminar (2 full days) is mandatory. Independently writing the seminar paper and preparing the seminar presentation (abt. 60 h).
Target group:
MSc students.
Prerequisites and co-requisites:
It is required that the student is taking the Research and Development Project at the same time.
Recommended or required reading:
Research articles and materials are to be independently collected and studied by the students.
Assessment methods and criteria:
Expertise in the topic area will be reported on the seminar paper. Seminar presentation will also be evaluated. Assessment criteria in detail will be given at the starting lecture and in the web-based learning environment for the course.

Grading:
Numerical scale 1-5 or fail.
Person responsible:
Tonja Molin-Juustila
Working life cooperation:
Seminar topics are related to the Master's students projects all of which are authentic project works in unique R&D project assignments from real customers (univerisity, companies and organizations like schools, library etc.).

Other information:
Enrollment by contacting the responsible person of the course and outlining a draft of the seminar paper before the starting lecture of the course, i.e. until the end of the period 3.

813621S: Research Methods, 5 op

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Leikkaavuudet:

   521146S   Research Methods in Computer Science   5.0 op

ECTS Credits:
5 ECTS credits / 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 in the 1st spring semester of the Master's studies.
Learning outcomes:
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 processing sciences. The student is able to identify and describe the main research approaches and methods in information processing sciences, 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.
Contents:
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.
Mode of delivery:
Face-to-face teaching, lecture videos.
Learning activities and teaching methods:
Lectures 40 h, exercises 30 h and individual work 65 h. Learning diary is written about the lectures and exercises. Exercises include group work.
Target group:
MSc students
Prerequisites and co-requisites:
The required prerequisite is that the student has completed BSc degree as well as has basic knowledge on Software Engineering and Information Systems
Recommended or required reading:
Lecture slides and specified literature.
Assessment methods and criteria:
Accepted learning diary, active participation
Grading:
Pass or fail.
Person responsible:
Arto Lanamäki

817612S: Research and Development Project, 10 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Tonja Molin-Juustila

Opintokohteen kielet: English

ECTS Credits:
10 ECTS credits / 267 hours of work.
Language of instruction:
English
Timing:
The course is held in the autumn semester, during periods 1 and 2. It is recommended to complete the course in the 2nd autumn semester.
Learning outcomes:
After completing the course, the students should demonstrate their abilities to work on a challenging ICT project. Students will learn to acquire and apply professional expertise in the topic of the project. Students will also demonstrate their skills to conduct an ICT project in a professional way. By completing this course, students are able to act as independent professional members of an ICT project and have advanced professionalism in project work and management. The topics for the course can be anything from the ICT field. As a professional expert conducting a successful project in a managed way, the student is able to: collectively produce, monitor and update the plan of the project (project with fixed time and human resources); search up to date information on the subject matter of the project in order to build professional expertise on the topic and apply this in the project work; build professional working knowledge and skills focused in the subject area of the project (e.g. software development, user experience evaluation); develop analytical and creative skills for successful completion of the project; monitor and communicate the status (time & human resources used) of the project in real time within the project team (weekly/daily meetings); use systematic means (e.g. ICT tools) to enable communication and transparency of the project work; develop skills to communicate with the customer in a professional context; manage a successful project review with the steering group/project team organization; report and explain the status (progress, results and future estimations of the project) to the steering group to support the decision making and problem resolution concerning the project's future; work as responsible project team member; as an expert and/or project manager; work as a project team member with people from different technical and/or cultural backgrounds; produce a realistic outcome in relation to the project time and human resources (ok, good, excellent); reflect the relationship between the process model(s) selected for the project (waterfall, evolutionary, agile etc.) and the management practices followed in the project. management practices followed in the project.
Contents:
Starting lecture, where the steps of carrying out the course will be described together with other important information. Allocation of the project teams will immediately follow the starting lecture. The project work will take two periods (one semester).
Mode of delivery:
Blended teaching.
Learning activities and teaching methods:
Project work 260 h per student. Working hours reported during the project. Attendance at the starting lecture (4 h) is mandatory. Praparing a project portfolio in the end (3 h).
Target group:
MSc students.
Prerequisites and co-requisites:
Mandatory: B.Sc. degree or other equivalent degree. Students enrolling directly to the Master's programme should take the "Preparatory course for MSc studies (811392A)" course first (see the timetable for the autumn semester, period 1) or otherwise master the basics of project work and management as in Pressman, R.S. Software Engineering: A Practitioner's Approach, the chapters related to project management. The expertise gained during this project course will be further elaborated during the "Project Seminar (817609S)" course, which will immediately follow this course during spring semester, period 3.
Recommended or required reading:
Unique project material provided by the customer of the project and / or material to be collected and studied by the project team.
Assessment methods and criteria:
Skills will be reported by a project portfolio. Details about the assessment criteria will be given at the starting lecture and they will also be available in the web-based learning environment.
Grading:
Numerical scale 1-5 or fail.
Person responsible:
Tonja Molin-Juustila
Working life cooperation:

Learning by doing, i.e. managing authentic, resource-limited project work and integrating the practices of an academic expert into the unique project assignment.
Other information:
Enrollment for the course is well beforehand, i.e. until the end of July between 1st and 2nd study year.

811602S: Advanced Software Quality and Security, 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Mika Mäntylä
Opintokohteen kielet: English

Ei opintojaksokuvauksia.

811373A: Professional Software Engineering Processes and Human Factors, 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: English

Ei opintojaksokuvauksia.

811372A: Software Development, Maintenance and Operations, 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Mika Mäntylä
Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work
Language of instruction:
English
Timing:
The course is held in the autumn semester, during period 1. It is recommended to complete the course at the 1st autumn semester of the Master's studies.
Learning outcomes:
After completing the course, the student is able to:
- explain and utilize theories of software evolution
- utilize the processes, techniques and tools for software deployment, and operations
- utilize the processes, techniques and tools for software maintenance
- utilize the processes, techniques and tools to better understand and maintain large code bases
Contents:
Software Evolution. Principles and practices of software maitenance. Software operations and Devops. Software Product line engineering: Commonality and Variation.
Mode of delivery:
Blended teaching

Learning activities and teaching methods:
Lectures 28 h, exercises 24 h, homework 60 h, independent study 31 h
Target group:
MSc students
Prerequisites and co-requisites:
Basics on software engineering. Basic programming skills.
Recommended or required reading:
Software Evolution and Maintenance, Priyadarshi Tripathy, Kshirasagar Naik, ISBN: 978-0-470-60341-3, 416 pages,
January 2015. TODO Maëlick add the DevOps book we are currently using
DevOps: A Software Architect's Perspective (SEI Series in Software Engineering), Len Bass, Ingo Weber, Lining Zhu
(ISBN: 978-0134049847), May 2015
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. Software Evolution and Maintenance, Priyadarshi Tripathy, Kshirasagar Naik, ISBN: 978-0-470-60341-
3, 416 pages, January 2015
Assessment methods and criteria:
Assignments and exercises
Grading:
Numerical scale 1-5 or fail
Person responsible:
Mika Mäntylä

811603S: Software Platforms and Ecosystems, 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Minna Isomursu, Juustila, Antti Juhani
Opintokohteen kielet: English

Ei opintojaksokuvauksia.

811604S: Software for Intelligent Systems and Artificial Intelligence (AI), 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Minna Isomursu
Opintokohteen kielet: English

Ei opintojaksokuvauksia.

811605S: Software-Defined Products, Systems and Services, 5 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Tero Päivärinta

Opintokohteen kielet: English

Ei opintojaksokuvauksia.

813626S: Emerging Technologies and Issues, 5 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Piiastiina Tikka, Oinas-Kukkonen, Harri Ilmari
Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English
Timing:
The course is held in the autumn semester, during period 2. It is recommended to complete the course at the 1st spring semester of the Master's studies.
Learning outcomes:
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-based and other information 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.
Contents:
* A shift in thinking about the web and emerging technologies
* How the social web is transforming businesses, software design, our perception of people as well as skills required of us
* How to accelerate innovation creation through web-based and other emerging technologies: Ecosystem thinking, strategies, core business values
* Transformation of the social web into humanized web
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 24 h, exercises 8 h, reflective personal exercises 21 h, independent work and exam (required reading) 80 h.

Target group:
 MSc students
Recommended optional programme components:

Recommended or required reading:
Oinas-Kukkonen H. & Oinas-Kukkonen H.: Humanizing the Web: Change and Social Innovation. Palgrave Macmillan, Basingstoke, UK, 2013 (required reading).

Assessment methods and criteria:
Exam.

Grading:
Numerical scale 1-5 or fail.
Person responsible:
Harri Oinas-Kukkonen

812351A: Enterprise Systems, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English
Timing:
 E-exam
Learning outcomes:
After completing the course, the student understands Enterprise Resource Planning (ERP), Supply Chain Management (SCM), Inventory
Management, CRM, Knowledge Management, Online Business systems, Marketing systems, etc., and also understands the intellectual capital and
organizational competitive advantage. The student should be able to describe how processes integrate the internal functions of the firm and allow the firm to interact with its environment, and be able to recognize, model, and improve processes to help the firm achieve efficiency and effectiveness.
Contents:
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)
Mode of delivery:
 E-exam
Target group:
 MSc students
Prerequisites and co-requisites:
Understanding of the business process modeling helps.

