Master’s Degree Programme
Computer Science

Revised 9 May 2020
Master’s Degree Programme

- Important choices
- Structure of the Master’s Degree Programme
- Specialization columns
- Elective courses
- Requirements for the study programme
- Admission
- Practical information

- Slides: www.cs.au.dk/studieorientering
During Master’s degree studies:

- Specialization?
- Elective courses?
- Study abroad?
- ph.d.?
### CS Bachelor

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

- Taught in **Danish**, except for courses marked 🇬🇧.
- Bachelor in cs or similar is prerequisite for master level cs courses.

- Math support
- Cs (only)
- Cs (and it)
- Elective
Master’s Degree Programme

- Important choices
- **Structure of the Master’s Degree Programme**
- Specialization columns
- Elective courses
- Requirements for the study programme
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### Structure of Master’s Programme: Ex 1

<table>
<thead>
<tr>
<th>1st Semester</th>
<th>Spec 1a</th>
<th>Spec 2a</th>
<th>Elective a</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd Semester</td>
<td>Spec 1b</td>
<td>Spec 2b</td>
<td>Elective b</td>
</tr>
<tr>
<td>3rd Semester</td>
<td>Spec 1c</td>
<td>Spec 2c</td>
<td>Elective c</td>
</tr>
<tr>
<td>4th Semester</td>
<td></td>
<td></td>
<td>Thesis</td>
</tr>
</tbody>
</table>

- **Specialization:**
  - Two full 30 ECTS specializations (spec 1 & spec 2)

- **Elective:**
  - Remaining mandatory courses not included in bachelor program,
  - (Part of) a 3rd 30 ECTS specialization,
  - Elective cs-courses (see later)
  - (Part of) a coherent 30 ECTS supplementary subject such as math, computer technology, digital design/informationsvidenskab (Arts), ideally supporting specialisations

- **Thesis:**
  - Written within the area of spec 1 or spec 2
## Structure of Master’s Programme: Ex 1

### Variations of example 1

<table>
<thead>
<tr>
<th>1st Semester</th>
<th>Spec 1a</th>
<th>Spec 2a</th>
<th>Tilvalg (Math: Algebra)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd Semester</td>
<td>Spec 1b</td>
<td>Spec 2b</td>
<td>Mandatory (Optimization)</td>
</tr>
<tr>
<td>3rd Semester</td>
<td>Spec 1c</td>
<td>Spec 2c</td>
<td>Spec 2: Project work</td>
</tr>
<tr>
<td>4th Semester</td>
<td>Thesis (within Spec 2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1st Semester</th>
<th>Spec 1a</th>
<th>Spec 2a</th>
<th>Spec 3a</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd Semester</td>
<td>Spec 1b</td>
<td>Spec 2b</td>
<td>Spec 3b</td>
</tr>
<tr>
<td>3rd Semester</td>
<td>Spec 1c</td>
<td>Spec 2c</td>
<td>Elective CS</td>
</tr>
<tr>
<td>4th Semester</td>
<td>Thesis (within Spec 2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1st Semester</th>
<th>Spec 1a</th>
<th>Spec 2a</th>
<th>Tilvalg (Digital Design)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd Semester</td>
<td>Spec 1b</td>
<td>Spec 2b</td>
<td>Tilvalg (Digital Design)</td>
</tr>
<tr>
<td>Summer</td>
<td></td>
<td></td>
<td>Summer school (abroad?)</td>
</tr>
<tr>
<td>3rd Semester</td>
<td>Spec 1c</td>
<td>Spec 2c</td>
<td></td>
</tr>
<tr>
<td>4th Semester</td>
<td>Thesis (within Spec 2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Structure of Master’s Programme: Ex 2
## Including study abroad

<table>
<thead>
<tr>
<th>Semester</th>
<th>Spec 1a</th>
<th>Spec 1c</th>
<th>Elective a</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Spec 1b</td>
<td>Elective b</td>
<td>Elective c</td>
</tr>
<tr>
<td>2nd</td>
<td></td>
<td>Semester abroad</td>
<td></td>
</tr>
<tr>
<td>3rd</td>
<td></td>
<td>Thesis</td>
<td></td>
</tr>
</tbody>
</table>

- **Specialization:**
  - A single 30 ECTS specialization (spec 1)

