MASTER’S DEGREE PROGRAM
COMPUTER SCIENCE
MASTER’S DEGREE PROGRAM

- Structure of the Master’s Degree Program
- Study abroad
- International full degree students
- Requirements for the study program
- Admission
- Practical information

Slides: www.cs.au.dk/studieorientsring
MASTER’S DEGREE PROGRAM

• Structure of the Master’s Degree Program
  • Box diagram
  • Specializations
  • Elective courses
• Study abroad
• International full degree students
• Requirements for the study program
• Admission
• Practical information
STRUCTURE OF MASTER’S DEGREE PROGRAM

<table>
<thead>
<tr>
<th>1st Semester</th>
<th>2nd Semester</th>
<th>3rd Semester</th>
<th>4th Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialization 1 (30 ECTS)</td>
<td>Specialization 2 (30 ECTS)</td>
<td>Elective (30 ECTS)</td>
<td>Thesis (30 ECTS)</td>
</tr>
</tbody>
</table>

Specialization:
• Two 30 ECTS specializations

Elective:
• Recommendation is a 3rd specialization.
• A small number of elective courses in computer science is offered in addition to specializations. Project work (partly) is also a possibility.
• Elective courses may be supportive rather than core computer science, e.g. extra mathematics courses.
• There may be requirements for the composition of the study program in connection with possible admission. In this case mandatory courses replace the elective courses (partly).

Thesis: Written within the area of specialization 1 or 2
### Master's Degree Program & Study Abroad

<table>
<thead>
<tr>
<th>Semester</th>
<th>Specialization 1</th>
<th>Specialization 2</th>
<th>Elective (30 ECTS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Part of Specialization 1 (20 ECTS)</td>
<td>Part of Specialization 2 (20 ECTS)</td>
<td></td>
</tr>
<tr>
<td>2nd</td>
<td></td>
<td></td>
<td>Elective (30 ECTS)</td>
</tr>
<tr>
<td>3rd</td>
<td>Study abroad (30 ECTS) including 10 ECTS within specialization 1 or 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th</td>
<td></td>
<td></td>
<td>Thesis (30 ECTS)</td>
</tr>
</tbody>
</table>

Or

<table>
<thead>
<tr>
<th>Semester</th>
<th>Specialization 1</th>
<th>Elective (30 ECTS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Specialization 1 (30 ECTS)</td>
<td></td>
</tr>
<tr>
<td>2nd</td>
<td></td>
<td>Elective (30 ECTS)</td>
</tr>
<tr>
<td>3rd</td>
<td>Study abroad (30 ECTS)</td>
<td></td>
</tr>
<tr>
<td>4th</td>
<td></td>
<td>Thesis (30 ECTS)</td>
</tr>
</tbody>
</table>

MSc program with study abroad semester:

- Suffices to have a single specialization
- A specialization may be finished abroad by taking a course within the relevant area
- Recommendation: start by having two specializations, so you can finish these if you do not succeed in going abroad
CURRENT SPECIALIZATIONS

Specializations are taught by active researchers in the corresponding field

Current offerings

- Advanced Machine Learning and Data Science (30 ECTS) NEW
- Algorithmics (30 ECTS)
- Cryptology (30 ECTS)
- Data-Intensive Systems (30 ECTS)
- Human-computer Interaction (30 ECTS)
- Logic, Semantics and Verification (30 ECTS) NEW
- Programming Languages and Software Security (30 ECTS) NEW
- Ubiquitous Computing and Interaction (30 ECTS)
- Bioinformatics (30 ECTS)

Each research group presents current research at the annual Computer Science Day, see https://cs.au.dk/news-events/cs-colloquium/.
ADVANCED MACHINE LEARNING AND DATA SCIENCE

1st Sem (Fall) | Computational Learning Theory (10 ECTS) (NEW from 2021) | CA
2nd Sem (Spring) | Cluster Analysis (10 ECTS) (NEW from 2022) | CS
3rd Sem (Fall) | Algorithms, Incentives, and Data (10 ECTS) (NEW from 2022) | IC

- Semesters are independent – can be taken in any order
- Machine Learning is a prerequisite for this specialization

Algorithms, Data Structures and Foundations of Machine Learning
- Chris Schwiegelshohn
- Gerth Stølting Brodal
- Kasper Green Larsen
- Peyman Afshani

Data-intensive Systems
- Cigdem Aslay
- Davide Mottin
- Ira Assent
- Panagiotis Karras