Recommended optional programme components:

Assessment methods and criteria:

Grading:
Numerical scale 1-5 or fail.
Person responsible:
Michael Oduor
Working life cooperation:
No

817604S: ICT and Organizational Change, 5 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Karin Väyrynen

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English
Timing:
The course is held in the spring semester, during period 3. It is recommended to complete the course at the 2nd spring semester of the Master's studies.
Learning outcomes:
After completing the course, the student is able to:
* distinquish various roles of information and communication technology (ICT) in change of organization and its context, and
* analyze the role of ICT in relation with change taking place in an organization.
Contents:
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. The role of power, trust and control in the change process is discussed. The different aspects of change agents are presented and analysed. Students familiarize themselves with 7 organizational theories.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures 28 h, individual work 105 h (for self-studying for weekly in-class exams - or optionally a traditional exam), and a review and analysis of selected course materials and writing a case analysis).
Target group:
MSc students
Prerequisites and co-requisites:
Recommended to take Emerging Technologies and Issues before this course.
Recommended optional programme components:

Recommended or required reading:
A list of research articles will be provided for the lectures and assignments.
Assessment methods and criteria:
Week exams and weekly case analysis (or traditional exam at end of the course), course assignment (literature review, case analysis).
Grading:
Numerical scale 1-5 or fail.
Person responsible:
Karin Väyrynen

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

Voimassaolo: 01.08.1950 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English
Timing:
The course is held in the spring semester, during period 4. It is recommended to complete the course at the 2nd spring semester of the Master's studies.

Learning outcomes:
After completing the course, the student is able to:
* develop BCM (Business Continuity Management) and SA (Systems Availability) strategy;
* develop organization specific information security policies in organizations;
* conduct Information Security (and risk) Analysis;
* conduct Information Security Audits;
* understand information security standards, regulations, and policies;
* improve employees' compliance with the information security procedures through training, campaigning and other means;
* describe certifications related to information security (such as ISO27001); as well as
* describe public-key infrastructure (PKI), Digital signature, & Certification authority (CA).
Contents:
* Business Continuity Management (BCM) and Systems Availability (SA)
* Information Security Life Cycle
* Conduct Information Security (and risk) Analysis;
* Information security standards, regulations, and policies
* Information security investment management
* Insider threats in information security management
* Security Audits (Active Security Assessment)
* Information Security Certification (ISO27001) & Certification authority (CA)
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures (24 h), exercises (23 h), homework (30 h), essay (20 h), examination (36 h).
Target group:
 MSc students
Prerequisites and co-requisites:
Understanding of information security issues, principles, techiniques, or similar knowledge, is helpful.

Recommended optional programme components:

Recommended or required reading:
Raggad, Bel G.: Information security management, Concepts and practice, CRC Press 2010, Chapters 1, 2.7. – 2.13, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, and 15.
Assessment methods and criteria:
Examination.
Grading:
Numerical scale 1-5 or fail.
Person responsible:
Nataliya Shevchuk

812331A: Interaction Design, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Netta Iivari

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English
Timing:
The course is held in the autumn semester, during period 1. It is recommended to complete the course at the 1st autumn semester of the Master's studies.
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.

Contents:
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.

Mode of delivery:
Face-to-face teaching.

Learning activities and teaching methods:
Lectures 20 h, exercises and seminar 25 h, individual and group assignments 90 h; or self-study: an opening lecture 2 h, one larger
assignment 110 h and individual tasks 21 h.

Target group:
MSc students

Prerequisites and co-requisites:
Basic knowledge on human-computer interaction with usability and user-centered design.

Recommended or required reading:
Sharp et al. (2015) Interaction Design, chapters 1-2, 4-5, 7-13 (pages 1-64, 100-157, 226-473).

Assessment methods and criteria:
Accepted assignments.

Grading:
Numerical scale 1-5 or fail.

Person responsible:
Netta Iivari

Working life cooperation:
Invited lectures, assignments.

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

Voimassaolo: 01.08.2011 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Pasi Karppinen

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work.

Language of instruction:
English

Timing:
E-exam

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 information systems design (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 particular, with socio-technical methods (e.g., SSM) 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. The student is also able to assess and give arguments which method is suitable for an ISD project in an organization.

Contents:
Information Systems Strategy, Information Systems Development Life Cycle (SDLC), Information systems success, Soft Systems Methodology (SSM), Socio-Technical Approach, Evolutionary development, Agile methodologies.

Target group:
 MSc students

Prerequisites and co-requisites:

Bachelor studies recommended.
Recommended optional programme components:

Assessment methods and criteria:
E-exam
Grading:
Numerical scale 1-5 or fail.
Person responsible:
Pasi Karppinen

811606S: Next Generation Software Engineering, 5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Mika Mäntylä

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work
Language of instruction:
English
Timing:
The course is held in the spring semester, during period 4. It is recommended to complete the course at the 1st spring semester of the Master's studies.
Learning outcomes:
After completing the course, the student understands the new trends in software engineering. The student is able to perform computer supported trend mining to discover new trends of any given topic. The student is able to critically think about the trends.
Contents:
- Software engineering trends (varies)
- Automated trend mining from online databases
- Writing, arguing and discussing about the trends
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 24 h, exercises 18 h, essays 30 h, project 30 h, independent study 31 h
Target group:
MSc students
Prerequisites and co-requisites:
The required prerequisite is that the student has completed BSc degree as well as has basic knowledge on Software Engineering
Recommended or required reading:
Articles + lectures
Assessment methods and criteria:
Active lecture participation, exercises, assignments, essays
Grading:
Numeerinen asteikko 1-5 tai hylätty
Person responsible:
Mika Mäntylä

815663S: Software Engineering Research, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Oivo, Markku Tapani

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English
Timing:
The course is held in the spring semester, during period 3. It is recommended to complete the course in the 1st spring semester of the Master's studies.
Learning outcomes:
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.
Contents:
State of the art research methods and topics in software engineering.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures and seminars 28 h, exercises / assignments 78 h, weekly study 42 h.
Target group:
MSc students
Prerequisites and co-requisites:
The required prerequisite is that the student has completed BSc degree as well as has basic knowledge on Software Engineering
Recommended or required reading:

Assessment methods and criteria:
Active participation in lectures and attendance. Final grade is composed of attendance, assignments and term paper. No remote participation or distance learning.
Grading:
Numerical scale 1-5 or fail.

Person responsible:
Markku Oivo

812650S: Advanced Topics in Digital Cultures and Design, 5 op

Voimassaolo: 01.08.2011 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Dorina Rajanen

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work
Language of instruction:
English
Timing:
The course is held in the spring semester, during period 3. It is recommended to complete the course at the 1st spring semester of the Master's studies.

Learning outcomes:
After completing the course, the student is able to:
* describe state-of-the-art research results related to digital cultures and design;

* understand the strengths and limitations of various methods and frameworks used;
* show competence in critiquing research articles published in some of the leading academic journals and conference proceedings;
* show competence in critical thinking, and analysis and synthesis of academic sources;
* show competence in verbally presenting arguments in an academic fashion;
* write a literature review on a relevant research topic;
* acquire knowledge and critically read relevant research articles on digital culture and design related research topics; as well as
* describe ethical aspects involved with work related to digital cultures and design.

Contents:
The content of the course will change with time. The initial set of current themes include: User experience as an object of analysis and design, Participatory design, end-user-design and living labs, Information ecologies and infrastructures, Design for all, Iterative and incremental design and development, The impact of human-centred design, Current development contexts such as: Open source software development, Game development, Development of ICT for children, Ubiquitous computing

Mode of delivery:
Face-to-face teaching.

Learning activities and teaching methods:
Lectures 20 h, assignments 107 h, seminars 6 h.

Target group:
 MSc students
Prerequisites and co-requisites:
The required prerequisite is that the student has completed BSc degree as well as has basic knowledge on Software Engineering and Information Systems

Recommended optional programme components:

Recommended or required reading:
Selected scientific articles.
Assessment methods and criteria:
Assignments

Grading:
 Numerical scale 1-5 or fail
Person responsible:
 Mikko Rajanen

812671S: User Experience (UX) and Usability Evaluation, 5 op

Voimassaolo: 01.08.2011 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Mikko Rajanen
Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work.

Language of instruction:
English
Timing:
The course is held in the spring semester, during periods 3 and 4.

Learning outcomes:

Students can: Design and follow through a UX/usability evaluation process; Design test scenarios and tasks; Select participants; Plan and follow through the evaluation in laboratory or in the field; Analyse and report the findings from the evaluations.

Contents:
Basic terms and types of UX and usability testing, usability and UX tests process, usability and UX test tasks and scenarios, test subjects, following through a usability and UX tests, analysing usability and UX test material, reporting the findings from usability and UX tests.

Mode of delivery:
Face-to-face teaching

Learning activities and teaching methods:
Lectures 24h, assignment tutoring 13h, assignment 90h, seminar 7h.

Target group:
 MSc students

Prerequisites and co-requisites:
The required prerequisite is that the student has completed BSc degree as well as has basic knowledge on Software Engineering and Information Systems

Recommended optional programme components:

Recommended or required reading:
"Dumas, J. S. & Redish, J. C. (1993): A Practical Guide to Usability Testing. Ablex Publishing Corporation. Rubin, J. (1994): Handbook of
Usability Testing: How to Plan, Design, and Conduct Effective Tests. Chichester: John Wiley & Sons, Inc."

Assessment methods and criteria:

Assessment of the course is based on the learning outcomes of the course based on the written usability test plan, supervised usability tests, written usability test report and oral seminar presentation

Grading:
 Pass or fail

Person responsible:
Mikko Rajanen

Working life cooperation:
Students learn how to collaborate with real customers

Other information:

812651S: ICT and Behaviour Change, 5 op

Voimassaolo: 01.08.2011 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Piiastiina Tikka

Opintokohteen kielet: English

ECTS Credits:
 5 ECTS credits / 133 hours of work

Language of instruction:
English

Timing:
The course is held in the spring semester, during period 4. It is recommended to complete the course at the 1st spring semester of the Master's studies.

Learning outcomes:
After completing the course, the student is able to:
* grasp the core theories of behaviour change and how they are/can be applied in goal-oriented behaviour change,
* understand ethical concerns inherent in behaviour change and persuasive systems, and

* understand the possible negative effects of ICT use not only as regards persuasive systems, but also with social media and other use.