- **Elective:**
  - Remaining mandatory courses not included in bachelor program,
  - (part of) a 2nd 30 ECTS specialization,
  - Elective cs-courses (see later)
  - (Part of ) a coherent 30 ECTS supplementary subject such as math, computer technology, digital design/informationsvidenskab (Arts), ideally supporting specialisations

- **Thesis:**
  - Written within the area of spec 1

- **NB:** Elective + study abroad must contain 30 ECTS master level CS
Structure of Master’s Programme: Ex 2
Including study abroad

- Variations of example 2

<table>
<thead>
<tr>
<th>1st Semester</th>
<th>Spec 1a</th>
<th>Spec 2a</th>
<th>Tilvalg (Math: Algebra)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd Semester</td>
<td>Spec 1b</td>
<td>Spec 2b</td>
<td>Mandatory (Optimization)</td>
</tr>
<tr>
<td>3rd Semester</td>
<td>Study abroad (with 20 ECTS master level CS &amp; credit transfer for Spec 1c)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th Semester</td>
<td>Thesis (within Spec 1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1st Semester</th>
<th>Spec 1a</th>
<th>Spec 2a</th>
<th>Spec 3a</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd Semester</td>
<td>Spec 1b</td>
<td>Spec 2b</td>
<td>Spec 3b</td>
</tr>
<tr>
<td>3rd Semester</td>
<td>Study abroad (with credit transfer for Spec 1c)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th Semester</td>
<td>Thesis (within Spec 1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1st Semester</th>
<th>Spec 1a</th>
<th>Spec 1c</th>
<th>Tilvalg (Technology)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd Semester</td>
<td>Spec 1b</td>
<td>Tilvalg (Technology)</td>
<td>Tilvalg (Technology)</td>
</tr>
<tr>
<td>3rd Semester</td>
<td>Study abroad (All 30 ECTS are master level CS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th Semester</td>
<td>Thesis (within Spec 1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Master’s Degree Programme

- Important choices
- Structure of the Master’s Degree Programme
- **Specialization columns**
- Elective courses
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What is a specialization column?

- 30 ECTS courses within a subdiscipline of computer science
- Gives the basis for writing a thesis

- Flexibility:
  - Up to 10 ECTS of the 30 ECTS may be replaced by a course from another specialization or a project work

- The following slides have current offerings
  - Depends on current research groups

- You choose based on
  - Interest
  - Career dreams
# Current specializations

<table>
<thead>
<tr>
<th>Semester</th>
<th>Spec 1</th>
<th>Spec 2</th>
<th>Spec 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Sem (Fall)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd Sem (Spring)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd Sem (Fall)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th Sem (Spring)</td>
<td></td>
<td></td>
<td>Thesis</td>
</tr>
</tbody>
</table>

**Specializations columns:**

- **Algorithmics**
  - Algo 1
  - Algo 2
  - Algo 3

- **Data-Intensive Systems**
  - Data 1
  - Data 2
  - Data 3

- **Cryptology**
  - Crypto 1
  - Crypto 2
  - Crypto 3

- **HCI**
  - HCI 1
  - HCI 2
  - HCI 3

- **Programming Languages**
  - Prog 1
  - Prog 2
  - Prog 3

- **Ubiquitous computing and Interaction**
  - UBI 1
  - UBI 2
  - UBI 3

- **Bioinformatics (3 specializations)**
  - Bioinf 1
  - Bioinf 2
  - Bioinf 3
Algorithmics

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Title</th>
<th>Credits</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Sem (Fall)</td>
<td>Computational Geometry: Theory and Experimentation (10 ECTS)</td>
<td></td>
<td>LA + PA</td>
</tr>
<tr>
<td>2nd Sem (Spring)</td>
<td>Randomized Algorithms (10 ECTS)</td>
<td></td>
<td>KGL</td>
</tr>
<tr>
<td>3rd Sem (Fall)</td>
<td>Theory of Algorithms and Computational Complexity (10 ECTS)</td>
<td></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 and Data Structures**

- Lars Arge
- Gerth Stølting Brodal
- Peyman Afshani
- Kasper Green Larsen
- Kristoffer Arnsfelt Hansen
Cryptology

<table>
<thead>
<tr>
<th>Semesters</th>
<th>Courses</th>
<th>Instructors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Sem (Fall)</td>
<td>Cryptology (10 ECTS)</td>
<td>IBD</td>
</tr>
<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)</td>
<td>CO</td>
</tr>
</tbody>
</table>

