Master of Applied Computer Science 2014 - 2016

Mandatory course, V - Optional course

MA110 Systems Development

Course leader
Ravi Vatrapu & Tor-Morten Grønli

Course
Systems Development

ECTS (European Credit Transfer System)
7.50

Date of approval

Aim
Students will gain knowledge of models, theories, and frameworks for information systems development from the research traditions of Action Research, Design Science, Scandinavian Participatory Design, and Engaged Scholarship. Students will obtain an overview of the technologies, tools, and platforms central to the upcoming courses Master programme. Students will also gain knowledge of software documentation, data collection, data analysis, and technical writing.

Prerequisites
None

Learning outcomes
A candidate who has completed this course should have the following learning outcomes defined in terms of knowledge, skills and general competence

Knowledge:
On successful completion of this course the candidate:

- has advanced knowledge of Design Science, Scandinavian Participatory Design, and Engaged Scholarship
- has advanced knowledge of the key technologies, tools, and platforms used in software integration
- has advanced knowledge of important constraints related to information systems development lifecycle

Skills:
On successful completion of this course the candidate:

- can analyse the different research modes available for information systems development projects
- can identify and choose the appropriate methods, tools, techniques and frameworks for a given information systems development project
- can conduct projects with proper software documentation, data collection, data analysis, and technical writing.

General competence:

- can describe and discuss research issues and practical challenges in information systems development
- can select the appropriate models, theories, and frameworks for technology integration oriented information systems development
- can identify and analyse research ethics in information systems development

Structure
The course is structured in block mode for four weeks. The first three weeks will be a combination of lectures and presentations in class. The last week is for self-study and essay writing.

Recommended workload

<table>
<thead>
<tr>
<th>Aktivitet</th>
<th>Tidsbruk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deltakelse i undervisning</td>
<td>36</td>
</tr>
<tr>
<td>Selvstudium</td>
<td>75</td>
</tr>
<tr>
<td>Forberedelse til presentasjon/diskusjon i klassen</td>
<td>15</td>
</tr>
<tr>
<td>Øving</td>
<td>55</td>
</tr>
<tr>
<td>Vurdering</td>
<td>18</td>
</tr>
</tbody>
</table>
A course pack with selected papers will be handed out on start of module.

### Literature:

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Publisher</th>
<th>ISBN</th>
<th>Version</th>
<th>Comment</th>
<th>Type</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>A course pack with selected papers will be handed out on start of module</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bok</td>
<td>Pensum</td>
</tr>
</tbody>
</table>

### MA120 Big Data

**Master**

**Code**

MA120

**Course**

Big Data

**ECTS (European Credit Transfer System)**

7.50

**Course leader**

Naimdjon Takhirov

**Date of approval**

**Aim**

Students will gain advanced knowledge of key theories and concepts of big data analytics. They will acquire specialised problem-solving skills, being able to bring together several key technologies used in manipulating, storing, and analysing big data. They shall take responsibility to conduct the planning and implementation of activities and evaluate the organisations value of big data analytics.

**Learning outcomes**

A candidate who has completed this course should have the following learning outcomes defined in terms of knowledge, skills and general competence:

**Knowledge:**

On successful completion of this course the candidate:

- has thorough knowledge of the theoretical and practical concept of big data analytics.
- has advanced knowledge of methods and tool for manipulating, storing and analysing big data.

**Skills:**

On successful completion of this course the candidate:

- can use Hadoop and related tools that provide SQL-like access to unstructured data.
- can analyze NoSQL storage solutions such as HBase, Cassandra, Oracle NoSQL or similar, for their critical features.
- can examine memory resident databases and streaming technologies which allow analysis of data on the flight.
- can use public or private Cloud as a resource for big data analytics.

**General competence:**

- can design highly scalable systems that can accept, process, store, and analyse large volumes of unstructured data in (near) real time.
- can critically evaluate ethical issues related to big data analytics.

**Structure**

The course is structured in block mode for four weeks. The first three weeks will be a combination of lectures and presentations in class. The last week is for self-study and essay writing.

<table>
<thead>
<tr>
<th>Aktivitet</th>
<th>Tidsbruk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delaktelse i undervisning</td>
<td>36</td>
</tr>
<tr>
<td>Selvstudium</td>
<td>76</td>
</tr>
<tr>
<td>Forberedelse til presentasjon/diskusjon i klassen</td>
<td>25</td>
</tr>
<tr>
<td>Øving</td>
<td>45</td>
</tr>
<tr>
<td>Vurdering</td>
<td>18</td>
</tr>
<tr>
<td>Anbefalt tidsbruk totalt</td>
<td>200</td>
</tr>
</tbody>
</table>

**Recommended workload**

**Technology and tools**

Pig and Hive, HBase, ZooKeeper, Cassandra, MongoDB, MemcacheDB, Storm.