Computational Complexity and Game Theory
- Ioannis Caragiannis
- Kristoffer Arnsfelt Hansen
- Srikanth Srinivasan
ALGORITHMICS

| 1st Sem (Fall) | Computational Geometry: Theory and Experimentation (10 ECTS) | PA |
| 2nd Sem (Spring) | Randomized Algorithms (10 ECTS) | KGL, IC |
| 3rd Sem (Fall) | Theory of Algorithms and Computational Complexity (10 ECTS) | KAH |

- Semesters are independent – can be taken in any order
- Third semester may be replaced with Advanced Data Management and Analysis (10 ECTS) from the Data-Intensive Systems group

Algorithms, Data Structures and Foundations of Machine Learning
- Chris Schwiegelshohn
- Gerth Stølting Brodal
- Kasper Green Larsen
- Peyman Afshani

Computational Complexity and Game Theory
- Ioannis Caragiannis
- Kristoffer Arnsfelt Hansen
- Srikanth Srinivasan
CRYPTOLOGY

<table>
<thead>
<tr>
<th>1st Sem (Fall)</th>
<th>Cryptology (10 ECTS)</th>
<th>IBD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd Sem (Spring)</td>
<td>Cryptologic Protocol Theory (10 ECTS)</td>
<td>IBD + JBN</td>
</tr>
<tr>
<td>3rd Sem (Fall)</td>
<td>Cryptographic Computing (10 ECTS) OR Systems Security (10 ECTS) <em>(NEW from 2021)</em></td>
<td>CO + PS</td>
</tr>
</tbody>
</table>

- Cryptology is prerequisite for Cryptologic Protocol Theory and Cryptographic Computing
- Systems Security is independent of the other courses

Cryptography and Security
- Claudio Orlandi
- Diego F. Aranha
- Ivan Bjerre Damgård
- Jesper Buus Nielsen
- Peter Scholl
DATA-INTENSIVE SYSTEMS

1st Sem (Fall)
| Data Visualization (10 ECTS) OR Deep Learning for Visual Recognition (10 ECTS) |
2nd Sem (Spring)
| Data Mining (10 ECTS) * |
3rd Sem (Fall)
| Advanced Data Management and Analysis (10 ECTS) |

Semesters are independent – can be taken in any order
(*) Machine Learning is a prerequisite for Data Mining
Data Visualization and Deep Learning for Visual Recognition are taught by and shared with the Ubiquitous Computing and Interaction group

Data-intensive Systems
- Cigdem Aslay
- Davide Mottin
- Ira Assent
- Panagiotis Karras
HUMAN-COMPUTER INTERACTION

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Sem (Fall)</td>
<td>Interactivity and Computer Mediation – Concepts, Theories, Methods, Cases (10 ECTS)</td>
<td>OB</td>
</tr>
<tr>
<td>2nd Sem (Spring)</td>
<td>Designing Interactive Technologies (10 ECTS)</td>
<td>SB</td>
</tr>
<tr>
<td>3rd Sem (Fall)</td>
<td>Multimodal Interaction (10 ECTS)</td>
<td>EH</td>
</tr>
</tbody>
</table>

- Semesters are independent – can be taken in any order

Computer Mediated Activity
- Clemens Nylandsted Klokmose
- Eve Hoggan
- Olav Bertelsen
- Susanne Bødker
PROGRAMMING LANGUAGES AND SOFTWARE SECURITY

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
<th>Instructors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Sem (Fall)</td>
<td>Program Analysis (10 ECTS) (NEW from 2021)</td>
<td>10</td>
<td>AM + MM</td>
</tr>
<tr>
<td>2nd Sem (Spring)</td>
<td>Language-based Security (10 ECTS)</td>
<td>10</td>
<td>AA</td>
</tr>
<tr>
<td>3rd Sem (Fall)</td>
<td>Advanced Topics in Programming Language Theory (10 ECTS) (NEW from 2022)</td>
<td>10</td>
<td>BS + AP + AT</td>
</tr>
</tbody>
</table>