- Semesters have progression
- First semester is prerequisite for the other semesters
- Last two semesters can be taken in any order

Cryptography and Security
- Ivan Bjerre Damgård
- Jesper Buus Nielsen
- Claudio Orlandi
- Peter Scholl
### Data-Intensive Systems

<table>
<thead>
<tr>
<th>Semester (Fall)</th>
<th>Course</th>
<th>ECTS</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Advanced Data Management and Analysis</td>
<td>10</td>
<td>IA+PK+DM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd (Spring)</td>
<td>Data Mining</td>
<td>10</td>
<td>IA+PK+DM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd (Fall)</td>
<td>Data Visualization or</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deep Learning for Visual Recognition</td>
<td></td>
<td></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

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## Data-intensive Systems

- Ira Assent
- Panagiotis Karras
- Davide Mottin
Human-Computer Interaction

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Credits</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></td>
<td>SB</td>
</tr>
<tr>
<td>2nd Sem (Spring)</td>
<td>Designing Interactive Technologies (10 ECTS)</td>
<td></td>
<td>SB</td>
</tr>
<tr>
<td>3rd Sem (Fall)</td>
<td>Multimodal Interaction (10 ECTS)</td>
<td></td>
<td>EH</td>
</tr>
</tbody>
</table>

- Semesters are independent – can be taken in any order

Computer Mediated Activity
- Susanne Bødker
- Olav Bertelsen
- Eve Hoggan

Use, Design and Innovation
- Morten Kyng
Programming Languages

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Sem (Fall)</td>
<td>Program Analysis and Verification (10 ECTS)</td>
<td>AM + LB</td>
</tr>
<tr>
<td>2nd Sem (Spring)</td>
<td>Language-based Security (10 ECTS)</td>
<td>AA</td>
</tr>
<tr>
<td>3rd Sem (Fall)</td>
<td>Functional Programming (10 ECTS)</td>
<td>BS</td>
</tr>
</tbody>
</table>

- Semesters are independent – can be taken in any order

Programming Languages
- Anders Møller
- Magnus Madsen
- Andreas Pavlogiannis

Logic and Semantics
- Lars Birkedal
- Aslan Askarov
- Bas Spitters
- Jaco van de Pol
- Amin Timany
# Ubiqitous Computing and Interaction

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

- Semesters are independent – can be taken in any order

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**Ubiqitous Computing and Interaction**

- Kaj Grønbæk
- Niels Olof Bouvin
- Marianne Graves Petersen
- Hans Gellersen
- Jo Vermeulen
- Hans-Jörg Schultz
## Specializations from Master’s degree Programme in Bioinformatics
*(offered by Bioinformatics Research Centre)*

Contact: Christian Storm Pedersen — Thomas Mailund

### Algorithms and Programming

<table>
<thead>
<tr>
<th>Sem</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>Tree of Life (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>Tree of Life (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>Sem</th>
<th>Data Science in Bioinformatics (10 ECTS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Sem (Fall)</td>
<td>Statistical and Machine Learning in Bioinformatics (10 ECTS)</td>
</tr>
<tr>
<td>2nd Sem (Spring)</td>
<td>Tree of Life (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)
Master’s Degree Programme

- Important choices
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Elective Courses (apart from specializations)

- **Fall**
  - Interdisciplinary Digital Entrepreneurship (10 ECTS)
  - Machine Learning (10 ECTS) (bachelor course)

- **Fall & Spring:**
  - Project work in Computer Science (5 or 10 ECTS)
  - Erhvervsprojekt / Vocational Training Project (10 ECTS)
    - Collaboration with a company
    - [https://studerende.au.dk/studier/fagportaler/datalogi/projektsamarbejde/](https://studerende.au.dk/studier/fagportaler/datalogi/projektsamarbejde/)
    - [https://studerende.au.dk/studier/fagportaler/datalogi/projektsamarbejde/cs-project-bank/](https://studerende.au.dk/studier/fagportaler/datalogi/projektsamarbejde/cs-project-bank/)

Courses aimed at teaching CS in high school:

- **Spring:**
  - Matematikdidaktik / Mathematics Education (5 ECTS)