**Grading system**

Letter grades A–E for passed and F for failure

**Type of assessment**

<table>
<thead>
<tr>
<th>Aktivitet</th>
<th>Tidsbruk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deltakelse i undervisning</td>
<td>36</td>
</tr>
<tr>
<td>Selvstudium</td>
<td>76</td>
</tr>
<tr>
<td>Forberedelse til presentasjon/diskusjon i klassen</td>
<td>25</td>
</tr>
<tr>
<td>Øving</td>
<td>45</td>
</tr>
<tr>
<td>Vurdering</td>
<td>18</td>
</tr>
<tr>
<td>Anbefalt tidsbruk totalt</td>
<td>200</td>
</tr>
</tbody>
</table>

**Anbefalt tidsbruk totalt**

200

**Grading system**

Letter grades A–E for passed and F for failure

**Type of assessment**

- A nbefalt tidsbruk totalt: 200
Innlevering

Literature:

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Publisher</th>
<th>Published</th>
<th>ISBN</th>
<th>Version</th>
<th>Comment</th>
<th>Type</th>
<th>Litterature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hadoop: The Definitive Guide</td>
<td>Tome White</td>
<td>O’Reilly Media / Yahoo</td>
<td>2012</td>
<td>978-1-4493-1152-0</td>
<td>3</td>
<td></td>
<td>Bok</td>
<td>Pensum</td>
</tr>
<tr>
<td>Mining of Massive Datasets</td>
<td>Leskovec J., Ra</td>
<td>Addision Wesley</td>
<td>2014</td>
<td>978-0321826626</td>
<td>2</td>
<td></td>
<td>Bok</td>
<td>Pensum</td>
</tr>
<tr>
<td>NoSQL A brief guide to the emerging world of polyglot persistence</td>
<td>Sadalage, R. G. and Fowler, M</td>
<td></td>
<td>2012</td>
<td>978-0321826626</td>
<td>2</td>
<td></td>
<td>Bok</td>
<td>Pensum</td>
</tr>
<tr>
<td>Selected papers will be made available at start of the course</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Tidsskrift</td>
<td>Pensum</td>
</tr>
</tbody>
</table>

MA130 Visual Analytics

Master

Code
MA130

Course
Visual Analytics

ECTS (European Credit Transfer System)
7.50

Course leader
Ravi Vatrapu

Date of approval

Aim
Students will gain knowledge about theoretical principles of and computational techniques for visual analytics. The course will enable students to design, develop, and evaluate information dashboards for organizations. The students shall be able to reflect upon the different models, theories, and frameworks for technology integration from a visual analytics perspective.

Prerequisites
Basic knowledge of human-computer interaction and good programming skills

Learning outcomes
A candidate who has completed this course should have the following learning outcomes defined in terms of knowledge, skills and general competence:

Knowledge:
On successful completion of this course the candidate:
- has advanced knowledge of the theoretical principles in visual analytics
- has thorough knowledge of the key technologies, tools, and platforms for visual analytics such as D3 for Data-Driven Documents, Google Charts API, Tableau, Many Eyes etc.
- has advance knowledge of important constraints related to the design, development, and evaluation of information dashboards

Skills:
On successful completion of this course the candidate:
- can analyse the different visual analytics principles and techniques such as focus+context, overview+detail, linking and brushing, pan and zoom etc.
- can select and apply the appropriate principles, methods, tools and techniques for a given dataset to order to create a meaningful and actionable information dashboard
- can do proof-of-concept design, evaluation, and documentation of an information dashboard from a dataset

General competence:
- can describe and discuss research issues and practical challenges in visual analytics
- can reflect upon the different models, theories, and frameworks for technology integration from a visual analytics perspective
- can identify and choose the appropriate principles, methods, tools and techniques for a given dataset to order to create a meaningful and actionable information dashboard
- can communicate the role of visual analytics in data-driven decision-making

Structure
The course is structured in block mode for four weeks. The first three weeks will be a combination of lectures and presentations in class. The last week is for self-study and essay writing.
### Recommended workload

<table>
<thead>
<tr>
<th>Aktivitet</th>
<th>Tidsbruk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deltakelse i undervisning</td>
<td>36</td>
</tr>
<tr>
<td>Selvstudium</td>
<td>76</td>
</tr>
<tr>
<td>Forberedelse til presentasjon/diskusjon i klassen</td>
<td>25</td>
</tr>
<tr>
<td>Øving</td>
<td>45</td>
</tr>
<tr>
<td>Vurdering</td>
<td>18</td>
</tr>
<tr>
<td>Anbefalt tidsbruk totalt</td>
<td>200</td>
</tr>
</tbody>
</table>