Contents:
The focus of the course is role of ICT in supporting people with their endeavours to change their habits or lifestyles. The course introduces the main theories and models regarding behaviour change in order to provide students with a solid base for understanding how behaviour change can also work through ICT. The course also introduces some of the more problematic topics in ICT and behaviour, such as the dark side of ICT use and ethics of persuasion.
The course aims at providing existing knowledge and theoretical starting points to the development and use of persuasive systems. With such base, the student will be able to review the field from a broad perspective with the view to applying appropriate theories and approaches when analysing or developing persuasive systems.

Mode of delivery:
Face-to-face teaching

Learning activities and teaching methods:
Lectures 14 h, seminars 20 h, individual and group assignments 100 h; or in self-study mode opening lecture 2 h, assignments 132 h

Target group:
MSc students

Prerequisites and co-requisites:
The required prerequisite is that the student has completed BSc degree as well as has basic knowledge on Software Engineering and Information Systems

Recommended optional programme components:
The MSc courses "Persuasive Systems Design" and "Emerging Technologies and Issues" would be helpful, but is not required.

Recommended or required reading:
Research articles to be announced more specifcally during the course implementation

Assessment methods and criteria:
Research articles to be announced more specifcally during the course implementation

Grading:
Numerical scale 1-5 or fail

Person responsible:
Harri Oinas-Kukkonen

Working life cooperation:
-

811607S: Persuasive Systems Design, 5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Oinas-Kukkonen, Harri Ilmari

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work
Language of instruction:
English
Timing:
The course is held in the spring semester, during period 3. It is recommended to complete the course at the 1st spring semester of the Master's studies.
Learning outcomes:

As learning outcomes of this course, the students will be better equipped to
• Analyze methods and techniques employed by persuasive systems
• Apply such methods in an ethical manner as design guidelines for developing persuasive ICT solutions
• Apply gamification as persuasive design principles for serious games and other similar solutions.
Contents:
Attitudinal theories from social psychology have been quite extensively applied to the study of user intentions and behaviour. These theories have been developed mostly for predicting user acceptance of information technology rather than for providing systematic analysis and design methods for developing software solutions that aim at attitude or behaviour change. At the same time a growing number of information technology systems and services are being developed for these purposes.
This course will focus on persuasive technology. It will address the process of designing and evaluating persuasive systems, the types of content and software functionality in such systems, the underlying assumptions behind these, methods for analysing the persuasion context, and principles for persuasive system design. The course also looks into the methods and techniques of gamifying persuasive content.
The course is primarily geared towards analysis and design tasks using the Persuasive Systems Design model as the main approach. Gamification forms another segment of the course, introducing topics in the role of games and game-like experiences in supporting persuasion.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 20 h, readings before lectures 14 h, personal reflective exercises 14 h, supervisory meetings 14 h, project assignment 71 h.
Target group:
MSc students
Prerequisites and co-requisites:
The required prerequisite is that the student has completed BSc degree as well as has basic knowledge on Software Engineering and Information Systems
Recommended optional programme components:
This course offers good groundwork for ICT and Behaviour Change course, but is not compulsory.
Recommended or required reading:
Research articles to be announced more specifcally during the course implementation
Assessment methods and criteria:
Participation in lectures, personal reflection reports, course assignments.
Grading:
Numerical scale 1-5 or fail
Person responsible:
Harri Oinas-Kukkonen

812649S: Advanced Research Methods, 5 op

Voimassaolo: 01.08.2016 -

Opiskelumuoto: Advanced Studies

Laji: Course

Vastuuyksikkö: Faculty of Information Technology and Electrical Engineering

Arvostelu: 1 - 5, pass, fail

Opettajat: Netta Iivari

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 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 2nd spring semester of the Master's studies.
Learning outcomes:
After completing the course, the student is able to:
* describe the background, philosophical assumptions and guiding principles of quantitative, qualitative and design science research, their role in information systems and software engineering research and the variety involved in them;
* evaluate the strengths and weaknesses of the research approaches and methods in relation to her or his research

topic as well as select the suitable approach and methods;
* use more advanced data analysis methods;
* prepare a research plan for a research project, including formulating research problems, specifying research designs and choosing appropriate data collection and analysis methods for solving the problems;
* describe state-of-the-art ways of reporting the results;
* evaluate the methodological quality of her or his research and research publications more generally; as well as
* search more information on research methods from scientific literature as well as to adapt and refine methods for her or his research problems and interests.

Contents:
Introduction to qualitative, quantitative and design science research in information systems and software engineering, their scientific background,
philosophical assumptions and guiding principles, variety involved in them, relationships between the research approaches and associated frameworks, methods, processes and practices, advanced data analysis methods, reporting and evaluating research within the approaches.

Mode of delivery:
Face-to-face teaching

Learning activities and teaching methods:
Lectures 16 h, exercises 12 h, seminar 18 h, individual and group assignments 100 h

Target group:
MSc students, PhD students

Prerequisites and co-requisites:
The required prerequisite is that the learning outcomes of the following courses are accomplished: Research Methods. In addition, the student must have a preliminary thesis topic.

Recommended optional programme components:
Recommended to take before Master's thesis.

Recommended or required reading:
Selected scientific articles or research method books.

Assessment methods and criteria:
Assignments

Grading:
Pass or fail

Person responsible:
Netta Iivari

811330A: Project management, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS
Timing:

Learning outcomes:
Upon the successful completion of the course, the student is able to
* split a project into phases and tasks,
* resource and schedule the tasks,
* gather information on the progress of a project and based on it, make project related decisions,
* apply theory on project management in practice,
* recognise risks of software projects and prepare for them,
* work as a project manager, and
* communicate with stakeholders by using both written and spoken language.
Target group:
Master students
Assessment methods and criteria:
Practical work in a real-life SW project as a project manager 130h
Person responsible:

Kari Liukkunen

816630S: Scientific paper writing, 1 - 3 op

Voimassaolo: 01.08.2008 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Henrik Hedberg
Opintokohteen kielet: English

Person responsible:
Henrik Hedberg

811610S: Special Course in Information Processing Science, 5 - 10 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Advanced Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Minna Isomursu
Opintokohteen kielet: English

Person responsible:
Minna Isomursu

814601S: Work Experience in ICT responsibilities, 5 op

Voimassaolo: 01.08.2010 -
Opiskelumuoto: Advanced Studies
Laji: Practical training
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Tonja Molin-Juustila
Opintokohteen kielet: Finnish

ECTS Credits:
3-5 ECTS credits / 2–4 months of full time work

Language of instruction:
Finnish or English.
Timing:
Timing of this course is free. Recommended to take as a summer course. The course is also suitable for the supported work placement studies. In that case, it is recommended to search for the work placement and apply for the support already at the turn of the year.
Learning outcomes:
After completing the course, the student:
- will master certain part of professional ICT work in enterprises or public organisations
- can analyse and reflect on the work experience with Information Processing Science studies
- can write an informative report on his/her work experience.

Contents:
Working from two to four months in professional ICT responsibilities that require university level studies.

Mode of delivery:
The student is responsible for making the needed arrangements for the internship: search for the work placement, negotiate job contract, prepare the support application when needed, follow the agreed labor agreement, work within the agreed responsibilities as well as study independently the needed professional skills and knowledge. In addition, the student documents his/her internship according to the course requirements.

Learning activities and teaching methods:
Search for the work placement, job contract negotiation, work within the professional ICT responsibilities and reflecting the work experience and learning by reporting; possibly also applying support, planning and weekly reporting the internship experience.

Target group:
 MSc students

Prerequisites and co-requisites:
Information Processing Science or related studies, which enable their practical application in the context of professional ICT responsibilities.

Recommended or required reading:
Studies and selected course materials related to the internship in professional ICT responsibilities.

Assessment methods and criteria:
Working in professional ICT responsibilities from two to four months. Work experience can be realized in several periods, which all are processed as independent internship periods. The work experience is proved by delivering a signed letter of reference from the employer(s). The letter of reference contains details of the internship period and the student's primary duties and responsibilities. After the internship period, experiences are reported as soon as possible. An internship report consists of description of realized work and analysis of learning outcomes in relation to the studies taken in Information Processing Science. The studies are proved by delivering an up-to-date transcript of records. Proposals to develop Information Processing Science studies are included in the report as well. Based on the internship period, student will gain 3-5 ECTS credits (2 months = 3, 3 months = 4, 4 months = 5). In addition to above, student may also document his/her personal plan and learning goals for the internship period as well as report weekly implementation status of those plans and goals. In this case, 5 ECTS credits will be gained already from 2 months' internship period. For applying the financial support, this documentation is mandatory.

Grading:
Pass/fail

Person responsible:
Tonja Molin-Juustila

Working life cooperation:
Working on professional ICT responsibilities.

Other information:
Documenting guidelines and templates are available in the course materials. Before the internship starts, the support application must be recorded in the university systems with the copy of the internship agreement. The letter of reference from the employer(s) will be recorded together with the credits.

902165Y: English Communication for Information Processing, Oral Skills, 3 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Leikkaavuudet:

902162Y-02	English Communication for Information Processing, Oral Skills	3.0 op

Proficiency level:
B2/C1 on the Common European Framework of Reference scale

Status:
This course is mandatory for students of Information Processing Science who will have English as their foreign language in their B.Sc. degree. The course is mandatory for Information Processing Sciences B.Sc. degree students who begin their studies in Autumn 2017.

Required proficiency level:
The students taking this course must have had English as an A1 or A2 language or equivalent English skills.