- **Fall & Spring:**
  - Praktik som gymnasielærer / Placement at Upper Secondary School (5 ECTS)
Elective courses (external)

- Courses at AU:
  - Mathematics
  - Technology
  - Digital Design and Information Studies (Arts)
- Courses outside AU
  - Exchange semester abroad (30 ECTS)
  - Summer school abroad (5-10 ECTS)

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**
  - 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 Perspectives in Mathematics 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 (ENG)

- **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)
  - Computer Vision and Machine Learning (10 ECTS)
  - Modelling and Verification (10 ECTS)

- Worried about prerequisites for engineering courses?
  - Check course catalogue
  - Contact course responsible, or
  - Contact programme responsible Qi Zhang qz@eng.au.dk
Elective courses (Digital Design and Information Studies)

- **Fall**
  - Audio Visuality (10 ECTS)
  - Digital Aesthetics (15 ECTS)
  - 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)
Study abroad (30 ECTS semester)

- General information (destinations, deadlines, procedures, etc)
  • [link](http://studerende.au.dk/studier/fagportaler/datalogi/udlandsophold/)
- Study Abroad Fair 3 October 2019:
  • [link](http://studerende.au.dk/au-study-abroad-fair/)
- Application Deadline: 1 December 2019
- Selected destinations (with programmes taught in English)

<table>
<thead>
<tr>
<th>University</th>
<th>Programme</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 Universitet</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 (30 ECTS semester)

- Selected destinations (with programmes taught in English)
  - University of California (several campuses)
  - UC Berkeley
    - Programme/courses: CS
    - Semester system
    - 30 ECTS requires 15 undergraduate credits or 12 graduate credits

Will be updated before next deadline 1 December 2020
Study abroad (30 ECTS semester)

- Credit transfer /course selection
  - Select potential universities based on course offerings http://scitech.studyabroad.au.dk/.
  - Apply for exchange through AU GO (opens for application approx 1 week before deadline) http://scitech.studyabroad.au.dk/.
  - 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

- Other aspects?
  - Contact Mette Glerup Thomsen, ST international coordinator, http://studerende.au.dk/studier/fagportaler/datalogi/udlandsophold/kontakt/
Study abroad (Summer school)

- General information (destinations, deadlines, procedures, etc)
  - https://studerende.au.dk/en/studies/subject-portals/computer-science/study-abroad/other-study-abroad-possibilities/summer-courses/

- Application Deadline: 15 March 2020
## International full degree students:

**Variation 1:** Theoretical computer science

<table>
<thead>
<tr>
<th>Semester</th>
<th>Algorithmics</th>
<th>Programming Languages</th>
<th>Cryptology</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st (Fall)</td>
<td>Computational Geometry: Theory and Experimentation</td>
<td>Compilation (BSc)</td>
<td>Cryptology</td>
</tr>
<tr>
<td>2nd (Spring)</td>
<td>Randomized Algorithms</td>
<td>Language-based Security</td>
<td>Cryptologic Protocol Theory</td>
</tr>
<tr>
<td>3rd (Fall)</td>
<td>Theory of Algorithms and Computational Complexity OR Machine Learning (BSc)</td>
<td>Functional Programming OR Program Analysis and Verification</td>
<td>Cryptographic computing</td>
</tr>
<tr>
<td>4th (Spring)</td>
<td></td>
<td></td>
<td>MSc Thesis</td>
</tr>
<tr>
<td>Semester</td>
<td>Data-Intensive Systems</td>
<td>Ubiquitous Computing and Interaction</td>
<td>Bioinformatics</td>
</tr>
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<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>1st (Fall)</td>
<td>Machine Learning (BSc)</td>
<td>Building the Internet of Things with P2P and Cloud Computing</td>
<td>Data Science in Bioinformatics</td>
</tr>
<tr>
<td>2nd (Spring)</td>
<td>Data Mining</td>
<td>Augmented Reality</td>
<td>Statistical and Machine Learning in Bioinformatics</td>
</tr>
<tr>
<td>3rd (Fall)</td>
<td>Advanced Data Management and Analysis OR Data Visualization</td>
<td>Data Visualization OR Deep Learning for Visual Recognition</td>
<td>Genome-Scale Algorithms</td>
</tr>
<tr>
<td>4th (Spring)</td>
<td></td>
<td>MSc Thesis</td>
<td></td>
</tr>
</tbody>
</table>
# International full degree students: Variation 3: Data, UBI and HCI