### Grading system

Letter grades A-E for passed and F for failure

### Type of assessment

Innlevering

### Literature:

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Publisher</th>
<th>Published</th>
<th>ISBN</th>
<th>Version</th>
<th>Comment</th>
<th>Type</th>
<th>Litterature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Visualization Perception for Design</td>
<td>Colin Ware</td>
<td>Elsevier</td>
<td>2012</td>
<td>978-0-12-381464-7</td>
<td>3</td>
<td>Bok</td>
<td>Pensum</td>
<td>Bok Pensum</td>
</tr>
<tr>
<td>Selected papers will be made available at start of the course</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### MA140 Integration Oriented Architecture

**Master**

**Code**

MA140

**Course**

Integration Oriented Architecture

**ECTS (European Credit Transfer System)**

7.50

**Course leader**

TBA

**Date of approval**

**Aim**

To give the students analytical skills, development methodology and technological skills in order to analyze, plan and implement technology integration projects. The course will be taught in the context of enterprise systems and distributed systems, which means that issues of network protocols, scalability and security will be emphasized.

**Learning outcomes**

A candidate who has completed this course should have the following learning outcomes defined in terms of knowledge, skills and general competence:

**Knowledge**

On successful completion of this course the candidate:

- has advanced knowledge of theories on heterogeneity, portability and interoperability
- has advanced knowledge of theory and technology on Service Orientation
- has advanced knowledge of architecture models, middleware
- has knowledge of principles of Identity Management in large scale systems
- has thorough knowledge of integration strategies (encapsulation, conversion, reengineering)

**Skills**

On successful completion of this course the candidate:

- can analyze integration problem from perspectives of error handling, resilience, data consistency, security etc.
- can select and use a range of integration technologies (SOA, MOM, other middleware)
- can do proof-of-concept development, testing and demonstration

**General competence**

On successful completion of this course the candidate:

- can suggest and evaluate integration plans
- can analyze past projects in order to improve existing methods
- can contribute with a modern perspective to large scale integration activities

**Structure**

The course is structured in block mode for four weeks. The first three weeks will be a combination of lectures and presentations in class. The last week is for self-study and essay writing.

**Recommended workload**

<table>
<thead>
<tr>
<th>Aktivitet</th>
<th>Tidsbruk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deltakelse i undervisning</td>
<td>36</td>
</tr>
</tbody>
</table>

http://nith.studiehandbok.no/eng/layout/set/print/content/view/complete/7709/language/eng-GB
MA210 Mobile Computing

Master

Code
MA210

Course
Mobile Computing

ECTS (European Credit Transfer System)
7.50

Course leader
George Ghinea

Date of approval

Aim
Students will gain in depth knowledge of mobile application development and user interaction. Students will further acquire knowledge of theories/models of mobile and pervasive computing applications, technologies and common research paradigms in mobile and pervasive computing such as context awareness, computing in an environment with limited resources, sensor-based interaction, and smart-device management. They will acquire skills in application design, architecture and implementation. Students will be expected to be able to analyse, discuss and critically reflect upon theories and research issues in mobile and pervasive computing.

Prerequisites
Intermediate programming skills, basic knowledge of distributed systems and/or computer networking

Learning outcomes
A candidate who has completed this course should have the following learning outcomes defined in terms of knowledge, skills and general competence:

Knowledge:
On successful completion of this course the candidate:

- has thorough knowledge of key paradigms and concepts in mobile computing such as context awareness, computing in an environment with limited resources, sensor-based interaction, and smart device management
- has advanced knowledge and understanding of the mobile user experience
- has advanced knowledge of theories/models in mobile computing
- has advanced knowledge of the main challenges in mobile computing

Skills:
On successful completion of this course the candidate:

- can plan, describe and sketch a mobile computing architecture
- can design and implement a mobile computing solution
- can assess business value potential of a mobile computing solution

General competence:
- can describe and discuss research issues in mobile computing such as mobile architecture, mobile cloud computing, user interface and user experience related issues
- can critically evaluate ethical issues related to mobile computing

Structure
The course is structured in block mode for four weeks. The first two weeks will be a combination of lectures, in-class demonstrations, case studies, in-class presentations and lab work. Guest lectures might be organized on chosen topics. Students work in groups under supervision. The last week is for self-study and project work.