- Semesters are independent – can be taken in any order

**Logic and Semantics**
- Amin Timany
- Aslan Askarov
- Bas Spitters
- Jaco van de Pol
- Lars Birkedal

**Programming Languages**
- Anders Møller
- Andreas Pavlogiannis
- Magnus Madsen
## LOGIC, SEMANTICS AND VERIFICATION

<table>
<thead>
<tr>
<th>Semester (Fall)</th>
<th>Course Description</th>
<th>ECTS</th>
<th>Semester (Spring)</th>
<th>Course Description</th>
<th>ECTS</th>
<th>Semester (Fall)</th>
<th>Course Description</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Sem</td>
<td>Formal Software Verification (10 ECTS) (NEW from 2021)</td>
<td>BS</td>
<td>2nd Sem (Spring)</td>
<td>Algorithmic Model Checking (10 ECTS) (NEW from 2022)</td>
<td>JvdP + AP</td>
<td>3rd Sem (Fall)</td>
<td>Program Logics (10 ECTS) (NEW from 2021)</td>
<td>LB + AT</td>
</tr>
</tbody>
</table>

- Semesters are independent – can be taken in any order

### Logic and Semantics

- Amin Timany
- Aslan Askarov
- Bas Spitters
- Jaco van de Pol
- Lars Birkedal

### Programming Languages

- Anders Møller
- Andreas Pavlogiannis
- Magnus Madsen

AARHUS UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE
COMPUTER SCIENCE MASTER'S
1 JUNE 2021
## UBIQUITOUS COMPUTING AND INTERACTION

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>ECTS</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st sem (Fall)</td>
<td><strong>Building the Internet of Things with P2P and Cloud Computing (10 ECTS)</strong></td>
<td>NOB</td>
<td></td>
</tr>
<tr>
<td>2nd Sem (Spring)</td>
<td><strong>Augmented Reality (5 ECTS)</strong></td>
<td>KG</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Advanced Augmented Reality Project (5 ECTS)</strong></td>
<td>KG</td>
<td></td>
</tr>
<tr>
<td>3rd Sem (Fall)</td>
<td><strong>Data Visualization (10 ECTS) OR Deep Learning for Visual Recognition (10 ECTS)</strong></td>
<td>H-JS</td>
<td></td>
</tr>
</tbody>
</table>

- Semesters are independent – can be taken in any order

**Ubiqitous Computing and Interaction**

- Hans-Jörg Schultz
- Kaj Grønbæk
- Marianne Graves Petersen
- Niels Olof Bouvin
SPECIALIZATIONS FROM MASTER’S DEGREE PROGRAM IN BIOINFORMATICS
(OFFERED BY BIOINFORMATICS RESEARCH CENTRE)

Algorithms and Programming

<table>
<thead>
<tr>
<th>Semester (Fall)</th>
<th>Recommended order of courses</th>
<th>Alternative order of courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Genome-Scale Algorithms (10 ECTS)</td>
<td>Evolutionary Thinking (10 ECTS)</td>
</tr>
<tr>
<td>2nd Spring</td>
<td>Algorithms in Bioinformatics (10 ECTS)</td>
<td>Algorithms in Bioinformatics (10 ECTS)</td>
</tr>
<tr>
<td>3rd Fall</td>
<td>Evolutionary Thinking (10 ECTS) OR Projects in Bioinformatics (10 ECTS)</td>
<td>Genome-Scale Algorithms (10 ECTS)</td>
</tr>
</tbody>
</table>

Statistics and Data

<table>
<thead>
<tr>
<th>Semester (Fall)</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Data Science in Bioinformatics (10 ECTS)</td>
</tr>
<tr>
<td>2nd Spring</td>
<td>Statistical and Machine Learning in Bioinformatics (10 ECTS)</td>
</tr>
<tr>
<td>3rd Fall</td>
<td>Evolutionary Thinking (10 ECTS) OR Genome-Scale Algorithms (10 ECTS) OR Projects in Bioinformatics (10 ECTS)</td>
</tr>
</tbody>
</table>

For more info about the Master's program in bioinformatics, see [http://www.birc.au.dk/Studies](http://www.birc.au.dk/Studies)
Contact: Christian Storm Pedersen cstorn@birc.au.dk
ELECTIVE COURSES
APART FROM SPECIALIZATIONS

Fall
- Machine Learning (10 ECTS) (bachelor course)

Fall & Spring:
- Project work in Computer Science (5 or 10 ECTS)
- Erhvervsprojekt / Vocational Training Project at the Department of Computer Science (10 ECTS)
  - Collaboration with a company
  - https://studerende.au.dk/en/studies/subject-portals/computer-science/project-collaboration/
  - https://studerende.au.dk/studier/fagportaler/datalogi/projektsamarbejde/cs-project-bank/

