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

• Structure of the Master’s Degree Program
• Study abroad
• Admission
• Practical information

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

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

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
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

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AARHUS UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE

COMPUTER SCIENCE MASTER'S
29 OCTOBER 2021
ALGORITHMICS

<table>
<thead>
<tr>
<th>Semesters</th>
<th>Courses</th>
<th>Instructors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Sem (Fall)</td>
<td>Computational Geometry: Theory and Experimentation (10 ECTS)</td>
<td>PA</td>
</tr>
<tr>
<td>2nd Sem (Spring)</td>
<td>Randomized Algorithms (10 ECTS)</td>
<td>KGL, IC</td>
</tr>
<tr>
<td>3rd Sem (Fall)</td>
<td>Theory of Algorithms and Computational Complexity (10 ECTS)</td>
<td>KAH</td>
</tr>
</tbody>
</table>

- 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

AARHUS UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE
COMPUTER SCIENCE MASTER'S
29 OCTOBER 2021
CRYPTOLOGY

<table>
<thead>
<tr>
<th>1st Sem (Fall)</th>
<th>Cryptology (10 ECTS)</th>
<th>IBD</th>
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</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) (NEW from 2021)</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
- Carsten Baum
- Claudio Orlandi
- Diego F. Aranha
- Ivan Bjerre Damgård
- Jesper Buus Nielsen
- Peter Scholl
- Sophia Yakoubov
## DATA-INTENSIVE SYSTEMS

<table>
<thead>
<tr>
<th>1st Sem (Fall)</th>
<th>Data Visualization (10 ECTS) OR Deep Learning for Visual Recognition (10 ECTS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd Sem (Spring)</td>
<td>Data Mining (10 ECTS) *</td>
</tr>
<tr>
<td>3rd Sem (Fall)</td>
<td>Advanced Data Management and Analysis (10 ECTS)</td>
</tr>
</tbody>
</table>

- 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>1st Sem (Fall)</th>
<th>Interactivity and Computer Mediation – Concepts, Theories, Methods, Cases (10 ECTS)</th>
<th>OB</th>
</tr>
</thead>
<tbody>
<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
- Henrik Korsgaard
- Olav Bertelsen
- Susanne Bødker
## PROGRAMMING LANGUAGES AND SOFTWARE SECURITY

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
<th>Tutors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Sem (Fall)</td>
<td>Program Analysis (10 ECTS) (NEW from 2021)</td>
<td>10 ECTS</td>
<td>AM + MM</td>
</tr>
<tr>
<td>2nd Sem (Spring)</td>
<td>Language-based Security (10 ECTS)</td>
<td>10 ECTS</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 ECTS</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>Semesters</th>
<th>Courses</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Sem (Fall)</td>
<td><strong>Formal Software Verification (10 ECTS)</strong> <em>(NEW from 2021)</em></td>
<td>BS</td>
</tr>
<tr>
<td>2nd Sem (Spring)</td>
<td><strong>Algorithmic Model Checking (10 ECTS)</strong> <em>(NEW from 2022)</em></td>
<td>JvdP + AP</td>
</tr>
<tr>
<td>3rd Sem (Fall)</td>
<td><strong>Program Logics (10 ECTS)</strong> <em>(NEW from 2021)</em></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
**UBIQITOUS COMPUTING AND INTERACTION**

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

- Semesters are independent – can be taken in any order

**Ubiqitous Computing and Interaction**
- Hans-Jörg Schultz
- Kaj Grønbæk
- Ken Pfeuffer
- 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</th>
<th>Recommended order of courses</th>
<th>Alternative order of courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Sem (Fall)</td>
<td>Genome-Scale Algorithms (10 ECTS)</td>
<td>Evolutionary Thinking (10 ECTS)</td>
</tr>
<tr>
<td>2nd Sem (Spring)</td>
<td>Algorithms in Bioinformatics (10 ECTS)</td>
<td>Algorithms in Bioinformatics (10 ECTS)</td>
</tr>
<tr>
<td>3rd Sem (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</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Sem (Fall)</td>
<td>Data Science in Bioinformatics (10 ECTS)</td>
</tr>
<tr>
<td>2nd Sem (Spring)</td>
<td>Statistical and Machine Learning in Bioinformatics (10 ECTS)</td>
</tr>
<tr>
<td>3rd Sem (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 cstorm@birc.au.dk
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>1. Sem (Fall)</th>
<th>2. Sem (Spring)</th>
<th>3. Sem (Fall)</th>
<th>4. Sem (Spring)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Computation</strong></td>
<td><strong>Cluster Analysis (10 ECTS)</strong></td>
<td><strong>Algorithms, Incentives, and Data (10 ECTS)</strong></td>
<td><strong>Thesis (30 ECTS)</strong></td>
</tr>
<tr>
<td><strong>Learning</strong></td>
<td><strong>Data Mining (10 ECTS)</strong></td>
<td><strong>Advanced Data Management and Analysis (10 ECTS)</strong></td>
<td><strong>Advanced Machine Learning and Data Science</strong> + <strong>Data-Intensive Systems</strong></td>
</tr>
<tr>
<td><strong>Theory (10 ECTS)</strong></td>
<td><strong>Deep Learning for Visual Recognition (10 ECTS)</strong></td>
<td><strong>Elective 1</strong></td>
<td><strong>Elective 2</strong></td>
</tr>
<tr>
<td><strong>Computational Learning</strong></td>
<td><strong>Advanced Machine Learning and Data Science</strong></td>
<td><strong>Elective 3</strong></td>
<td><strong>Computational Learning Theory (10 ECTS)</strong></td>
</tr>
<tr>
<td><strong>Theory (10 ECTS)</strong></td>
<td><strong>Deep Learning for Visual Recognition (10 ECTS)</strong></td>
<td><strong>Elective 1</strong></td>
<td><strong>Thesis (30 ECTS)</strong></td>
</tr>
<tr>
<td><strong>Elective 1</strong></td>
<td><strong>Data Mining (10 ECTS)</strong></td>
<td><strong>Elective 2</strong></td>
<td><strong>Elective 3</strong></td>
</tr>
<tr>
<td><strong>Elective 2</strong></td>
<td><strong>Advanced Data Management and Analysis (10 ECTS)</strong></td>
<td><strong>Elective 3</strong></td>
<td><strong>Computational Learning Theory (10 ECTS)</strong></td>
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<tr>
<td><strong>Elective 3</strong></td>
<td><strong>Computational Learning Theory (10 ECTS)</strong></td>
<td><strong>Elective 3</strong></td>
<td><strong>Thesis (30 ECTS)</strong></td>
</tr>
</tbody>
</table>