Recommended workload

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Publisher</th>
<th>Published</th>
<th>ISBN</th>
<th>Version</th>
<th>Comment</th>
<th>Type</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>A course pack with selected papers will be handed out on start of module</td>
<td>Bass, L., Clements, P., and Kazman, R.</td>
<td>Addison-Wesley Professional</td>
<td>2012</td>
<td>978-0321815736</td>
<td>3</td>
<td>Bok</td>
<td>Pensum</td>
<td></td>
</tr>
</tbody>
</table>

Literature:
## MA220 Architecting the Internet of Things

**Master**

**Code**
MA220

**Course**
Architecting the Internet of Things

**ECTS (European Credit Transfer System)**
7.50

**Course leader**
Tor-Morten Grønli

**Date of approval**

**Aim**
The aim of the course is to introduce the Internet of Things (IoT) from a technical perspective. Emphasis is invested in relating the contemporary IoT theme to general distributed systems models and more specific aspects of IoT systems such as a general IoT systems model, key protocols for wired, architecture and wireless IoT systems software and hardware design for IoT.

**Prerequisites**
Basic knowledge of distributed systems and computer networking

**Learning outcomes**
A candidate who has completed this course should have the following learning outcomes defined in terms of knowledge, skills and general competence:

**Knowledge:**

On successful completion of this course the candidate:

- has thorough knowledge of the Internet of Things from a systems perspective
- has advanced knowledge of the key protocols in relation to RFID, different ambient sensors, embedded systems, and smartphones
- has thorough knowledge of important constraints related to design of IoT components

**Skills:**

On successful completion of this course the candidate:

- can analyse different products within IoT (e.g., RFID, sensors, mobile devices, smart house, etc.) from a technical systems perspective and address technical challenges related to specific functions
- can identify and choose the right components and architecture for a given IoT system
- can do proof-of-concept development, testing, and demonstration of an IoT system

**General competence:**

- can describe and discuss research issues in and industry applications of Internet of Things (IoT)
- can reflect upon the opportunities within Internet of Things (IoT) for technology integration
- can critically evaluate ethical issues related to IoT.

**Structure**
The course is structured in block mode for four weeks. The first two weeks will be a combination of lectures, in-class demonstrations, case studies, in-class presentations and lab work. Guest lectures will be organized on chosen topics. Students work in groups under supervision. The two last weeks are for self-study, project work and oral exam.

**Recommended workload**

### Tidslut

<table>
<thead>
<tr>
<th>Aktivitet</th>
<th>Tidslut</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deltakelse i undervisning</td>
<td>36</td>
</tr>
<tr>
<td>Selvstudium</td>
<td>64</td>
</tr>
<tr>
<td>Forberedelse til presentasjon/diskusjon i klassen</td>
<td>25</td>
</tr>
<tr>
<td>Øvning</td>
<td>-</td>
</tr>
<tr>
<td>Vurdering</td>
<td>75</td>
</tr>
<tr>
<td><strong>Anbefalt tidsbruk totalt</strong></td>
<td>200</td>
</tr>
</tbody>
</table>

**Grading system**
Letter grades A-E for passed and F for failure

**Type of assessment**
Innlevering

### Literature:

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Publisher</th>
<th>Published</th>
<th>ISBN</th>
<th>Version</th>
<th>Comment</th>
<th>Type</th>
<th>Litterature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selected article will be made available on course page</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ubiquitous Computing: Smart Devices, Environments and Interactions</td>
<td>Poslad</td>
<td>Wiley</td>
<td>2009</td>
<td>978-0470035603</td>
<td>1</td>
<td>Bok</td>
<td>Pensum</td>
<td></td>
</tr>
</tbody>
</table>

http://nith.studiehandbok.no/eng/layout/set/print/content/view/complete/7709/language/eng-GB

6/13
### Aktiviteter

<table>
<thead>
<tr>
<th>Aktivitet</th>
<th>Tidsbruk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deltakelse i undervisning</td>
<td>48</td>
</tr>
<tr>
<td>Selvstudium</td>
<td>76</td>
</tr>
<tr>
<td>Forberedelse til presentasjon/diskusjon i klassen</td>
<td>25</td>
</tr>
<tr>
<td>Øving</td>
<td>-</td>
</tr>
<tr>
<td>Vurdering</td>
<td>51</td>
</tr>
<tr>
<td>Anbefalt tidsbruk total</td>
<td>200</td>
</tr>
</tbody>
</table>

### Grade system

Letter grades A-E for passed and F for failure

**Type of assessment**

Innlevering

---

### Literature:

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Publisher</th>
<th>Published</th>
<th>ISBN</th>
<th>Version</th>
<th>Comment</th>
<th>Type</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecting the Internet of Things</td>
<td>Uckelmann, D. Harrison, M. and Michahelles, F.</td>
<td>Springer</td>
<td>2011</td>
<td>978-3642191565</td>
<td>1</td>
<td>Bok</td>
<td>Pensum</td>
<td></td>
</tr>
<tr>
<td>Selected articles will be made available at start of course</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bok</td>
<td>Pensum</td>
<td></td>
</tr>
</tbody>
</table>