Courses aimed at high school teaching:

Spring:
- Matematikdidaktik / Mathematics Education (5 ECTS)

Fall & Spring:
- Praktik som gymnasielærer / Placement at Upper Secondary School (5 ECTS)
ELECTIVE COURSES

EXTERNAL

Courses at other AU departments:

• Mathematics (Nat)
• Computer Engineering (Tech)
• Digital Design and Information Studies (Arts)

If you fail an exam in an elective course, then that course has become mandatory!
If you have made an erroneous choice of an elective course please contact us for guidance immediately!
ELECTIVE COURSES

EXTERNAL

Courses at other AU departments:

• Mathematics (Nat)
• Computer Engineering (Tech)
• Digital Design and Information Studies (Arts)

If you fail an exam in an elective course, then that course has become mandatory!
If you have made an erroneous choice of an elective course please contact us for guidance immediately!
ELECTIVE COURSES

MATHEMATICS

Fall

- Introductory Algebra (10 ECTS) - New title for Perspectives in Mathematics (10 ECTS)
  - Introductory algebra – sufficient for basic use in computer science
- Algebra (10 ECTS)
  - Abstract algebra – relevant for more advanced study of Cryptology and advanced Programming Languages (Category Theory)
  - It is possible to take Introductory Algebra and later take Algebra in addition
- Mathematical Analysis 1 (10 ECTS)
  - Graph Theory 2 (10 ECTS) (not every year)

Spring

- Mathematical Statistics (10 ECTS)
- Mathematical Analysis 2 (10 ECTS)
  - Mixed Integer Optimization (10 ECTS) (not every year)
  - Advanced Convex Optimization (10 ECTS) (not every year)
ELECTIVE COURSES
COMPUTER ENGINEERING

Fall
• Optimization and Data Analytics (10 ECTS)
• Embedded Real Time Systems (10 ECTS)
• Modelling of Critical Systems (5 ECTS)
• Internet of Things Technology (10 ECTS)

Spring
• System Engineering (5 ECTS)
• Wireless Sensor Networks (5 ECTS)
• Decision Support Systems (5 ECTS)
• Distributed and Pervasive Systems (10 ECTS)
• Modelling and Verification (10 ECTS)

Worried about prerequisites for engineering courses?
• Check course catalogue
• Contact course responsible, or
• Contact program responsible Qi Zhang qz@eng.au.dk
ELECTIVE COURSES
DIGITAL DESIGN AND INFORMATION STUDIES

Fall
• Data and Digital Culture (10 ECTS)

Spring
• Sound and Interaction (10 ECTS)
• Computer Game Theory (15 ECTS)
• 3D interaction (15 ECTS)

Summer
• Game.Play.Design (10 ECTS)
MASTER’S DEGREE PROGRAM

- Structure of the Master’s Degree Program
- Study abroad
  - Study abroad semester (30 ECTS)
  - Study abroad summerschool (5-10 ECTS)
- International full degree students
- Requirements for the study program
- Admission
- Practical information
STUDY ABROAD (30 ECTS SEMESTER)

General information (destinations, deadlines, procedures, etc)

Study Abroad Fair 8 October 2020:
- [http://studerende.au.dk/au-study-abroad-fair/](http://studerende.au.dk/au-study-abroad-fair/)

Application Deadline: 1 December 2020

Selected destinations (with programs taught in English)

<table>
<thead>
<tr>
<th>University</th>
<th>Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technische Universität München</td>
<td>CS: courses</td>
</tr>
<tr>
<td>Radboud University Nijmegen</td>
<td>CS: courses</td>
</tr>
<tr>
<td>Uppsala Universität</td>
<td>CS: courses</td>
</tr>
<tr>
<td>University of Helsinki</td>
<td>CS: courses</td>
</tr>
<tr>
<td>Technische Universität Wien</td>
<td>Logic and Computation: courses</td>
</tr>
</tbody>
</table>

Study abroad information will be updated at the beginning of the autumn semester before next application deadline in December 2021.
STUDY ABROAD (30 ECTS SEMESTER)

Credit transfer / course selection

  - Select potential universities based on course offerings.
  - Apply for exchange through MoveON
  - When you have been admitted for exchange at specific university you need **advance approval of courses**.
  - If foreign university allows less than 30 ECTS then top up with summer courses or project work.
  - Update Master’s contract / book an interview.
  - Contact Gudmund Frandsen, Nygaard 275, [gudmund@cs.au.dk](mailto:gudmund@cs.au.dk)

Other aspects?