ECTS Credits:
3 ECTS credits / 80 hours of work
Language of instruction:
English
Timing:
Information Processing Science, 1st year Spring (periods 3 & 4)
EXCEPT: In Autumn 2019, it is offered for 2nd year students (periods 1 & 2)
Learning outcomes:
By the end of the course you are expected to demonstrate the ability to:
--**use appropriate strategies and techniques for communicating effectively** in English in scientific and professional contexts in your own field
--**participate actively in team-building exercises and group work** in the classroom and in homework assignments
--**identify and practice effective interviewing skills and negotiation skills**
--**prepare and present scientific subjects from your own field of study**, using appropriate field-related vocabulary, both independently and in groups
Contents:
In the classroom, you will practice the skills of listening, speaking, and presenting topics in your own field. The emphasis is on working in pairs and small groups. In addition to a group project, you will complete independent homework assignments, including a blog, to support the classroom learning. There are 2 presentations to be given by groups.
Mode of delivery:
Contact teaching, group work and independent work
Learning activities and teaching methods:
There will be 26 hours of guided teaching events in the classroom and 48 hours of independent work, which includes both individual and group work.
Individual work: weekly readings, a course blog and preparation for a job interview
Group work: Group project and preparation of 2 presentations
Target group:
1st year students of Information Processing Science
(EXCEPT: 2nd year students will have ECIP A & B in Autumn 2019.)
Prerequisites and co-requisites:
Co-requisite:
English Communication for Information Processing-A (902164Y), to be taken concurrently during the same term
Recommended optional programme components:
-
Recommended or required reading:
-

Assessment methods and criteria:
This course utilises *continuous assessment* and requires regular attendance and active participation. The assessment criteria are based on the learning outcomes.
Homework tasks include both independent and group work, for example:
- Independent learning methods: reading + blog work, 15 hours
- Group project: 25 hours
- Preparing group presentations: 15 hours

Read more about assessment criteria at the University of Oulu webpage.
Grading:
Pass / fail
Person responsible:
Karen Niskanen

902164Y: English Communication for Information Processing, Reading for Academic Purposes, 2 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Language and Communication Studies

Laji: Course

Vastuuyksikkö: Languages and Communication

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: English

Leikkaavuudet:

902162Y-01   English Communication for Information Processing, Reading   2.0 op

Proficiency level:
B2/C1 on the Common European Framework of Reference scale.
Status:
This course is mandatory for students who choose English as their foreign language in the following B.Sc. degree programme:
Faculty of Information Technology and Electrical Engineering
- Department of Information Processing Science

N.B.:
Students who began their studies prior to Autumn 2018 should contact the faculty for information about their foreign language requirements.
Exemption from ECIP-A RAP (2op/2ECTS) will be granted to students with laudatur or eximia cum laude approbatur grades from the "long language" matriculation examination. These students should sign up for an ECIP-B (Scientific Communication 3 op/ECTS) group only.
Please consult your faculty's Study Guide to establish the language requirements for your own degree program
Required proficiency level:
English must have been the A1 or A2 language at school or equivalent English skills should have been acquired otherwise.
ECTS Credits:

2 ECTS / 52 hours of work
Language of instruction:
English
Timing:
Information Processing Science:
1st year Spring term (periods 3 and 4) from Spring 2020 onward.
N.B.:
ECIP A and B are offered for 2nd year students in Autumn 2019 (periods 1 and 2)
Learning outcomes:
In ECIP-A, you will learn to read more extensive academic - general or discipline-specific - text with increased confidence and at sufficient speed and to process it critically. By the end of the course, you are expected to
--have acquired effective vocabulary-learning techniques
--be able to distinguish parts of words to infer meanings
--be able to utilise your knowledge of text structure and cohesion markers to understand academic texts
--to be able to extract information and learn content from English readings in scientific and professional contexts
Contents:
The course will focus on reading strategies; these include recognising how texts are organised, identifying key points in a text, and understanding words in context. Vocabulary work in the course will focus on: a) academic vocabulary, as used in formal scientific writing, and b) using your knowledge of the meanings of parts of words (affixes) to infer meaning.
Mode of delivery:
Contact teaching and independent study
Learning activities and teaching methods:

There are 26 hours of guided teaching events and 28 hours of independent study, either individually or in a group. Homework tasks include vocabulary study and written work. A more detailed course description and list of homework tasks will be provided by the teacher.
Target group:
ECIP-A and ECIP-B are both offered during the Spring of the 1st year from Spring 2020 onward.
(For 2nd year students, the courses are offered in Autumn 2019.)
Prerequisites and co-requisites:
Students are also required to take the co-requisite course English Communication for Information Processing B (902165Y), which is offered concurrently during the same term.
Recommended optional programme components:
-
Recommended or required reading:
Course materials will be provided in electronic form or will be accessible from the university library.
Assessment methods and criteria:
Student work is monitored by continuous assessment, and students are required to participate regularly and actively in all contact teaching provided. During the course, there will be three tests on material covered so far, reading tasks and written work (e.g. a critique). ECIP A coursework is designed to coordinate with the ECIP-B coursework. The assessment of the course is based on the learning outcomes listed above.
Read more about assessment criteria at the University of Oulu webpage.
Grading:

Pass/Fail
Person responsible:
Karen Niskanen
Working life cooperation:
-
Other information:
N.B. Students with grades laudatur or eximia in their A1 English school-leaving examination can be exempted from this course and will be granted the credits. Please contact your own faculty for information.

030005P: Information Skills, 1 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Faculty of Technology

Arvostelu: 1 - 5, pass, fail

Opettajat: Ursula Heinikoski

Opintokohteen kielet: Finnish

Leikkaavuudet:

030004P   Introduction to Information Retrieval   0.0 op

ECTS Credits:
1 ECTS credits / 27 hours of work
Language of instruction:
Finnish
Timing:
Architecture 3. spring semester, period I; Biochemistry 3. autumn semester; Biology 3. autumn semester, period I; Chemistry 3. autumn semester, period II; Computer Science and Engineering 2. spring semester, period IV; Electronics and Communications Engineering 3. spring semester; Geosciences 2. spring semester, period IV; Geography 1. and 3. spring semester, period III; Industrial Engineering and Management 3. year (Master's degree students in Industrial Engineering and Management 1st year.); I nformation Processing Sciences 1. year; Mathematics and Physics 1. spring semester, period III; Mechanical Engineering 3. year; Mining Engineering and Mineral Processing 3. year; Process and Environmental Engineering 2. year, period II.
Learning outcomes:
Upon completion of the course, the students:
- can search scientific information,
- can use the most important databases of their discipline,
- know how to evaluate search results and information sources,
- can use the reference management tool
Contents:
Scientific information retrieval process, the most important databases and publication channels of the discipline, evaluation of the reliability of information sources and RefWorks reference management tool.
Mode of delivery:
Blended teaching: classroom training, web-based learning material and exercises, a group assignment.
Learning activities and teaching methods:
Training sessions 8 h, group working 7 h, self-study 12 h
Target group:
Compulsory for all bachelor degree students of Faculty of Information Technology and Electrical Engineering, Faculty of Technology and Faculty of Science. Compulsory also for those Master's degree students in Industrial Engineering and Management who have no earlier studies in the information skills. Optional for the students of biochemistry.

Prerequisites and co-requisites:
-
Recommended optional programme components:
-
Recommended or required reading:
Web learning material Tieteellisen tiedonhankinnan opas http://libguides.oulu.fi/tieteellinentiedonhankinta (in Finnish)
Assessment methods and criteria:

Passing the course requires participation in the training sessions and successful completion of the course assignments.
Grading:
pass/fail
Person responsible:
Ursula Heinikoski
Working life cooperation:
-
Other information:
-

900105Y: Launch your career through communication, 5 op

Voimassaolo: 01.01.2017 -
Opiskelumuoto: Language and Communication Studies
Laji: Course
Vastuuyksikkö: Languages and Communication
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

810020Y: Orientation Studies, 2 op

Voimassaolo: 01.08.2015 -
Opiskelumuoto: General Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opettajat: Leena Arhippainen
Opintokohteen kielet: Finnish

ECTS Credits:
2 ECTS credits / 53 hours of work.

Language of instruction:
Finnish
Timing:
The course is held in the autumn semester, during periods 1 and 2. The course is taken at the beginning of the studies.
Tutor teaching activity continues throughout the whole first study year.

Learning outcomes:
 After passing the course a student:
- Recognizes from the viewpoint of his / her university studies the actions and services of the most important units, organizations and societies and his / her action possibilities in them
- Recognizes the characteristics of the university-level studies, own curriculum and the discipline of Information Processing Science from the viewpoint of his / her studies and their planning
- Is able to discuss on the purpose of his / her studies and the upcoming study path;
- Is able to create and present his / her own Personal Study Plan (PSP);
- Knows the city of Oulu and its services.

Contents:
 1. Common occasions and lectures, 2. Small group activities (student tutoring), 3. PSP process, 4. Library and Oula database, 5. Teacher tutoring.

Mode of delivery:
Blended teaching.

Learning activities and teaching methods:
Common occasions and lectures 16 h, small-group activities (student tutoring) 15 h, PSP process 4 h, independent personal work 8 h, teacher tutoring 10 h.

Target group:
BSc students.

Recommended or required reading:
  Lecture materials, www pages, study guides, brochures and forms.

Assessment methods and criteria:
Active participation in lectures, common occasions, small group activities (student tutoring) and teacher tutoring. Creating and returning PSP to WebOodi.

Grading:
Pass or fail.

