Computer Science (IT)
CS international track in English

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Education Coordinator CS-IT
Agenda

• Overview of CS educations
• Entries to CS-IT
• Computer Science (IT) – the details
• PBL and UN SDGs
• Study environment
• After graduating ..
• Questions
Full time educations @CS.AAU.DK

Bachelor

- Computer Science
  - DAT 1-6
  - Danish
- Software
  - SW 1-6
  - Danish
- Software
  - SW 1-6
  - Copenhagen
- Information-Technology
  - BAIT 1-6
  - BAIT-T

Master

- Computer Science
  - DAT 7-10
  - Danish
- Software
  - SW 7-10
  - Danish
- Start 2023
  - Software
  - SW 7-10
  - Copenhagen
- Computer Science (IT)
  - CS(IT)7-10
  - English

IT bachelor

- Data Science and Machine Learning
  - DVML 1-6
- Interaction Design
  - IxD 1-6

non IT bachelor

- Data Science and Machine Learning
  - DVML 7-10
- Interaction Design
  - IxD 7-10
- Digitalisation and application design
  - DAD 7-10
Entries to CS-IT

Computer Science
Foreign University

Bachelor
Computer science or Software
AAU

Information Technology
BAIT 1-6
BAIT-T

Professions Bachelor Software Development (PBA SU)
UCN++

IT Bachelor
With 150 ECTS CS related topics (SPO+)

Programming (10 ECTS), Software Engineering (5 ECTS), Algorithms and data structures (5 ECTS) Databases (5 ECTS) Discrete mathematics (5 ECTS). Formal Languages (5 ECTS) Compilers (5 ECTS) Computability and complexity (5 ECTS)

Computer Science (IT)
CS(IT)7-10 Option A

English
Cand.scient.

English
Cand.scient.

Bachelor
Computer Science (IT)
CS(IT)7-10 Option B

Programming (10 ECTS), Software Engineering (5 ECTS), Algorithms and data structures (5 ECTS) Databases (5 ECTS) Discrete mathematics (5 ECTS). Formal Languages (5 ECTS)

PBA SU + electives:
Databaser for udviklere (10 ECTS)
Diskret matematik (5 ECTS)
Syntaks og semantik (5 ECTS)
Admission on dispensation

- If you have not completed your BSc yet, you may apply for dispensation for entry if you are missing less than 15 ECTS
  - The missing 15 ECTS must be at most
    - a. one module in the 5th semester and/or
    - b. one module in either 4th or 6th semester
  - So you cannot have missing elements on any of the first 3 semesters and you cannot have missing elements in all three of the final semesters!

- If you have a BSc but are missing some elements to fulfil the entry criteria for CS-IT you may be admitted conditionally on completing these elements during the first year of studies. The missing elements must not exceed 30 ECTS.
  - Note, we are not allowed to take into account missing elements that you complete after your BSc but before you apply!
# Overview of CT-IT

<table>
<thead>
<tr>
<th>MODULE NAME</th>
<th>COURSE TYPE</th>
<th>ECTS</th>
<th>APPLIED GRADING SCALE</th>
<th>EVALUATION METHOD</th>
<th>ASSESSMENT METHOD</th>
<th>LANGUAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secure, Scalable and Useful Systems</td>
<td>Project</td>
<td>15</td>
<td>1-point grading scale</td>
<td>External examination</td>
<td>Oral exam based on a project</td>
<td>English</td>
</tr>
<tr>
<td>Programming Paradigms</td>
<td>Course</td>
<td>5</td>
<td>1-point grading scale</td>
<td>External examination</td>
<td>Written or oral exam</td>
<td>English</td>
</tr>
<tr>
<td>Machine Intelligence</td>
<td>Course</td>
<td>5</td>
<td>1-point grading scale</td>
<td>Internal examination</td>
<td>Written or oral exam</td>
<td>English</td>
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</tbody>
</table>

**1 SEMESTER**

<table>
<thead>
<tr>
<th>ELECTIVES 1ST SEMESTER</th>
<th>SELECT 1 COURSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODULE NAME</td>
<td>COURSE TYPE</td>
</tr>
<tr>
<td>Selected Topics in Database Research and Practice</td>
<td>Course</td>
</tr>
<tr>
<td>Distributed Systems</td>
<td>Course</td>
</tr>
<tr>
<td>Selected Topics in HCI</td>
<td>Course</td>
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**2 SEMESTER**