STUDY ABROAD (SUMMER SCHOOL)

General information (destinations, deadlines, procedures, etc)


Application Deadline: 15 March 2021
MASTER’S DEGREE PROGRAM

- Structure of the Master’s Degree Program
- Study abroad
- International full degree students
  - Prerequisites for specializations
  - Example programs
- Requirements for the study program
- Admission
- Practical information
INTERNATIONAL FULL DEGREE STUDENTS

PREREQUISITES

- Bachelor in cs or similar is prerequisite for master level cs courses
- CS Bachelor’s program at AU Taught in **Danish**, except for courses marked 🇩🇰

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st sem</td>
<td>Introduction to Programming</td>
<td>10 ECTS</td>
</tr>
<tr>
<td></td>
<td>Algorithms and Data Structures</td>
<td>10 ECTS</td>
</tr>
<tr>
<td></td>
<td>Introduction to Mathematics and Optimisation</td>
<td>10 ECTS</td>
</tr>
<tr>
<td>2nd sem</td>
<td>Database Systems</td>
<td>5 ECTS</td>
</tr>
<tr>
<td></td>
<td>Implementation and Applications of Databases</td>
<td>5 ECTS</td>
</tr>
<tr>
<td></td>
<td>Programming Languages</td>
<td>10 ECTS</td>
</tr>
<tr>
<td></td>
<td>Computability and Logic</td>
<td>10 ECTS</td>
</tr>
<tr>
<td>3rd sem</td>
<td>Software Engineering and Architecture</td>
<td>10 ECTS</td>
</tr>
<tr>
<td></td>
<td>Human-Computer Interaction</td>
<td>10 ECTS</td>
</tr>
<tr>
<td></td>
<td>Introduction to Probability Theory and Statistics</td>
<td>10 ECTS</td>
</tr>
<tr>
<td>4th sem</td>
<td>Computer Architecture, Networks and Operating Systems</td>
<td>10 ECTS</td>
</tr>
<tr>
<td></td>
<td>Experimental System Development</td>
<td>10 ECTS</td>
</tr>
<tr>
<td></td>
<td>Numerical Linear algebra</td>
<td>10 ECTS</td>
</tr>
<tr>
<td>5th sem</td>
<td>Compilation</td>
<td>10 ECTS</td>
</tr>
<tr>
<td></td>
<td>Distributed Systems and Security</td>
<td>10 ECTS</td>
</tr>
<tr>
<td></td>
<td>Elective (recom: Machine Learning)</td>
<td>10 ECTS</td>
</tr>
<tr>
<td>6th sem</td>
<td>Bachelor's Project</td>
<td>15 ECTS</td>
</tr>
<tr>
<td></td>
<td>Philosophy and Ethics of Information Technology</td>
<td>5 ECTS</td>
</tr>
<tr>
<td></td>
<td>Optimization</td>
<td>10 ECTS</td>
</tr>
</tbody>
</table>

**Mathematics** 🇩🇰 **Computer Science (only)** 🇩🇰 **Computer Science (and IT)** 🇩🇰 **Elective** 🇩🇰
# SPECIALIZATIONS: PREREQUISITES

If you don’t have the prerequisite courses or similar background in your bachelor, you can take a bachelor course as part of your MSc program.

<table>
<thead>
<tr>
<th>Specialization</th>
<th>Prerequisite (bachelor course)</th>
<th>Recommended / required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Machine Learning and Data Science</td>
<td>Machine Learning</td>
<td>required</td>
</tr>
<tr>
<td>Algorithms and Data Structures</td>
<td>Optimization</td>
<td>recommended</td>
</tr>
<tr>
<td>Cryptology</td>
<td>Distributed Systems and Security</td>
<td>recommended</td>
</tr>
<tr>
<td>Data-Intensive Systems</td>
<td>Machine Learning</td>
<td>recommended</td>
</tr>
<tr>
<td>Human-Computer Interaction</td>
<td>Human-Computer Interaction</td>
<td>required</td>
</tr>
<tr>
<td>Logic, Semantics and Verification</td>
<td>Computability and Logic</td>
<td>recommended</td>
</tr>
<tr>
<td>Programming Languages and Software Security</td>
<td>Compilation</td>
<td>required</td>
</tr>
<tr>
<td>Ubiquitous Computing and Interaction</td>
<td>Distributed Systems and Security</td>
<td>recommended</td>
</tr>
</tbody>
</table>
### EXAMPLE 1:

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Details</th>
</tr>
</thead>
</table>
| 1. Sem (Fall) | **Computational Learning Theory** (10 ECTS)  
**Deep Learning for Visual Recognition** (10 ECTS)  
**Elective 1** |
| 2. Sem (Spring) | **Cluster Analysis** (10 ECTS)  
**Data Mining** (10 ECTS)  
**Elective 2** |
| 3. Sem (Fall) | **Algorithms, Incentives, and Data** (10 ECTS)  
**Advanced Data Management and Analysis** (10 ECTS)  
**Elective 3** |
| 4. Sem (Spring) | **Thesis** (30 ECTS) |

OR

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Details</th>
</tr>
</thead>
</table>
| 1. Sem (Fall) | **Machine Learning** (10 ECTS)  
**Deep Learning for Visual Recognition** (10 ECTS)  
**Elective 1** |
| 2. Sem (Spring) | **Cluster Analysis** (10 ECTS)  
**Data Mining** (10 ECTS)  
**Elective 2** |
| 3. Sem (Fall) | **Algorithms, Incentives, and Data** (10 ECTS)  
**Advanced Data Management and Analysis** (10 ECTS)  
**Computational Learning Theory** (10 ECTS) |
| 4. Sem (Spring) | **Thesis** (30 ECTS) |
**EXAMPLE 2:**

<table>
<thead>
<tr>
<th>Time</th>
<th>Subject</th>
<th>Credits</th>
<th>Elective 1</th>
<th>Elective 2</th>
<th>Elective 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sem (Fall)</td>
<td>Program Analysis (10 ECTS)</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Formal Software Verification (10 ECTS)</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total: 20 ECTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**OR**

<table>
<thead>
<tr>
<th>Time</th>
<th>Subject</th>
<th>Credits</th>
<th>Elective 1</th>
<th>Elective 2</th>
<th>Elective 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sem (Fall)</td>
<td>Compilation (10 ECTS)</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Formal Software Verification (10 ECTS)</td>
<td>10</td>
<td></td>
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<td><strong>Total: 20 ECTS</strong></td>
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<table>
<thead>
<tr>
<th>Time</th>
<th>Subject</th>
<th>Credits</th>
<th>Elective 1</th>
<th>Elective 2</th>
<th>Elective 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Sem (Spring)</td>
<td>Language-based Security (10 ECTS)</td>
<td>10</td>
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<td></td>
<td>Algorithmic Model Checking (10 ECTS)</td>
<td>10</td>
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<td><strong>Total: 20 ECTS</strong></td>
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<th>Elective 3</th>
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</thead>
<tbody>
<tr>
<td>3. Sem (Fall)</td>
<td>Advanced Topics in Programming Language Theory (10 ECTS)</td>
<td>10</td>
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<tr>
<td></td>
<td>Program Logics (10 ECTS)</td>
<td>10</td>
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<td><strong>Total: 20 ECTS</strong></td>
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<th>Elective 2</th>
<th>Elective 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Sem (Spring)</td>
<td>Thesis (30 ECTS)</td>
<td>30</td>
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</table>

**Logic, Semantics and Verification**
# EXAMPLE 3:

<table>
<thead>
<tr>
<th>Semester (Fall)</th>
<th>Module 1</th>
<th>Module 2</th>
<th>Elective 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interactivity and Computer Mediation – Concepts, Theories, Methods, Cases (10 ECTS)</td>
<td>Building the Internet of Things with P2P and Cloud Computing (10 ECTS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semester (Spring)</td>
<td>Module 1</td>
<td>Module 2</td>
<td>Elective 2</td>
</tr>
<tr>
<td>Designing Interactive Technologies (10 ECTS)</td>
<td>Augmented Reality (5 ECTS) + Advanced Augmented Reality Project (5 ECTS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semester (Fall)</td>
<td>Module 1</td>
<td>Module 2</td>
<td>Elective 3</td>
</tr>
<tr>
<td>Multimodal Interaction (10 ECTS)</td>
<td>Data Visualization (10 ECTS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semester (Spring)</td>
<td>Module 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thesis (30 ECTS)</td>
<td></td>
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</table>