---

**MA230 Interactive Technologies**

**Master**

**Code**

MA230

**Course**

Interactive Technologies

**ECTS (European Credit Transfer System)**

7.50

**Course leader**

Ravi Vatrapu

**Date of approval**

**Aim**

The aim of the course is to design, develop and evaluate interactive technologies with a focus on the enterprise context of use. Students will be immersed in a pedagogical experience that covers the full spectrum of design, development, use and evaluation of innovative and interactive enterprise technologies using smartphones, tablets, motion controllers, touch tables, and touch walls. Natural User Interfaces (NUI) will be a special focus of the course. Students will use state-of-the-art mobile eye-tracking solutions to evaluate the applications/products designed and developed.

**Prerequisites**

Good programing skills and basic design knowledge

**Learning outcomes**

A candidate who has completed this course should have the following learning outcomes defined in terms of knowledge, skills and general competence:

**Knowledge**

On successful completion of this course the candidate:

- has advanced knowledge of the aspects of and issues in Graphical User Interfaces (GUI) and Natural User Interfaces (NUI) and their role in software integration
- has thorough knowledge of the interactive systems lifecycle process (from envisioning to realization) with a focus on software integration
- has thorough knowledge of the tools and technologies (e.g., SDKs, IDEs, smartphones, tablets, motion controllers, touch tables, and touch walls) required to create interactive technologies
- can apply important theories, models, and frameworks from human computer interaction, software engineering, and information systems towards design, development, and evaluation of interactive technologies

**Skills**

On successful completion of this course the candidate:

- can analyze and deal critically with the design principles and technical documentation for envisioning and realizing interactive enterprise technologies
- can analyze existing theories, methods and interpretations in the field of interactive technologies and work independently on practical and theoretical problems with (e.g., smartphones, tablets, motion controllers, touch tables, and touch walls) and their applications in both current and near-future organizational context
- can carry out an independent development of an interactive technologies project under supervision and in accordance with applicable norms for research ethics

**General competence**

On successful completion of this course the candidate:
can apply his/her knowledge and skills in new areas in order to carry out advanced assignments and projects
- can analyze relevant academic, professional and research ethical problems with interactive technologies
- can communicate about academic issues, analyses and conclusions with regard to interactive technologies, both with specialists and the
general public
- can contribute to new thinking and innovation processes using interactive technologies

Structure
The course is structured in block mode for four weeks. The first two weeks will be a combination of lectures, in-class demonstrations, case
studies, in-class presentations and lab work. Guest lectures will be organized on chosen topics. Students work in groups under supervision. The
two last weeks are for self-study, project work and oral exam.

Recommended workload

<table>
<thead>
<tr>
<th>Aktivitet</th>
<th>Tidsbruk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deltakelse i undervisning</td>
<td>48</td>
</tr>
<tr>
<td>Selvstudium</td>
<td>64</td>
</tr>
<tr>
<td>Forberedelse til presentasjon/diskusjon i klassen</td>
<td>25</td>
</tr>
<tr>
<td>Øving</td>
<td>0</td>
</tr>
<tr>
<td>Vurdering</td>
<td>63</td>
</tr>
</tbody>
</table>

Anbefalt tidsbruk totalt

Type of assessment
Innlevering

Grading system
Letter grades A-E for passed and F for failure

Literature:

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Publisher</th>
<th>Published</th>
<th>ISBN</th>
<th>Version</th>
<th>Type</th>
<th>Litterature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designing Interactive Systems: A Comprehensive</td>
<td>Benyon, D</td>
<td>Pearson</td>
<td>2010</td>
<td>978-0321435330</td>
<td>2</td>
<td>Bok</td>
<td>Pensum</td>
</tr>
<tr>
<td>Guide to HCI and Interaction Design</td>
<td></td>
<td>Education Canada.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MS210 Agile Project Management

Master

Code
MS210

Course
Agile Project Management

ECTS (European Credit Transfer System)
7.50

Course leader
Tor-Morten Grønli

External examiner
Ketil Stadskleiv

Date of approval

Aim
Organizations need to develop project managers who can complete projects on time, within budget and and to the right quality. This course
addresses challenges such as the ability to manage projects, stakeholders, risk and do agile planning. Students will gain advanced knowledge
of the key theories of project management and agile development. They will acquire specialised problem-solving skills, being able to plan and
run a time-boxed iteration, and to use a project management tool. They shall take responsibility to conduct plan, organise and control an agile
IS project.