Person responsible:
Leena Arhippainen (Leena Ventä-Olkkonen)

901049Y: Second Official Language (Swedish), Oral Skills, 1 op

Voimassaolo: 01.08.2014 -
Opiskelumuoto: Language and Communication Studies
Laji: Course
Vastuuyksikkö: Languages and Communication
Opintokohteen kielet: Swedish
Leikkaavuudet:

   901061Y   Second Official Language (Swedish), Oral Skills   1.0 op

   ay901049Y   Second Official Language (Swedish), Oral Skills (OPEN UNI)   1.0 op

901048Y: Second Official Language (Swedish), Written Skills, 1 op

Voimassaolo: 01.08.2014 -
Opiskelumuoto: Language and Communication Studies
Laji: Course
Vastuuyksikkö: Languages and Communication

Opintokohteen kielet: Swedish

Leikkaavuudet:

901060Y   Second Official Language (Swedish), Written Skills   1.0 op

ay901048Y   Second Official Language (Swedish), Written Skills (OPEN UNI)   1.0 op

811102P: Devices and Data Networks, 5 op

Voimassaolo: 01.01.2019 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Juustila, Antti Juhani

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay811102P   Devices and Data Networks (OPEN UNI)   5.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work
Language of instruction:
finnish
Timing:
The course is held in the autumn semester, during period 1. It is recommended to complete the course at the 1st autumn semester of the Bachelor's studies.
Learning outcomes:
After completing the course, the student is able to:
- explain the basic structure and the development history of a microprocessor
- identify the core features of microprocessors (word size, clock frequency, power consumption, level of integration, RISC/CISC) and based on these, choose a suitable processor regarding the problem at hand
- describe the different representations of data (binary, hexadecial, octal) as well as data persistence and presentation formats within a computer as well as in data transmission through networks
- describe the most important peripheral devices, data buses and interfaces (memory, I/O, USB, I2C, SPI)
- explain the principles of using stack and heap memories from the programmer's perspective
- explain the central properties and history of internet and important internet protocols (such as TCP, UDP, HTTP, TLS/SSL, XMPP, DHCP) as well as the layered architecture of protocols
- describe the implications of data networks, such as delays, packet loss and capacity, and understand the effects of these on developing services and applications relying on networks.
- explain the particular features of wireless networks
- identify the basic techniques of utilizing networks when developing services and applications, using some programming language

Contents:
Basic structure and development history of microprocessors. Core features of microprocessors (word size, clock frequency, power consumption, level of integration, RISC/CISC). Different representations of data (binary, hexadecial, octal), data persistence and presentation formats in computers and networks. Peripheral devices, data buses and interfaces (memory, I/O, USB, I2C, SPI). Stack and heap memories. Properties and history of internet and internet protocols, layered architecture of protocols. Impact of data network properties on developing services and applications. Wireless networks. Programming networked applications and services.
Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Lectures, (20 h), independent studying (30 h), exercises (20 h), demonstrations (20 h), essay (20 h), other active teaching methods and group work (20 h).
Target group:
BSc students
Recommended optional programme components:

Recommended or required reading:

Lecture material, demonstrations, exercise material and other material and literature announced in the course.
Assessment methods and criteria:
Exam (in learning environment), personal portfolio, essay, continuous evaluation.
Grading:
Numerical scale 1-5 or fail
Person responsible:
Antti Juustila

811168P: Information Security, 5 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Tero Päivärinta

Opintokohteen kielet: Finnish

Leikkaavuudet:

   ay811168P   Information Security (OPEN UNI)   5.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish
Timing:
The course is held in the spring semester, during period 3. It is recommended to complete the course in the 1st spring semester of the Bachelor's studies.
Learning outcomes:
After completing the course a student is able to
- define essential information security concepts and components of information systems security
- recognize the common types of security threats, and their managerial and technical protection mechanisms
- describe the tasks and responsibilities of information security professionals
- explain the different phases of secure systems development/acquisition
- recognize the fundamental characteristics of risk management and is evaluate information security risks
- recognize basics of technical information security methods and cryptography
- explain areas of behavioral information security research and their practical implications
Contents:
* Basic concepts of information security
* Information security threats, vulnerabilities, and risks
* Legal issues and information security frameworks
* Risk management
* Cryptography
* Information security technologies
* Behavioral information security research
Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Lectures and related quizzes or final exam 26 h, weekly assignments and scientific essay 107 h

Target group:
 BSc students.
Prerequisites and co-requisites:
The required prerequisite is that the learning outcomes of the following courses are accomplished: Introduction to Information Processing Science as well as Devices and Data Network
Recommended optional programme components:

Recommended or required reading:
Lecture materials, selected articles, and book: Whitman & Mattord (2015). Principles of information security.
Assessment methods and criteria:
Lecture tasks or exam, weekly assignments and essay.

Grading:
Numerical scale 1-5 or fail.
Person responsible:
Tero Päivärinta

810136P: Introduction to Information Processing Sciences, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Henrik Hedberg

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay810136P   Introduction to information processing sciences (OPEN UNI)   5.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish
Timing:
The course is held in the autumn semester, during period 1. It is recommended to complete the course at the 1st autumn semester of the Bachelor's studies. Another implementation, targeted especially for Open University and minor students, is held in the spring semester, during period 4.
Learning outcomes:
After passing the course, a student will be able to:
- describe the disciplines of Information Processing Science,
- explain the essential Information Processing Science concepts,
- name historically significant and current research topics in Information Processing Science,
- identify the characteristics and requirements of work tasks in the field of Information Processing,
- retrieve, analyse, contest and classify information related to those, as well as
- discuss and report in written form on those using one reference convention of the scientific discipline.
Contents:
The course consists of lectures on disciplines, essential concepts, historically significant and current research as well practical work life in Information Processing Science. In addition, the student will familiarize with scientific work skills by listening, discussing, reading, thinking critically and creatively, retrieving data, classifying and presenting in written form.

Mode of delivery:
Blended teaching.
Learning activities and teaching methods:
Blended studies 133 h.
Target group:
BSc students
Recommended optional programme components:

Recommended or required reading:
Digital study material, material searched by students themselves.
Assessment methods and criteria:
Exercise tasks.

Grading:
Numerical scale 1-5 or fail.
Person responsible:
Henrik Hedberg
Working life cooperation:
Cooperation with persons studied Information Processing Science and currently working.

811174P: Introduction to Software Business, 5 op

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Marianne Kinnula

Opintokohteen kielet: Finnish

Leikkaavuudet:

811178P   Technology Business and Innovations   5.0 op

ay811174P   Introduction to Software Business (OPEN UNI)   5.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish
Timing:
The course is held in the spring semester, during period 3. It is recommended to complete the course at the 1st spring semester of the Bachelor's studies.

Learning outcomes:
After completing the course, a student can:
• Explain how the industry is structured;
• Describe the software industry's business logic as typically used in business models and the reasoning behind their use;
• Describe the important areas of the software business;
• Describe legal issues related to software business
Contents:
This course provides an overview of software business from three different viewpoints: software industry, business logic, and functions of a software company.
Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Blended teaching 100 h, home essay 30 h
Target group:
BSc students.
Prerequisites and co-requisites:
The required prerequisite is that the learning outcomes of the following courses are accomplished: Introduction to Information Processing Science
Recommended optional programme components:
-
Recommended or required reading:
Course material and related literature.
Assessment methods and criteria:
Assignments, take home examination.
Grading:
Numerical scale 1-5 or fail.
Person responsible:
Marianne Kinnula

811319A: Data Modeling and Design, 5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Lappalainen, Jouni Esko Antero

Opintokohteen kielet: Finnish

ECTS Credits:

5 ECTS credits / 133 hours of work
Language of instruction:
Finnish
Timing:
The course is held in the spring semester, during period 3. It is recommended to complete the course in the 2nd spring semester of the Bachelor's studies.
Learning outcomes:
After completing the course, students will:
• have knowledge of some modern database principles - such as non-relational databases.
• have prefatory knowledge of making use of those non-relational databases (ie. data mining techniques).
• knows data persistency concepts and database transaction management and distributed databases as well CAP-theorem.
• have awareness of (typical) contemporary database solutions and their role in large-scale software systems (such as ERP).
Contents:
Modern database solutions and the use of them as well transactions, concurrency and recovery.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 6 h, Study groups 8 h (+preparation 32 h), online assignments 24 h, litterature reviews 60 h
Target group:
BSc students
Prerequisites and co-requisites:
The required prerequisite is that the learning outcomes of the following courses are accomplished: Software Quality
Recommended or required reading:
Will be anounced in the course.
Assessment methods and criteria:
Continuous evaluation
Study groups, online assignments, litterature reviews
Grading:
Numerical scale 1-5 or fail
Person responsible:
Not implemented during academic year 2019-2020
Jouni Lappalainen

811103P: Introduction to Software Engineering, 5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Oivo, Markku Tapani

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay811103P   Introduction to Software Engineering (OPEN UNI)   5.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work
Language of instruction:
Finnish
Timing:
The course is held in the autumn semester, during period 2. It is recommended to complete the course at the 1st autumn semester of the Bachelor's studies.
Learning outcomes:
Upon completion of the course, the student will be able to:
- Describe the principles, define the key concepts and use professional terminology of software engineering
- Demonstrate an understanding of software engineering as a professional practice and a field of industry
- Be aware and able to work following professional practices that are important for software engineers
- Describe contemporary software processes and choose appropriate ones for specific situations

- Know and is able to apply valid problem identification and structuring methods in software engineering
- Know and is able to apply some contemporary software engineering models, methods and tools
- Shows understanding of the necessity of continuing learning and professional development

Contents:
* Principles of professional software development
* Software processes
* Agile software development
* Requirements engineering
* System modelling
* Architectural design
* Design and implementation
* Software testing
* Software evolution

Mode of delivery:
Blended teaching

Target group:
BSc students

Prerequisites and co-requisites:
The required prerequisite is that the learning outcomes of the following courses are accomplished: Introduction to Information Processing Science

Recommended or required reading:
Sommerville, Ian (2016). Software Engineering, 10th Edition

Grading:
Numerical scale 1-5 or fail

Person responsible:
Markku Oivo

Working life cooperation:
Guest lectures and /or company visits

811391A: Requirements Engineering, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Markus Kelanti

Opintokohteen kielet: Finnish

Leikkaavuudet:

   ay811391A   Requirements Engineering (OPEN UNI)   5.0 op

ECTS Credits:
5 ECTS credits / 133 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 in the 2nd spring semester of the Bachelor's studies.