OR

<table>
<thead>
<tr>
<th>Semester (Fall)</th>
<th>Module 1</th>
<th>Module 2</th>
<th>Module 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human-Computer Interaction (10 ECTS)</td>
<td>Data Visualization (10 ECTS)</td>
<td>Distributed Systems and Security (10 ECTS)</td>
<td></td>
</tr>
<tr>
<td>Semester (Spring)</td>
<td>Module 1</td>
<td>Module 2</td>
<td>Elective 1</td>
</tr>
<tr>
<td>Designing Interactive Technologies (10 ECTS)</td>
<td>Augmented Reality (5 ECTS) + Advanced Augmented Reality Project (5 ECTS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semester (Fall)</td>
<td>Module 1</td>
<td>Module 2</td>
<td></td>
</tr>
<tr>
<td>Multimodal Interaction (10 ECTS)</td>
<td>Building the Internet of Things with P2P and Cloud Computing (10 ECTS)</td>
<td>Interactivity and Computer Mediation – Concepts, Theories, Methods, Cases (10 ECTS)</td>
<td></td>
</tr>
<tr>
<td>Semester (Spring)</td>
<td>Module 1</td>
<td></td>
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<tr>
<td>Thesis (30 ECTS)</td>
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</tbody>
</table>
## EXAMPLE 4:

### Algorithmics + Cryptology

<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sem (Fall)</td>
<td>Computational Geometry: Theory and Experimentation (10 ECTS)</td>
<td></td>
</tr>
<tr>
<td>1. Sem (Fall)</td>
<td>Cryptology (10 ECTS)</td>
<td></td>
</tr>
<tr>
<td>1. Sem (Fall)</td>
<td>Systems Security (10 ECTS)</td>
<td></td>
</tr>
<tr>
<td>2. Sem (Spring)</td>
<td>Randomized Algorithms (10 ECTS)</td>
<td></td>
</tr>
<tr>
<td>2. Sem (Spring)</td>
<td>Cryptologic Protocol Theory (10 ECTS)</td>
<td>Elective 1</td>
</tr>
<tr>
<td>3. Sem (Fall)</td>
<td>Theory of Algorithms and Computational Complexity (10 ECTS)</td>
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</tr>
<tr>
<td>3. Sem (Fall)</td>
<td>Cryptographic Computing (10 ECTS)</td>
<td>Elective 2</td>
</tr>
<tr>
<td>4. Sem (Spring)</td>
<td>Thesis (30 ECTS)</td>
<td></td>
</tr>
</tbody>
</table>

**OR**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sem (Fall)</td>
<td>Computational Geometry: Theory and Experimentation (10 ECTS)</td>
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<td>1. Sem (Fall)</td>
<td>Cryptology (10 ECTS)</td>
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<tr>
<td>1. Sem (Fall)</td>
<td>Distributed Systems and Security (10 ECTS)</td>
<td></td>
</tr>
<tr>
<td>2. Sem (Spring)</td>
<td>Randomized Algorithms (10 ECTS)</td>
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</tr>
<tr>
<td>2. Sem (Spring)</td>
<td>Cryptologic Protocol Theory (10 ECTS)</td>
<td>Optimization (10 ECTS)</td>
</tr>
<tr>
<td>3. Sem (Fall)</td>
<td>Theory of Algorithms and Computational Complexity (10 ECTS)</td>
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<td>3. Sem (Fall)</td>
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<td>Systems Security (10 ECTS)</td>
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<tr>
<td>4. Sem (Spring)</td>
<td>Thesis (30 ECTS)</td>
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</tbody>
</table>
MASTER’S DEGREE PROGRAM

• Structure of the Master’s Degree Program
• Study abroad
• International full degree students
• Requirements for the study program
• Admission
• Practical information
REQUIREMENTS FOR THE STUDY PROGRAM

- 120 ECTS in total
  - At least 90 ECTS graduate level computer science
  - At least 180 ECTS computer science in bachelor’s + master’s
- Mandatory courses:
  - Mandatory courses are determined at admission (usually courses missing in bachelor program)
- Specializations:
  - At least 2 specializations of 30 ECTS each
  - A single specialization suffices when the program includes study abroad
  - Up to 10 ECTS of the 30 ECTS may be replaced by a course from another specialization or a project work
- Thesis (30 ECTS)
- All Programs (Bachelor or Master’s) must include 60 ECTS passed at Natural Science, Aarhus University
  - This has implications for credit transfer!
MASTER’S DEGREE PROGRAM