<table>
<thead>
<tr>
<th>Semester</th>
<th>Data-Intensive Systems</th>
<th>Ubiquitous Computing and Interaction</th>
<th>HCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; (Fall)</td>
<td>Machine Learning (BSc)</td>
<td>Building the Internet of Things with P2P and Cloud Computing</td>
<td>Human-Computer Interaction (BSc)</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; (Spring)</td>
<td>Data Mining</td>
<td>Augmented Reality</td>
<td>Designing Interactive Technologies</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; (Fall)</td>
<td>Advanced Data Management and Analysis OR Data Visualization</td>
<td>Data Visualization OR Deep Learning for Visual Recognition</td>
<td>Multimodal Interaction OR Interactivity and Computer Mediation – Concepts, Theories, Methods, Cases</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt; (Spring)</td>
<td></td>
<td></td>
<td>MSc Thesis</td>
</tr>
</tbody>
</table>
# International full degree students:

*if you are in doubt: a bit of everything*

<table>
<thead>
<tr>
<th>Semester</th>
<th>Algorithmics</th>
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<th>Programming Languages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; (Fall)</td>
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</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; (Spring)</td>
<td>Randomized Algorithms</td>
<td>Augmented Reality</td>
<td>Language-based Security</td>
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<td></td>
<td>MSc Thesis</td>
<td></td>
</tr>
</tbody>
</table>

- 2<sup>nd</sup> semester alternatives: Optimization (bachelor), Project Work
- 3<sup>rd</sup> semester alternatives: Cryptology, Project Work
Master’s Degree Programme

- Important choices
- Structure of the Master’s Degree Programme
- Specialization columns
- Elective courses
- Requirements for the study programme
- Admission
- Practical information
Requirements for the Study Programme

- 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)

- Specialization columns
  - At least 2 specialization columns of 30 ECTS each
  - A single specialization column suffices when the programme includes study abroad

- Thesis (30 ECTS)
Yellow Brick Requirement

- All Programmes (Bachelor or Master’s) must include 60 ECTS passed at Natural Science, Aarhus University

- This has implications for credit transfer!
Master’s Degree Programme

- Important choices
- Structure of the Master’s Degree Programme
- Specialization columns
- Elective courses
- Requirements for the study programme
- Admission
- Practical information
Admission

- When bachelor completed
- You apply for admission into Master’s Programme
  - 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 programme (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 Programme
- 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!
Apply for PhD studies!
- For deadlines see [http://talent.au.dk/phd/scienceandtechnology/opencalls/](http://talent.au.dk/phd/scienceandtechnology/opencalls/)
- You receive a salary while studying!
- [http://talent.au.dk/phd/scienceandtechnology/programmes/computer-science/](http://talent.au.dk/phd/scienceandtechnology/programmes/computer-science/)
- Apply for PhD studies directly following your bachelor studies, during you Master’s studies or following your Master’s degree. (Why not apply early?)
- 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 Programme

- Important choices
- Structure of the Master’s Degree Programme
- Specialization columns
- Elective courses
- Requirements for the study programme
- Admission

Practical information
  - Contracts
  - Signing up for courses
  - "Fremdriftsreform"
  - Student Guidance
Contracts

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

**Master’s Contract:**
- Complete before signing up for first course in Master’s Programme
  - 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
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 Nat-Tech,
- 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 pass minimum 45 ECTS per year or 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/](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 programme, delay, leave of absence, withdrawel.
    - Illness.
    - Study regulations, selecting supplementary subjects.
Information Meetings

Thursday 26 marts 2020 (Store Aud, 5510-103):
- 13-14: **Computer Science: Bachelor Program**
- 14-15: **Computer Science: Master’s Program**

Friday 27 marts 2020 (Lille Aud, 5510-104):
- 12-13: **IT-Product Development: Bachelor Program**
- 13-14: **IT-Product Development: Master’s Program**
- 14-15: **Computer Science & IT-Product Development: Master’s Thesis**
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

- **PR** Committee
  - Chair: Søren Poulsen, poulson@cs.au.dk
  - [http://cs.staff.au.dk/boards-and-committees/pr-committee/](http://cs.staff.au.dk/boards-and-committees/pr-committee/)