Learning outcomes:
Upon completion of the course, the student will be able to:
- Understand the requirements fundamentals
- Apply requirements engineering skills and techniques individually and in teams
- Choose and apply some of the requirements elicitation techniques
- Choose and apply some of requirements specification and documentation techniques
- Apply appropriate requirements validation techniques
- Learn new requirements engineering methods and techniques

Contents:
* Requirements traceability
* Different stakeholder viewpoints and requirement categories
* Requirements change
* Problem structuring methods
* Requirements engineering skills and techniques in iterative development environment

* Requirements identification, elicitation, specification and documentation techniques
* Requirements prioritization and validation techniques
Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Lectures and exercises 32 h; independent work, weekly assignments and group project 101 h. Alternatively, independend study and book exam 133 h.
Target group:
B.Sc. students.
Prerequisites and co-requisites:
The required prerequisite is that the learning outcomes of the following courses are accomplished: Introduction to Software Engineering
Recommended optional programme components:

Recommended or required reading:
Wiegers, Karl & Beatty, Joy (2013). Software Requirements, 3rd Edition.
Assessment methods and criteria:
Active participation (lectures, weekly assignments and group project), or alternatively book exam
Grading:
Numerical scale 1-5 or fail.
Person responsible:
Markus Kelanti

815345A: Software Architectures, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Juustila, Antti Juhani

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 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 3rd spring semester of the Bachelor's studies.
Learning outcomes:
The goal of the course is to give the students an overview of the concepts and techniques related to software architectures. The focus of the architectural solutions is in the object oriented systems, but the course addresses also generic architectural models and techniques supporting architectures. After the course, the student is able to identify and analyse different architectural solutions and understands the pros and cons of these, from the perspective of building and running software, as well as from the viewpoint of quality and maintainability. The student is able to describe architectural solutions and elements of these, as well as different interfaces, using the modeling techniques of UML. The student is able to create alternative architectural solutions based on functional and non-functional requirements, using different design methods and techniques of architectural design, as well as evaluate the solutions' fit to use. The student is able to differentiate the design of product and product family architectures from the design of more usual software architectures.

Contents:
The fundamentals of software architectures. Documenting software architectures. Components and interfaces, Software dependencies. Design patterns. Architectural styles. Product line architectures. Frameworks, Evaluation methods of software architectures.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures 24 h, exercises 20 h, exercise work as group work 90 h.

Target group:
 BSc students.
Prerequisites and co-requisites:
The required prerequisite is that the learning outcomes of the following courses are accomplished: Data Modeling and Design
Recommended or required reading:
Robert Hanmer: Pattern-Oriented Software Architecture For Dummies, 2013; K. Koskimies, T. Mikkonen: Ohjelmistoarkkitehtuurit. Talentum 2005; L. Bass, R. Clements, R. Kazman: Software Architecture in Practice. Addison-Wesley 2003; Other material mentioned in the course.
Assessment methods and criteria:
The evaluation of the course is based on the learning outcomes of the course. The course is passed by participating in the course assignments as well as by evaluation of the exercise work. Detailed evaluation principles are announced in the wiki page of the course.

Grading:
Numerical scale 1-5 or fail.
Person responsible:
Antti Juustila
Working life cooperation:
Guest lectures

811301A: Software Modeling and Design, 5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Tero Päivärinta

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work
Language of instruction:
Finnish
Timing:
The course is held in the autumn semester, during period 1. It is recommended to complete the course at the 2nd autumn semester of the Bachelor's studies.
Learning outcomes:
After completing the course, the student is able to:
•know possibilities of UML-language family to describe different views of software development
• produce detailed descriptions using static and dynamic modelling as well how to produce code from design
• know principles of object-orientation, reverse engineering and general principles and concepts of software design (such as abstraction, modularization, cohesion, connectedness)
•knows some best practices.
Contents:
Some of UML -diagrams (at least class, sequence and static diagrams). Principles of object-orientation and quality aspects of it. Design best practices.
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 32 h, exercises 32 h, self study 66 h
Target group:
BSc students
Prerequisites and co-requisites:
The required prerequisite is that the learning outcomes of the following courses are accomplished: Requirements Engineering, Programming 2, Humans as Users and Developers of Infomation Technology, Devices and Data Networks, Information Security, as well as Introduction to Software Business
Recommended optional programme components:
Elementary course of object-oriented programming is a compolsory prerequisite. Basic knowledge of object programming and information systems analysis and design are assumed.

Assessment methods and criteria:
Examination and week exams.
Weekly every exercises will be evaluated. Moreover there will an examination of topics not covered in exercises. All must be passed.
Grading:
Numerical scale 1-5 or fail
Person responsible:
Not implemented during academic year 2019-2020
Tero Päivärinta

811306A: Software Quality, 5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Mika Mäntylä

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work
Language of instruction:
Finnish
Timing:
The course is held in the autumn semester, during period 2. It is recommended to complete the course at the 2nd autumn semester of the Bachelor's studies."Demonstrate understanding of different views on software quality and the role of testing in software engineering
Able to detect defects in software using different techniques
Know testing levels, and techniques
Can create test cases and conduct unit testing with appropriate testing tools
Demonstrate the basics of test-driven development and test automation
Able to define the scope of software testing and quality assurance projects"
Learning outcomes:
Demonstrate understanding of different views on software quality and the role of testing in software engineering
Able to detect defects in software using different techniques
Know testing levels, and techniques
Can create test cases and conduct unit testing with appropriate testing tools
Demonstrate the basics of test-driven development and test automation
Able to define the scope of software testing and quality assurance projects
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Independent work, Group exercise sessions, Lectures, Project Based Learning, Visiting Lectures from Industry
Target group:
BSc students
Prerequisites and co-requisites:
The required prerequisite is that the learning outcomes of the following courses are accomplished: Software Modeling and Design
Assessment methods and criteria:
Lab Exercise Deliverables, Quiz, Final exam, Student project
Grading:
Numerical scale 1-5 or fail
Person responsible:
Not implemented during academic year 2019-2020
Mika Mäntylä
Working life cooperation:
Guest lectures when available

811312A: Data Structures and Algorithms, 5 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Ari Vesanen

Opintokohteen kielet: Finnish

Leikkaavuudet:

   521144A   Algorithms and Data Structures   6.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish. One English exercise group will be arranged.
Timing:
The course is held in the autumn semester, during period 2. It is recommended to complete the course in the 2nd autumn semester of the Bachelor's studies.
Learning outcomes:
After completing the course the student is able to
- Select a data structure and an algorithm to an application
- Analyze correctness and time complexity of an algorithm implemented in a program
- Apply induction when proving algorithm correctness and define recursive algorithms
- Describe the most common sorting algorithms
- Describe trees, graphs and their basic algorithms, and apply them in a program
Contents:
* Basic data structures
* Analysis of algorithms
* Sorting algorithms
* Hash tables
* Binary search trees
* Graphs and their algorithms
* Algorithm design paradigms
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures 48 h, exercises 21 h, exercise work 27 h, independent study 39 h.

Target group:
BSc students.
Prerequisites and co-requisites:
The required prerequisite is that the learning outcomes of the following courses are accomplished: Databases

Recommended optional programme components:

Recommended or required reading:
Cormen, Leiserson, Rivest, Stein: Introduction to algorithms, Second edition, MIT Press 2001 (or newer) and other material defined during the course.

Assessment methods and criteria:
1. Exam and assignment OR 2. Mid-term exams (2) and assignment
Grading:
Numerical scale 1-5 or fail.
Person responsible:
Ari Vesanen

811325A: Databases, 5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Iisakka, Juha Veikko

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work
Language of instruction:
Finnish
Timing:
The course is held in the autumn semester, during period 1. It is recommended to complete the course in the 2nd year autumn semester of the Bachelor's studies.
Learning outcomes:
Upon the successful completion of this course, the student is able to:
• Apply the theory of the relational databases and the basics of the set theory.
* Build a good quality relational database and use queries.
* Use a relational database for storing persistent objects.
* Use conceptual modelling for designing databases.
* Normalise a database and assess its quality.
Contents:
* Conceptual modelling
* Relational model and database
* SQL
* Quality of database
* Storing objects to the relational database
Mode of delivery:
Face-to-face teaching
Learning activities and teaching methods:
Lectures 40 h, exercises 24 h, computer exercises 40 h, self-study10 h
Target group:
BSc students
Prerequisites and co-requisites:
The required prerequisite is that the learning outcomes of the following courses and their predecessors are accomplished: Programming 2.
Recommended or required reading:
Ramez Elmasri and Shamkant Navathe. 2017. Fundamentals of Database Systems (7th ed.). Addison-Wesley Publishing Company, USA.
Assessment methods and criteria:
Continuous evaluation. The course will be divided to parts. Every part will be evaluated and all parts must pass.
Grading:
Numerical scale 1-5 or fail
Person responsible:
Not implemented during academic year 2019-2020
Juha Iisakka

811104P: Programming 1, 5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Ilkka Räsänen

Opintokohteen kielet: Finnish

Leikkaavuudet:

   ay811104P   Programming 1 (OPEN UNI)   5.0 op

ECTS Credits:
5 ECTS credits / 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 1st autumn semester of the Bachelor's studies.
Learning outcomes:
After completion of this course, the student is able to:
- Create simple working programs
- Identify basic control structures and use them in the program.
- Identify the concepts of modularity, table, storage of information, and use them in the program.
- Find and fix errors in the program.
- Solve a computational problem by using abstraction and stepwise refinement
- Explain the concept of recursion.
- Operate with binary and hexadecimal number systems, as well as knows the presentation of numbers on a computer.
- Document the program.
Contents:
1. Software design method (waterfall) 2. Problem solving 3. Stepwise refinement 4. Control structures 5. Modular programming, calling modules, communication between modules 6. Data types 7. Arrays 8. Pointers 9. Character strings 10. Data structures 11. Storing data.
Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Lecture (in Finnish) 40 h, exercises 24 h, self-study 70 h
Target group:
BSc students
Recommended or required reading:
Deitel, Deitel: C HOW TO PROGRAM;
Pearson Education Inc. 2007, or a newer edition.
Lecture slides.
Assessment methods and criteria:
1. Final exam and exercise points and programming assignment. OR 2. Mid-term exams (2) and exercise points and home programming assignment.
Grading:
Numerical scale 1-5 or fail
Person responsible:
Ilkka Räsänen

811322A: Programming 2, 5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

Leikkaavuudet:

   ay811322A   Programming 2 (OPEN UNI)   5.0 op

ECTS Credits:
5 ECTS credits / 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 1st spring semester of the Bachelor's studies.
Learning outcomes:
Upon the successful completion of this course, the student is able to: * Describe the principles of object paradigm (encapsulation, polymorphism, inheritance, composition), generics, and design patterns and is able to utilise these

concepts when creating software. * Describe exception and error management and create fault tolerant programs. * Explain the connection between the UML models and the source code. * Test an application and interpret the structure and functionality of the source code. * Use basic programming tools, such as a version control system, an IDE, and code analysis tools.