Prerequisites
Introduction to Research

Learning outcomes
After completing the course the student will be able to:

Knowledge
- Describe main theories of agile project management
- Define key concepts related to project management
- Identify and discuss agile project management methodologies

Skills
- Evaluate and assess risks in a project
- Recognize and mitigate the early sources of failure in the project life cycle
- Apply estimation techniques to a project requirements specification
- Create and evaluate project plans in a project management tool (Atlassian Jira)
- Run a time-boxed, incremental, iteration
Competence
- Understand the implications, challenges, and opportunities of organizational dynamics in project management
- Critically evaluate project management teams in an organisation

Structure
Block teaching for four weeks. There will be class teaching three days a week for the two first weeks. The course is structured as a combination of class teaching, group collaboration and presentation in class.

Recommended workload

<table>
<thead>
<tr>
<th>Aktivitet</th>
<th>Tidsbruk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deltakelse i undervisning</td>
<td>36</td>
</tr>
<tr>
<td>Selvstudium</td>
<td>76</td>
</tr>
<tr>
<td>Forberedelse til presentasjon/diskusjon i klassen</td>
<td>10</td>
</tr>
<tr>
<td>Øvning</td>
<td>23</td>
</tr>
<tr>
<td>Vurdering</td>
<td>55</td>
</tr>
<tr>
<td>Anbefalt tidsbruk total</td>
<td>200</td>
</tr>
</tbody>
</table>

Technology and tools
Atlassian Jira Studio

Grading system
Letter grades A-E for passed and F for failure

Curriculum
Cohn, Mike. Agile estimating and planning. Prentice Hall, 2005.

Type of assessment
Innlevering

Literature:

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Publisher</th>
<th>Published</th>
<th>ISBN</th>
<th>Version</th>
<th>Comment</th>
<th>Type</th>
<th>Litterature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agile estimating and planning.</td>
<td>Cohn, Mike</td>
<td>Prentice Hall</td>
<td>2005</td>
<td>978-0131479418</td>
<td>1</td>
<td>Bok</td>
<td>Pensum</td>
<td></td>
</tr>
<tr>
<td>Agile project management with Scrum.</td>
<td>Schwaber, Ken</td>
<td>Microsoft Press</td>
<td>2004</td>
<td>978-0735619937</td>
<td>1</td>
<td>Bok</td>
<td>Pensum</td>
<td></td>
</tr>
</tbody>
</table>

MS310 Consulting and Leadership

Master

Code
MS310

Course
Consulting and Leadership

ECTS (European Credit Transfer System)
7.50

Course leader
Eivind Brevik

External examiner
Lars Erik Aas, PDMT

Date of approval

Aim
This course focuses on the soft skills in management of information systems. Students will gain advanced knowledge of theories on leadership, change agents, ethics and required skills within IT-consultancy. They will acquire specialised problem-solving skills, being able to master the personal and organisational techniques required to participate in a change process, practising leadership and developing professional skills within consulting. They shall take responsibility to conduct a minor consulting project thru an agreement, plan and evaluation.

Prerequisites
First year of Master programme

Learning outcomes
After successfully completing the course the student will be able to:

Knowledge:
7.5.2015

Skills:
- Explain theories on organisational change and change management, leadership, ethics and human resources within knowledge based organisations
- Analyse case studies and research into the success (and failure) of IT-driven organisational change
- Use oral, negotiational and analytical skills as a change agent within organisational development

Competence:
- Plan, implement and evaluate a minor consulting project
- Critically evaluate ethical issues related to leadership and consultancy

Structure
The course is structured in block mode for four weeks. The first two weeks will be a combination of lectures and presentations in class. The two last weeks are for self-study and essay writing.

Recommended workload

<table>
<thead>
<tr>
<th>Aktivitet</th>
<th>Tidsbruk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deltakelse i undervisning</td>
<td>36</td>
</tr>
<tr>
<td>Selvstudium</td>
<td>59</td>
</tr>
<tr>
<td>Forberedelse til presentasjon/diskusjon i klasser</td>
<td>20</td>
</tr>
<tr>
<td>Øving</td>
<td>30</td>
</tr>
<tr>
<td>Vurdering</td>
<td>55</td>
</tr>
<tr>
<td>Anbefalt tidsbruk totalt</td>
<td>200</td>
</tr>
</tbody>
</table>

Grading system
Letter grades A-E for passed and F for failure

Curriculum
O'Mahoney, J. (2010), Management Consultancy. University of Oxford Press, UK

Type of assessment
Inntiervering

MS320 Research Methods

Master

Code
MS320

Course
Research Methods

ECTS (European Credit Transfer System)
7.50

Course leader
Asle Fagerstrøm

External examiner
Jon Iden

Date of approval

Aim
The aim of the course is to provide a methodological foundation for the Master dissertation. Students will gain advanced knowledge of epistemologies and relevant methods for IS. They will acquire specialised problem-solving skills, being able to conduct a systematic data collection and analysis. They shall take responsibility to conduct the steps of a research project, according to professional and ethical standards.