- Structure of the Master’s Degree Program
- Study abroad
- International full degree students
- Requirements for the study program
- Admission
- Practical information
ADMISSION

• When bachelor completed
• You apply for admission into Master’s Program
  • Deadline 1 March
• … or apply for admission into PhD studies
• Admission
  • You must actively apply for admission
  • You must actively apply for SU
  • Making a study program (contract) does not suffice
• https://kandidat.au.dk/optagelse/ansoegning/
TEMPORARY ADMISSION

• If you lack X<30 ECTS in your bachelor, you may for a 6 months period take 30-X ECTS courses to be part of your future Master’s Program
• No temporary admission if you still lack a mandatory course and you have failed it twice!
• Never delay (re)examination in a mandatory course!
• This might have SU-related consequences!
PHD STUDIES?

Apply for PhD studies!

- [https://phd.nat.au.dk/programmes/computer-science/](https://phd.nat.au.dk/programmes/computer-science/)
- You receive a salary while studying!
- Apply for PhD studies directly following your Bachelor’s degree, during you Master’s studies or following your Master’s degree.
- For deadlines see [https://phd.nat.au.dk/for-applicants/](https://phd.nat.au.dk/for-applicants/)
- Contact Anders Møller for info [http://pure.au.dk/portal/en/amoeller@cs.au.dk](http://pure.au.dk/portal/en/amoeller@cs.au.dk)
MASTER’S DEGREE PROGRAM

- Structure of the Master’s Degree Program
- Study abroad
- International full degree students
- Requirements for the study program
- Admission
- **Practical information**
  - Contracts
  - Signing up for courses
  - "Fremdriftsreform”
  - Student Guidance
CONTRACTS

- [http://kontrakt.nattech.au.dk/](http://kontrakt.nattech.au.dk/)

Master’s Contract:
- Complete before signing up for first course in Master’s Program
  - Also in case of temporary admission
  - You may only sign up for courses mentioned in your contract
- Revise at semiannual interviews in April and October

Project Work Contract:
- In addition to signing up for a project work / vocational training project (erhvervsprojekt) you must also make a contract

Thesis Contract:
- Fill out at start of thesis work
SIGNING UP FOR COURSES

Sign up:

• January 15 – April 1 for courses in Summer
• May 1-5 for courses in (Summer &) Fall
• November 1-5 for courses in the Spring
• Advance approval of credit transfer is needed for courses from outside Natural sciences,
  • Outside AU: see http://studerende.au.dk/en/studies/subject-portals/computer-science/student-counselling/credit-transfer/
  • Outside Natural Sciences, but inside AU: see http://studerende.au.dk/en/studies/subject-portals/computer-science/student-counselling/enrolment-in-a-credit-module/
  • Apply well in advance!
  • Advance approval of credit transfer is no guarantee that you will be admitted to the course!

Schedule for elective courses:

• watch out for collisions!
FREMDRIFTSREFORM ("STUDY PROGRESS REFORM")

• If you follow the recommended program of study (30 ECTS per semester), take courses in the correct order (the Box Diagrams) and pass all courses at the ordinary exam or at the first scheduled re-exam then you need not worry about the study progress reform.

• If you fall behind or do not pass a course at the latest by the first reexamination then contact us for advice and guidance on your individual study program.

• If you ignore this advice and believe that “it will be fine”, it may have serious consequences!

• If you do not complete your master’s program within six months after the prescribed time you are automatically signed out of the study program / out of the university http://studerende.au.dk/en/studies/subject-portals/computer-science/student-counselling/maximum-duration-and-active-enrolment/.

• If you fail an exam in an elective course, then that course has become mandatory! If you have made an erroneous choice of an elective course please contact us for guidance immediately!
STUDENT COUNSELOR

The student counselor may help you

• Henrik Dalsgaard Henriksen


• Possible topics:
  • Change of study program, delay, leave of absence, withdrawal.
  • Illness.
  • Study regulations, selecting supplementary subjects.
YOU CAN HAVE INFLUENCE!

Join a committee

• Contact the chair
• You may look up current student members on the web

**Education Committee**

• Chair: Marianne Graves Petersen, mgraves@cs.au.dk
• [http://cs.staff.au.dk/boards-and-committees/education-committee/](http://cs.staff.au.dk/boards-and-committees/education-committee/)

**Office Committee**

• Chair: Na Ree Sabina Pagaard Sørensen, nrs@cs.au.dk