Contents:
The concept of an object, encapsulation, composition, inheritance, polymorphism, exceptions, UML charts and code, generics (templates), libraries, containers, design patterns, development tools, version control, documenting, unit testing.

Mode of delivery:
Face-to-face teaching, can also be implemented as blended teaching

Learning activities and teaching methods:
Lectures 32 h and laboratory exercises 24 h (or an equivalent amount of independent learning) plus weekly assignments and independent work 72 h

Target group:
BSc students

Prerequisites and co-requisites:
The required prerequisite is that the learning outcomes of the following courses are accomplished: Programming 1

Recommended or required reading:
Timothy Budd: Introduction to object-oriented programming, 3rd edition, and other material announced in the beginning of the course.

Assessment methods and criteria:
The weekly assignments (preferred) or a final exam in Examinarium + a programming assignment.

Grading:
Numerical scale 1-5 or fail

Person responsible:
Antti Siirtola

811367A: Programming 3, 5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Markus Kelanti

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work

Language of instruction:
Finnish

Timing:
The course is held in the spring semester, during period 3. It is recommended to complete the course at the 2nd spring semester of the Bachelor's studies.

Learning outcomes:
Upon the successful completion of this course, the student is able to: *Recognise the influence and requirements of the interface specification on the server development and is able to apply them in his/her own work. *Implement and document a good quality database and use it in an application. *Implement and document the server functionality of a client-server application and apply concurrency when appropriate. *Use existing programming interfaces and message passing protocols in a server application *Test a server application and interpret code written by someone else. *Use programming tools, such as a version control system, an IDE, and code analysis tools in the server development.

Contents:
Databases, database programming, data formats, the design, implementation, and testing of a server interface, the safety and security of a server, concurrency.

Mode of delivery:
Face-to-face teaching, may also be implemented as blended teaching

Learning activities and teaching methods:
Lectures 32 h and laboratory exercises 24 h (or an equivalent amount of independent learning) plus weekly assignments and independent work 72 h

Target group:

BSc students
Prerequisites and co-requisites:
The required prerequisite is that the learning outcomes of the following courses are accomplished: Data Structures and Algorithms
Recommended or required reading:
Announced in the beginning of the course.
Assessment methods and criteria:
Programming assignments.
Grading:
Numerical scale 1-5 or fail
Person responsible:
Not implemented during academic year 2019-2020
Markus Kelanti

811368A: Programming 4, 5 op

Voimassaolo: 01.08.2019 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Lappalainen, Jouni Esko Antero

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 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 2nd spring semester of the Bachelor's studies.
Learning outcomes:
Upon the successful completion of this course, the student is able to:
* recognise the influence and requirements of the design/implementation interface on the user interface development process and is able to apply them in his/her own work
* utilize UI libraries and frameworks in his/her application
* implement and document the client functionality of a client-server application
* test the application and test and interpret the code and the application structure with its effects to testing, maintenance and further development.
* use programming tools, such as a version control system, an IDE, and code analysis tools
* function as a member of a software development team
Contents:
User interface elements, foundations of user interface libraries, user interface design principles, user interface layout, the relationship between user interfaces and software architectures, web usability, web user interfaces, web programming.
Mode of delivery:
Blended teaching
Learning activities and teaching methods:
Exercise 24h, coursework 75h, independent study 35h
Target group:
BSc students
Prerequisites and co-requisites:
The required prerequisite is that the learning outcomes of the following courses are accomplished: Programming 3
Recommended or required reading:
Provided reading material during the course.
In addition, Lauesen, S. 2005. User Interface Design: A Software Engineering Perspective.
Assessment methods and criteria:
The student must submit coursework that fulfils the given requirements (defined during the course), as well as answers to given study questions.
Grading:
Numerical scale 1-5 or fail

Person responsible:
Not implemented during academic year 2019-2020
Jouni Lappalainen

811379A: Basics of Human Computer Interaction, 5 op

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Netta Iivari

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay811379A   Basics of Human Computer Interaction (OPEN UNI)   5.0 op

812327A   Introduction to HCI design   4.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish
Timing:
The course is held in the autumn semester, during period 2. It is recommended to complete the course at the 2nd autumn semester of the Bachelor's studies.
Learning outcomes:
Upon completion of the course, the student will be able to define basic concepts of user interface design, introduce basic design process with design and evaluation methods and tasks, and apply graphical user interface design from the viewpoint of a certain user group and system.

Contents:
Basic concepts of user interface design and usability evaluation; user-centred design process; gathering of user data, analysis, expert evaluation and design by prototyping, user-based evaluation; universal design and user support; user interface description.

Learning activities and teaching methods:
Lectures 20 h, guided group assignment tasks in exercises 21 h and without guidance in assignment groups 58 h; seminar 3 h; individual tasks 31 h.
Target group:
BSc students.
Prerequisites and co-requisites:
Humans as Users and Developers of Information Technology (811177P) -course or related knowledge.

Recommended optional programme components:

Recommended or required reading:
Dix et al. (2004, third or later edition) *Human-Computer Interaction* and lecture and assignment materials.

Assessment methods and criteria:
During the course, the students will be compiling the group assignments and individual integration tasks on their implementation. These will be assessed based on the learning outcomes of the course. The assessment criteria and the requirements will be explained in detail during the opening lecture of the course.

Grading:
Numerical scale 1-5 or fail.
Person responsible:
Helena Tokkonen

813316A: Business Process Modeling, 5 op

Voimassaolo: 01.08.2010 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Dorina Rajanen

Opintokohteen kielet: English

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
English

Timing:
The course is held in the spring semester, during period 4. It is recommended to complete the course at the 3rd spring semester of the Bachelor's studies.
Learning outcomes:
After completing the course, the student are able to:
* model and design business processes;
* use a computer-based process modeling tool;
* distinguish between business process change on the enterprise level, business process level and the implementation level; as well as
* design process architecture in teamwork with other students.

Contents:
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.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures 26 h (or exam), exercises 13 h, individual assignments (lecture assignments, small process model, etc.) 34 h, large process model (group work) 60 h.

Target group:
 BSc students.
Recommended or required reading:
Harmon, Paul (2007). Business Process Change. A Guide for Business Managers and BPM and Six Sigma Professionals. Morgan Kaufmann Publishers. Additional material to be announced during the course.
Assessment methods and criteria:
This course unit utilizes continuous assessment. Students can either participate in the lectures (min. 85 % attendance required) or take the exam. All students will write lecture assigments, and will create a process architecture / model with a software tool. The assessment of the course unit is based on the learning outcomes of the course unit.

Grading:
Numerical scale 1-5 or fail.
Person responsible:
Dorina Rajanen

811177P: Humans as Users and Developers of Information Technology, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Tonja Molin-Juustila

Opintokohteen kielet: Finnish

Leikkaavuudet:

ay811177P   Humans as Users and Developers of Information Technology (OPEN UNI)   5.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.

Language of instruction:
Finnish.
Timing:
The course is held in the autumn semester, during period 2. It is recommended to complete the course at the 1st autumn semester of the Bachelor's studies.

Learning outcomes:
After completing the course, the student is able to:
* examine humans as both users and developers of information technology,
* explain core concepts of the phenomenon, and understands their meaning in relation to practice, as well as
* describe the background of usability research and some of its scientific theories.
Contents:
The key themes and concepts of the course are the diversity of information technology, humans as users and developers of information technology, usability, use and user experience, user-centred design and service design.
Mode of delivery:
Blended teaching.

Learning activities and teaching methods:
Lectures (24 h), home assignments and written task based on required reading (about 106 h).

Target group:
BSc students.
Recommended or required reading:
Antti Oulasvirta (ed.): "Ihmisen ja tietokoneen vuorovaikutus" (2011), parts I and II. In addition, the material during lectures and other supplementary material.

Assessment methods and criteria:
Home assignments, individual essay, and optional advanced assignment.

Grading:
Numerical scale 1-5 or fail.
Person responsible:
Tonja Molin-Juustila

812332A: Information Systems Design, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.
Language of instruction:
Finnish
Timing:
The course is held in the spring semester, during period 3. It is recommended to complete the course in the 3rd year spring semester of Bachelor's studies.
Learning outcomes:
After completing the course, the student is able to understand the link between information system design and organizational development, and to apply such a system design method in an organizational context.
Contents:

During the course the students complete a group exercise (typically in groups of 4 persons) using Contextual Design method and its design stages that lead to actual information systems implementation.

Mode of delivery:
Face-to-face teaching.

Learning activities and teaching methods:
Lectures 24 h, exercises 18 h, seminar 12 h.

Target group:
BSc students

Prerequisites and co-requisites:
Prerequisite is 811169P Introduction to Information Systems Design.