**OR**

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

| 1. Sem (Fall) | Program Analysis (10 ECTS) | Formal Software Verification (10 ECTS) | Elective 1 |
| 2. Sem (Spring) | Language-based Security (10 ECTS) | Algorithmic Model Checking (10 ECTS) | Elective 2 |
| 3. Sem (Fall) | Advanced Topics in Programming Language Theory (10 ECTS) | Program Logics (10 ECTS) | Elective 3 |
| 4. Sem (Spring) | | Thesis (30 ECTS) | |

OR

| 1. Sem (Fall) | Compilation (10 ECTS) | Formal Software Verification (10 ECTS) | Elective 1 |
| 2. Sem (Spring) | Language-based Security (10 ECTS) | Algorithmic Model Checking (10 ECTS) | Computability and Logic (10 ECTS) |
| 3. Sem (Fall) | Advanced Topics in Programming Language Theory (10 ECTS) | Program Logics (10 ECTS) | Program Analysis (10 ECTS) |
| 4. Sem (Spring) | | Thesis (30 ECTS) | |
## EXAMPLE 3:

### Human-Computer Interaction + Ubiquitous computing and Interaction

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

**OR**

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

**Distributed Systems and Security (10 ECTS)**
## EXAMPLE 4:

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

AARHUS UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE

COMPUTER SCIENCE MASTER'S
29 OCTOBER 2021
ELECTIVE COURSES
EXTERNAL

Courses at Department of Computer Science

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
DEPARTMENT OF COMPUTER SCIENCE (APART FROM SPECIALIZATIONS)

Fall & Spring:
- Bachelor level courses
- 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:
- Informatikkens fagdidaktik (5 ECTS)

Fall & Spring:
- Praktik som gymnasielærer (5 ECTS)
ELECTIVE COURSES

MATHMATICS

Fall

- Introductory Algebra (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)
  - Elliptic Curves - Number Theory and Cryptography (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
• Lyd og Interaktion (10 ECTS)
• Computerspilsteori (10 ECTS)
• 3D-interaktion (10 ECTS)

Summer
• Game.Play.Design (10 ECTS)
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
  • Study abroad semester (30 ECTS)
  • Study abroad summerschool (5-10 ECTS)
• Admission
• Practical information
### 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

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

**Or**

<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>Elective (30 ECTS)</td>
<td>Study abroad (30 ECTS)</td>
<td>Thesis (30 ECTS)</td>
</tr>
</tbody>
</table>
STUDY ABROAD (30 ECTS SEMESTER)

General information (destinations, deadlines, procedures, etc)
• http://studerende.au.dk/studier/fagportaler/datalogi/udlandsophold/

Study Abroad Event 27 October 2021:
https://studerende.au.dk/studier/fagportaler/datalogi/udlandsophold/events/nat-tech-study-abroad-events/

Application Deadline: 1 December 2021
KEY PARTNERS

Selected destinations (with programs taught in English)

<table>
<thead>
<tr>
<th>University</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technische Universität Wien</td>
<td>Austria</td>
</tr>
<tr>
<td>KU Leuven</td>
<td>Belgium</td>
</tr>
<tr>
<td>Université Catholique de Louvain</td>
<td>Belgium</td>
</tr>
<tr>
<td>University of Helsinki</td>
<td>Finland</td>
</tr>
<tr>
<td>Technische Universität München</td>
<td>Germany</td>
</tr>
<tr>
<td>Groningen University</td>
<td>Netherlands</td>
</tr>
<tr>
<td>Radboud University Nijmegen</td>
<td>Netherlands</td>
</tr>
<tr>
<td>Norges Teknisk Naturvidenskabelige Universitet (NTNU)</td>
<td>Norway</td>
</tr>
<tr>
<td>Universitetet i Oslo</td>
<td>Norway</td>
</tr>
<tr>
<td>Göteborgs Universitet</td>
<td>Sweden</td>
</tr>
<tr>
<td>Uppsala Universitet</td>
<td>Sweden</td>
</tr>
</tbody>
</table>

We expect to have these exchange partners from fall 2022 and onwards. However, negotiations are not finished until approximately November 1st 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 a meeting.
  - 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)

MASTER’S DEGREE PROGRAM

• Structure of the Master’s Degree Program
• Study abroad
• 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/](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 your 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
- Admission
- Practical information
  - Contracts
  - Signing up for courses
  - "Fremdriftsreform"
  - Student Guidance
CONTRACTS

- http://kontrakt.nattech.au.dk/

Study 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
  - You will have a friendly chat with Andreas and Gudmund

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 – March 21 for courses in Summer
• May 1-5 for courses in 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 https://studerende.au.dk/en/studies/subject-portals/computer-science/student-counselling/maximum-duration-of-study/.

• 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

• Nikolaj Beck Mikkelsen


• 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