Prerequisites
First year of Master Programme

Learning outcomes
After successfully completing the course the student will be able to:

Knowledge:
- Understand the main epistemologies relevant for IS research
- Describe main research methods, such as surveys, case studies, design research and experiments
- Assess critically and ethically the suitability of a method for a research issue

Skills:
- Conduct a data collection process, both on qualitative and quantitative data
- Conduct a data analysis process, both on qualitative and quantitative data
- Present findings, appropriate for the target group

Competence:
- Analyse a dissertation topic, and select and justify an appropriate research approach
- Design and plan a research project
- Assess issues and challenges on validity

Structure
The course is structured in block mode for four weeks. The first two weeks will be a combination of lectures and presentations in. The two last weeks are for self-study and essay writing.
### Recommended workload

<table>
<thead>
<tr>
<th>Aktivitet</th>
<th>Tidsbruk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deltakelse i undervisning</td>
<td>36</td>
</tr>
<tr>
<td>Selvstudium</td>
<td>76</td>
</tr>
<tr>
<td>Forberedelse til presentasjon/diskusjon i klassen</td>
<td>10</td>
</tr>
<tr>
<td>Øving</td>
<td>28</td>
</tr>
<tr>
<td>Vurdering</td>
<td>50</td>
</tr>
</tbody>
</table>

Anbefalt tidsbruk totalt 200

### Technology and tools

Excel, for quantitative analysis

### Grading system

Letter grades A-E for passed and F for failure

### Curriculum


### Type of assessment

Innlevering

**Assessment**

Exam: 40%

Essay: 60%

### Literature:

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Publisher</th>
<th>Published</th>
<th>ISBN</th>
<th>Version</th>
<th>Comment</th>
<th>Type</th>
<th>Litterature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case study research</td>
<td>Yin, R. K.</td>
<td>Sage</td>
<td>2009</td>
<td></td>
<td></td>
<td></td>
<td>Bok</td>
<td>Pensum</td>
</tr>
<tr>
<td>Researching</td>
<td>Oates, B.J.</td>
<td>Sage</td>
<td>2006</td>
<td></td>
<td></td>
<td></td>
<td>Bok</td>
<td>Pensum</td>
</tr>
<tr>
<td>Information Systems</td>
<td>Carlsberg, C.</td>
<td>Person</td>
<td>2011</td>
<td></td>
<td></td>
<td></td>
<td>Bok</td>
<td>Pensum</td>
</tr>
<tr>
<td>and Computing</td>
<td></td>
<td>Educations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### MS330 Practice Period

**Master**

**Code**

MS330

**Course**

Practice Period

**ECTS (European Credit Transfer System)**

15.00

**Course leader**

Hanne Sørum

**External examiner**

Kim Normann Andersen

**Date of approval**

29/08/2014

**Aim**

The aim of this course is to provide a systematic understanding and critical awareness, based on relevant theories, in regards to a business-specific problem within the field of Information Systems or Applied Computer Science.
Prerequisites
2/3 of the master courses first year.

Learning outcomes
After successfully completing the course the student will be able to:
Knowledge:
- Understand the main research areas within Information Systems or Applied Computer Science.
- Explain the main theories of a relevant business problem and/or challenges in a chosen business domain.
Skills:
- Identify Information Systems or Applied Computer Science related problems, based on practical experience and/or investigation.
- Conduct, report and evaluate a significant programme of research and solution related to a relevant problem within a specific business or organisation.
Competence:
- Demonstrate the ability to integrate a practical business experience and relevant Information Systems or Applied Computer Science theories, in order to develop a robust and sound solution to a challenge/problem.
- Be able to critical evaluate and discuss challenges/problems concerning a relevant business problem and/or challenges in a chosen business domain.

Structure
The course will be a combination of lectures, seminars, presentations, as well as practical experience in an industry. The student will gain industry experience by either an industry internship or hands-on study and contact with a public or private business. In seminars the student will present and discuss relevant topics, theories and present on-going work with fellow students and academic staff. Each student will be assigned a contact person from Westerdals – Oslo ACTs academic staff, and will have regular contact throughout the practise period.