Recommended or required reading:
Preferable: Beyer, H. Holtzblatt, K. (1998): Contextual Design: Defining Customer-Centered Systems. San Francisco: Morgan Kaufmann Publishers, Inc. Alternative: Holtzblatt, K., & Beyer, H. (2016). Contextual design: Design for life. Morgan Kaufmann.

Assessment methods and criteria:
The course is normally completed as group work, and the output is presented in a course seminar. The work follows the stages of Contextual Design method and the exercise assignments support the completion of the course work. Course work reports are presented and reviewed in a final seminar. In special circumstances the course can also be completed as individual work.

Grading:
Numerical scale 1-5 or fail.

Person responsible:
Liisa Kuonanoja

812305A: Information Systems in Organisations, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 hours of work.

Language of instruction:
Finnish

Timing:
The course is held in the autumn semester, during period 4. It is recommended to complete the course in the 1st autumn semester of the Bachelor's studies.

Learning outcomes:
After completing the course, the student:
-is able to explain the importance of information systems in organizations, -is able to define the conditions for the successful operation of the information in the organization.

Contents:
The basics issues of organization, structure, and operation, the basics of a digital organization, information types and roles of the organizations, interaction between information and organization, the role of information systems in the management of organizations and decision-making, formation of organizational knowledge and management, enterprise resource planning (ERP) systems, organizational reform of information systems and the economic importance of information systems.

Mode of delivery:
Face-to-face teaching.

Learning activities and teaching methods:
Lectures 20 h, independent study of the course literature, weekly tasks and scientific essay 110 h.

Target group:
BSc students.

Recommended or required reading:

Lecture materials and Laudon, K. C. (2018). Management information systems: Managing the digital firm (Fifteenth edition, global edition.). Harlow, England: Pearson. Alternatively Wallace, Patricia: Information Systems in Organizations, People, Technology, and Processes. Pearson 2013.
Assessment methods and criteria:
Active participation in lectures. Weekly tasks and scientific essay.
Grading:
Numerical scale 1-5 or fail.
Person responsible:
Liisa Kuonanoja
Working life cooperation:
Visiting lecturers from companies and other organizations

811167P: Introduction to Information Systems Design, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Basic Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Mikko Rajanen

Opintokohteen kielet: Finnish

Leikkaavuudet:

   ay811167P   Introduction to Information Systems Design (OPEN UNI)   5.0 op

ECTS Credits:
5 ECTS credits / 133 hours of work.

Language of instruction:
Finnish
Timing:
The course is held in the spring semester, during period 3. It is recommended to complete the course in the 2nd spring semester.

The course is held in the spring semester, during period 3. It is recommended to complete the course in the 1st study year.

Learning outcomes:
After completing the course, the student will be able to: Explain the main areas of the information system design on technical level, main design process models for the information system design, basics of the requirement gathering, basics of the information system initialization, and basics of how to evaluate information systems.; Produce use-case descriptions, use-case diagrams and other types of diagrams and descriptions needed to model the operational environment of the information system.

Contents:
Basic concepts of Information Systems, Information System Design, Information System Modeling, Operational Environment Modeling, Process models for Information System Development, Evaluation of Information Systems.

Mode of delivery:
Face-to-face teaching.

Learning activities and teaching methods:
Lectures 27 h, exercises 21 h, assignment 85 h, exam 3 h.

Lectures (27h), Exercises (21h), Assignment (85h), Exam (3h).

Target group:
BSc students.
Recommended or required reading:
Satzinger, Jackson ja Burd (2007), Systems Analysis and Design in a Changing World. Hoffer, George and Valacich (2008), Modern systems Analysis and Design, 5. painos.

Assessment methods and criteria:
Exam and mandatory assignment.

Grading:
Numerical scale 1-5 or fail.
Person responsible:
Mikko Rajanen

813307A: IPS (TOL), Maturity Test for Bachelor 's Degree, 0 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

Ei opintojaksokuvauksia.

811383A: Bachelor Thesis, 7 op

Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

ECTS Credits:
7 ECTS credits/187 hours of work

Language of instruction:

Timing:
3rd year, timing is free
Learning outcomes:
After completing the course, a student is able to:

- Produce their own research work, stage a concrete plan and refine it as the work progresses;
- Find the source materials as well as the library electronic databases;
- Analyse scientific texts and make them a source of criticism;
- Produce well-structured scientific text;
- Identify their work against future problems;
- Ask for advice and the counsellor will use the guidance in favour of work-testing plan.

Contents:
Each student will be guided based on the research literature.
Mode of delivery:
Guided self-motivated work
Learning activities and teaching methods:
Students prepare calendars of work as part of the research plan. The student has personal meetings with the supervisor or instructor to discuss topic selection and scoping, the research plan, the final review of the literature and a thesis draft. The director, depending on the thesis, may also be associated with other students via meetings for interaction.
Target group:
Bachelor level students.
Prerequisites and co-requisites:
Compulsory basic studies in the major subject (about 60 credits) completed, in particular an introduction to research work-study modules to prepare the thesis for BSc. During the course or immediately after, the course is part of the pre-Master's thesis. Written final test conducted on the research topic.

Recommended optional programme components:

Recommended or required reading:
The student's self-written material, institution and the instructor advice and scientific research and support material. Written work must be in compliance with the institution's formal guidelines.

Assessment methods and criteria:

Course requires a Bachelor's thesis preparation. In addition, the course may be included in the pilot, as determined by scientific research-related tasks.
Read more about assessment criteria at the University of Oulu webpage.
Grading:
Approved / failed
Person responsible:
Raija Halonen
Working life cooperation:
No

811370A: Bachelor's Seminar, 3 op

Voimassaolo: 01.08.2019 -
Opiskelumuoto: Intermediate Studies
Laji: Course
Vastuuyksikkö: Information Processing Science DP
Arvostelu: 1 - 5, pass, fail
Opintokohteen kielet: Finnish

811393A: Introduction to research work, 5 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Halonen, Raija Helena

Opintokohteen kielet: Finnish

ECTS Credits:
5 ECTS credits / 133 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 2nd spring semester of the Bachelor's studies.
Learning outcomes:
The student understands the role of science in the community and at the university, and knows how the research of the curriculum is situated in the discipline. The student can name the phases of a research process and how they are connected with each other. The student understands the significance of scientific publishing, identifies different forums for publishing, and knows at least two ways to evaluate research - the quality of the forum and number of citations. The student understands the value of scientific argumentation, knows its structure and can analyse simple argumentation structures. The student identifies the role of empirical research material in research and knows some main data collection and analysis methods and reasons to choose them. The student can write search strings into databases and use them.
Contents:
Introduction, nature of knowledge, concept of research, deception, basics of qualitative, quantitative, constructive and literature research methos, reporting and argumentation, research process and evaluation, reporting of own study and commenting others'.
Mode of delivery:
Face-to-face teaching.
Learning activities and teaching methods:
Lectures 18 h, excercise 33 h, independent work 82 h.
Target group:
BSc students.
Recommended optional programme components:
Information Skills (030005P), Launch your career through comminication (900105Y), BSc thesis (811383A).
Recommended or required reading:
Lecture notes, additional articles.
Assessment methods and criteria:
Active implementation based on activity and presense & written thesis as guided, active doing during excercise hours, or independent study according to separate guidelines.
Grading:
Numerical scale 1-5 or fail; pass or fail for independent study.
Person responsible:
Raija Halonen
Working life cooperation:
No

811366A: Project Work, 10 op

Voimassaolo: 01.08.2015 -

Opiskelumuoto: Intermediate Studies

Laji: Course

Vastuuyksikkö: Information Processing Science DP

Arvostelu: 1 - 5, pass, fail

Opettajat: Iisakka, Juha Veikko

Opintokohteen kielet: Finnish

Leikkaavuudet:

811311A   Project Management Principles   3.0 op

811365A   Project I   7.0 op

811108P   Basics of Project Work and Management   3.0 op

811308A   Principles of Project Work   4.0 op

ECTS Credits:
10 ECTS credits / 267 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 in the 3rd spring semester of the Bachelor's studies.

Learning outcomes:
Upon completion of the course, the student will be able to tell about concepts and methods related to software projects, split a project into phases and tasks, resource and schedule the tasks, gather information on the progress of a project and based on it, make project related decisions, apply theory on project work and management in practice, recognise risks of software projects and prepare for them, work as a member of a project team, communicate with stakeholders by using both written and spoken language and apply his/her experience on design, implementation and testing to software and/or academic research projects.

Contents:
Project as a working method, splitting a project into phases and tasks, resourcing, and scheduling, recognising and preparing for risks, project management tools, the follow-up of a project, reporting, meeting skills, practical work in a software or academic research project.

Mode of delivery:
Face-to face teaching.

Learning activities and teaching methods:
Info lecture 1 h, lectures 20 h, assignments and practical project work 240 h.

Target group:
BSc students.

Prerequisites and co-requisites:
The compulsory prerequisites are Introduction to Programming (811122P), Object-Oriented Programming (812347A), Advanced Object-Oriented Programming (812339A), Object-Oriented Analysis and Design (812346A), Data Structures and Algorithms (811312A), Basics of Databases (811380A) and Software Engineering (811335A).

Recommended optional programme components:
The recommended prerequisites are User Interface Programming (811375A), Software Architectures (815345A), and Database systems (811384A).

Recommended or required reading:
Lecture slides, R. Pressman, Software Engineering: A Practitioner's Approach. McGraw-Hill, 2005 and all other material given / presented during the course.

Assessment methods and criteria:
The assessment of the course unit is based on the learning outcomes of the course unit. The student must complete all assignments and work toward the completion of the project tasks for the required amount of time. More detailed assessment criteria are available in the learning environment of the course.

Grading:
Pass or fail

Person responsible:
Juha Iisakka

Working life cooperation:
The students will work in projects ordered by customer organisations while simulating software development as authentically as possible in a real working environment.

Other information:
Enrollment by the end of November. Enrollment is binding. There will be an info lecture in December before the course starts.