<table>
<thead>
<tr>
<th>MODULE NAME</th>
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<th>ECTS</th>
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<th>EVALUATION METHOD</th>
<th>ASSESSMENT METHOD</th>
<th>LANGUAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliable Innovative Systems</td>
<td>Project</td>
<td>15</td>
<td>1-point grading scale</td>
<td>External examination</td>
<td>Oral exam based on a project</td>
<td>English</td>
</tr>
<tr>
<td>Machine Learning</td>
<td>Course</td>
<td>5</td>
<td>1-point grading scale</td>
<td>Internal examination</td>
<td>Written or oral exam</td>
<td>English</td>
</tr>
<tr>
<td>Numerical Topics in Modelling and Verification</td>
<td>Course</td>
<td>5</td>
<td>1-point grading scale</td>
<td>Internal examination</td>
<td>Written or oral exam</td>
<td>English</td>
</tr>
<tr>
<td>Software Innovation</td>
<td>Course</td>
<td>5</td>
<td>1-point grading scale</td>
<td>Internal examination</td>
<td>Written or oral exam</td>
<td>English</td>
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<th>ASSESSMENT METHOD</th>
<th>LANGUAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design, Definition and Implementation of Programming Languages</td>
<td>Project</td>
<td>15</td>
<td>1-point grading scale</td>
<td>External examination</td>
<td>Oral exam based on a project</td>
<td>English</td>
</tr>
<tr>
<td>Agile Software Engineering</td>
<td>Course</td>
<td>5</td>
<td>1-point grading scale</td>
<td>External examination</td>
<td>Written or oral exam</td>
<td>English</td>
</tr>
<tr>
<td>Languages and Compilers</td>
<td>Course</td>
<td>5</td>
<td>1-point grading scale</td>
<td>External examination</td>
<td>Practicum exam</td>
<td>English</td>
</tr>
<tr>
<td>Competability and Complexity</td>
<td>Course</td>
<td>5</td>
<td>1-point grading scale</td>
<td>External examination</td>
<td>Written or oral exam</td>
<td>English</td>
</tr>
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**3 SEMESTER**

<table>
<thead>
<tr>
<th>MODULE NAME</th>
<th>COURSE TYPE</th>
<th>ECTS</th>
<th>APPLIED GRADING SCALE</th>
<th>EVALUATION METHOD</th>
<th>ASSESSMENT METHOD</th>
<th>LANGUAGE</th>
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</thead>
<tbody>
<tr>
<td>Pre-Specialization in Computer Science</td>
<td>Project</td>
<td>20</td>
<td>1-point grading scale</td>
<td>External examination</td>
<td>Oral exam based on a project</td>
<td>English</td>
</tr>
<tr>
<td>Entrepreneurship</td>
<td>Course</td>
<td>9</td>
<td>1-point grading scale</td>
<td>Internal examination</td>
<td>Written or oral exam</td>
<td>English</td>
</tr>
<tr>
<td>Electives 3rd semester</td>
<td>Select 1 specialization course</td>
<td>Course</td>
<td>9</td>
<td></td>
<td></td>
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**4 SEMESTER**

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<thead>
<tr>
<th>MODULE NAME</th>
<th>COURSE TYPE</th>
<th>ECTS</th>
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<th>ASSESSMENT METHOD</th>
<th>LANGUAGE</th>
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</thead>
<tbody>
<tr>
<td>Master’s Thesis</td>
<td>Project</td>
<td>30</td>
<td>1-point grading scale</td>
<td>External examination</td>
<td>Master’s thesis/ final project</td>
<td>English</td>
</tr>
</tbody>
</table>
### CS-IT 7

#### Secure, Scalable and Useful Systems

- **Programming Paradigms (PP)**
- **Machine Intelligence (MI)**
- **Selected Topics in Database Research and Practice (sDRP)**
- **Distributed systems (DS)**
- **Selected topics in HCI (sHCI)**

#### Electives: Choose 1

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### CS-IT 8

**Option A:** Reliable Innovative Systems  
**Option B:** Design, Definition and Implementation of Programming Languages  
...  
...  
...  

---

**Secure, Scalable and Useful Systems**

**Purpose:** The project must include consideration of all three aspects: Security, scalability and usability. But the project is expected to go particularly in-depth with one of these topics

**Example**

**Scalable Recommender System for Dota 2**

**Rating Matrix as a product of its factors**

<table>
<thead>
<tr>
<th></th>
<th>F1</th>
<th>F2</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>F2</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**DOT PRODUCT**

\((3\times1) + (2\times0)\)  
\((3\times1) + (5\times1)\)
Secure, Scalable and Useful Systems

Reliable Innovative Systems

Purpose:
That the students work to form advanced computer models of a problem themselves and use these to develop innovative solutions balanced in relation to the reliability of the solution

Example project:

Option A: Reliable Innovative Systems

Software Innovation (SI)
Machine Learning (ML)
Selected topics in Modelling and Verification (sMV)
## Design, Definition and Implementation of Programming Languages

**Purpose:**
That the student learns how to design and implement a programming language and how this process can be supported by formal definitions of the language's syntax and semantics and techniques and methods for translator and/or interpreter construction.