Recommended workload

<table>
<thead>
<tr>
<th>Aktivitet</th>
<th>Workload</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation in class</td>
<td></td>
</tr>
<tr>
<td>Self-study</td>
<td></td>
</tr>
<tr>
<td>Preparation for presentation/discussion in class</td>
<td></td>
</tr>
<tr>
<td>Exercise</td>
<td></td>
</tr>
<tr>
<td>Assessment (Written essay)</td>
<td></td>
</tr>
<tr>
<td><strong>Total recommended workload</strong></td>
<td></td>
</tr>
</tbody>
</table>

Grading system
Letter grades A-E for passed and F for failure

Curriculum
A package of selected papers and articles

Type of assessment
Innlevering

Literature:

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Publisher</th>
<th>Published</th>
<th>ISBN</th>
<th>Version</th>
<th>Comment</th>
<th>Type</th>
<th>Litterature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Information Systems: Enabling and Transforming Business</td>
<td>Rainer &amp; Cegielski</td>
<td>John Wiley &amp; Sons</td>
<td>2010</td>
<td></td>
<td></td>
<td>Bok</td>
<td>Pensum</td>
<td></td>
</tr>
</tbody>
</table>

MS401 Master dissertation

Master

Code
MS401

Course
Master dissertation

ECTS (European Credit Transfer System)
30.00

Course leader
Asle Fagerstrøm

External examiner
Tba

Date of approval

Aim
The aim of this course is to provide the student with an opportunity to develop systematic understanding and critical awareness on the solution of a relevant problem in the student’s focal area. Students will gain advanced knowledge of the research process at Master level in information systems or applied computer sciences, including a deep knowledge of selected theories. They will acquire specialized problem-solving skills, being able to plan and conduct the steps in the research or development process at a high methodological standard. They shall take responsibility to conduct a well planned and executed project at Master level.

Prerequisites
First year of Master programme, Practice Periode and Research Methods.

Learning outcomes
After successfully completing the course, the student will be able to:
Knowledge:
- Demonstrate critical awareness of key theories within the focal area and the interface with related fields.
- Demonstrate critical awareness of key theories and the interface with related fields.
- Identify related problems in business and public sector and assess an appropriate methodological approach.

Skills:
- Demonstrate advanced thinking skills (e.g., synthesis, reasoning, judgement and reflection).
- Demonstrate a comparative understanding of the methods of research and evaluation relevant to focal area and the chosen business case of study.
- Conduct, report and evaluate a programme of research and solution related to a relevant problem within a business or public sector.
- Demonstrate competent project management skills (e.g., set objectives, plan and manage workload(s) and deliverables, monitor outcomes and manage time).

Competence:
- Demonstrate the ability to integrate practical business experience with relevant theories to develop the student's professional competence.
- Demonstrate the ability to reflect (critically) on content, approaches, techniques and tools.
- Contribute to professional knowledge and practice based on own original and high quality research and practice.

To take responsibility to conduct a well planned and executed project at Master level.

Structure
The course will be a combination of lectures, seminars, presentations, as well as literature review and writing of the dissertation. The course will be given during the fourth semester of the programme. Each student will be assigned a supervisor from Westerdals – Oslo ACT academic staff, and will have regular contact throughout the dissertation.

Recommended workload

<table>
<thead>
<tr>
<th>Aktivitet</th>
<th>Tidsbruk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation in class</td>
<td>10</td>
</tr>
<tr>
<td>Self-study</td>
<td>390</td>
</tr>
<tr>
<td>Preparation for presentation/discussion in class</td>
<td>0</td>
</tr>
<tr>
<td>Exercise</td>
<td>0</td>
</tr>
<tr>
<td>Assessment (writing dissertation)</td>
<td>400</td>
</tr>
<tr>
<td>Anbefalt tidsbruk total</td>
<td>800</td>
</tr>
</tbody>
</table>

Technology and tools
None.

Grading system
Letter grades A-E for passed and F for failure

Type of assessment
Innlevering

Literature:

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Publisher</th>
<th>Published</th>
<th>ISBN</th>
<th>Version</th>
<th>Comment</th>
<th>Type</th>
<th>Litterature</th>
</tr>
</thead>
<tbody>
<tr>
<td>How to Write Dissertations &amp; Project Reports</td>
<td>Weyers, J. and McMillan, K.</td>
<td>Prentice Hall, UK</td>
<td>2011</td>
<td>9780273743835</td>
<td>2</td>
<td></td>
<td>Bok</td>
<td>Pensum</td>
</tr>
<tr>
<td>Project Management for Information Systems</td>
<td>Cadie, J. and Yeates, D.</td>
<td>Prentice Hall, UK</td>
<td>2008</td>
<td>978-0132068581</td>
<td>5</td>
<td></td>
<td>Bok</td>
<td>Pensum</td>
</tr>
</tbody>
</table>