**Example project**
A programming language for card games.
Pre-specialisation

Purpose:
The student should gain insight into a current research problem in computer science and be able to communicate this problem so that the student can make the thesis on this basis.

Reason:
University educations are research-based educations. On the master programmes, all students must achieve in-depth insight into current research issues and methods.

Choose a specialisation course

CS-IT 9
Pre-Specialisation (20 ECTS)
Entreprenuerhip (ENT)
Spec. course: HCl, DB, DS, SV, MI, PT, SU

CS-IT 10
Master Thesis (30 ECTS)

Example project
Choose a specialisation course

Mining Driving Preferences and Efficient Personalized Routing
Specialisations

- Database Technology
- Distributed Systems
- Human Computer Interaction
- Semantics and Verification
- Machine Intelligence
- System Development
- Programming Technology

- It is possible to form groups with students from Dat, SW and CS(IT)
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**Choose a specialisation course**

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<td><strong>Master Thesis</strong> (30 ECTS)</td>
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**Master Thesis**

**Purpose:**

That the student can formulate, analyze and contribute to the solution of a current research problem within computer science independently, systematically and critically through the application of scientific theory and method.

**Example projects**

- Block Reorgs Mitigation in Ethereum Proof-of-Stake
- An energy-oriented look into memoizability, using static analysis
- A Saxophone Teaching Glove: Introducing Haptic Feedback Amongst Beginner Musical Enthusiasts
Study regulations
studieordninger.aau.dk
https://studieordninger.aau.dk/2022/35/3398

- The official rules and all the details
- Details of all courses and projects in §18
How many hours per week?

- Expect weekly average of 45 hours
  - This is a full-time study!

- Group work is a large part of your study time at AAU and project work takes up approximately half of the time

- The time spent can be different from group to group, but typically 08:15 - 16:15

- Preparation for courses from home
**Studies and Exams**

- Lectures
- Exercise sessions
- Oral and written exams
- Project work (in groups)
- Oral project exam based on project report, individual grade
Problem based Learning PBL

• You can transfer the learning outcomes from the specific project work to similar situations you will encounter in your professional work.
  • You will acquire knowledge and skills independently and at a high professional level work analytically, interdisciplinary.
  • Requires understanding of the context of the problem and of the scope of your conclusions.
  • In cooperation with the business community solving authentic professional problems you will develop your teamwork skills

• Course on “Problem-based Learning and Project Management” if you are new to PBL
PBL and UN sustainability goals

- The PBL model offers ample opportunity to contextualize the project in relation to the UN's sustainability goals.

- Lots of projects on:
  - Energy management
  - Water management
  - Traffic management and routing of vehicles
  - Personalized medicine
  - Energy reduction of ICT
Responsibility for own learning

- You have considerable freedom to choose the projects yourself - and thus key parts of the study.
- You are supported by one or more supervisors who help you ensure that the group's work meets the requirements of the study plan.
- However, you are responsible for the cooperation in the group, organization of the learning and for the progress and result of the project.
The department and the study board

- Educations at CS@AAU
  - [https://www.cs.aau.dk/education/](https://www.cs.aau.dk/education/)
  - The study secretaries

- Study board for Computer Science
  - [https://www.cs.aau.dk/education/study-board/](https://www.cs.aau.dk/education/study-board/)
  - 5 student representatives
  - Approve study regulations
  - Approve dispensation applications
  - Approve plans for studying abroad
  - Process all semester evaluations
Study Environment

- What do students do when they are not studying?
- The social life at the university is an important part of thriving.
- The F-Club
  - Friday bar, Christmas lunch, LAN and more…
- ADSL
  - Student politics
  - Board game nights, go-karts, a trip to the Zoo and more...
- Professional events
  - Company visits, courses, presentations...
  - Job fairs
    - DSE, IT-day, Connect-IT and more...
- Aalborg has a lot to offer
  - Elected 2. best town for students in Denmark in 2019
  - In top 15 cities in Europe for getting a job while studying
When I finish – then what?

- Most CS-IT candidates work as:
  - System developers
  - IT architects
  - Project managers
  - System Administrators
  - Development consultants
  - PhD students

- The industry predicts that there will be a lack of around 20,000 IT specialists in 2030.

- Salary level
  - Bachelor: 35,000 Dkr.
  - Master: 39,000-45,000 Dkr.
Questions?