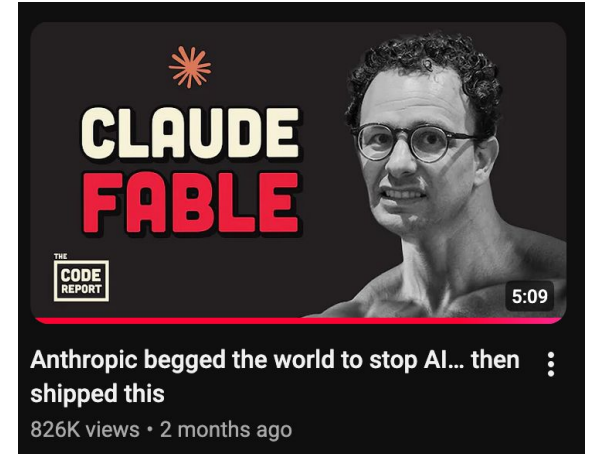
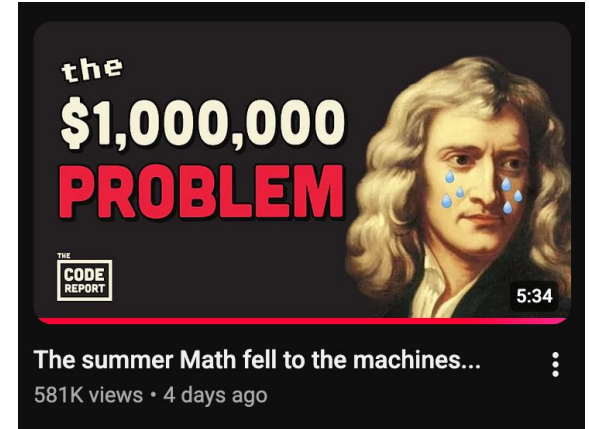


Quantum-Aware Software Systems

<https://www.aalto.fi/en/programmes/masters-programme-in-computer-communication-and-information-sciences/curriculum-2026-2028#23-study-track--quantum-aware-software-systems-60---40-ects>

Perspectives of jobs after graduation

Study track: Algorithms and Theory 60 / 40 ECTS	 Open AI	 Google	 Meta	 Anthropic
Study track: Big Data and Large-Scale Computing 60 / 40 ECTS	 Open AI	 Google	 Meta	 Anthropic
Study track: Secure Systems 60 / 40 ECTS	 Open AI	 Google	 Meta	 Anthropic
Study track: Quantum-Aware Software Systems 60 / 40 ECTS	+			
Study track: Web Technologies, Application and Science 60 / 40 ECTS	 Open AI	 Google	 Meta	 Anthropic



Quantum-Aware Software Systems

focuses on a wide range of topics, including

- embedded systems
- mobile computing
- virtualization
- cloud computing, and data center networking

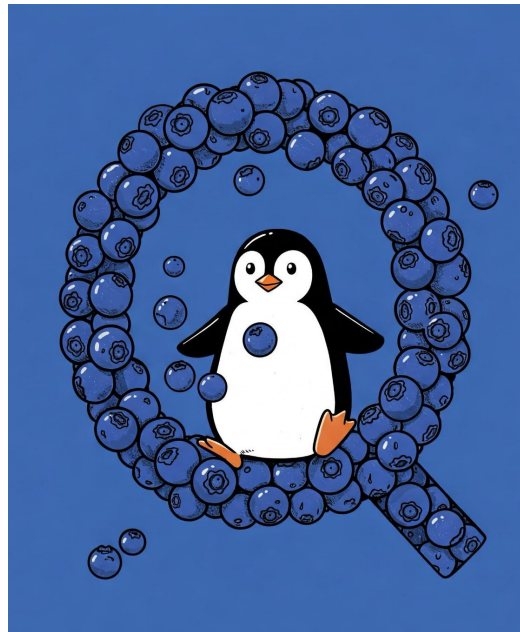
Graduates acquire in-depth knowledge of advanced software systems and architectures, preparing them for emerging platforms and technologies.

The logo for IQM, consisting of the letters 'I', 'Q', and 'M' in a stylized, black, sans-serif font.The logo for Quanscient, featuring the word 'QUANSCIENT' in a purple, sans-serif font.The logo for KONE, consisting of the letters 'K', 'O', 'N', and 'E' in white, each inside a blue square.The logo for QMill, featuring a black square with a white circle inside, and the text 'QMill' in a black, sans-serif font.The logo for CSC, featuring a stylized 'C' in teal and 'S' in purple, with the letters 'CSC' in a small, black, sans-serif font below.The logo for Supercell, consisting of the word 'SUPERCELL' in white, stacked vertically, inside a black square.The logo for Nokia, consisting of the word 'NOKIA' in a blue, sans-serif font.The logo for Rovio, featuring a stylized red 'R' shape above the word 'ROVIO' in a red, sans-serif font.

GE Healthcare

Key Course Areas

- **Quantum Computing:** For a more forward-looking approach, you can explore the emerging field of quantum computing. The program offers research opportunities and courses that provide an introduction to the unique challenges and paradigms of
 - building quantum computers
 - programming quantum computers
- **Cloud and Real Distributed Systems:** Modern parallel computing often takes place in the cloud. Courses in this area will help you understand the architectural principles of distributed services, virtualization, and cloud platforms. You'll learn to develop and deploy large-scale, parallel applications that can leverage cloud resources.



Key Course Areas

- **High-Performance Computing (HPC):** This is the core of parallel computing. Courses in this area will teach you how to program modern multi-core processors, GPUs, and distributed supercomputers like LUMI. You'll learn concepts such as thread-level parallelism, message passing (e.g., MPI), and shared memory programming (e.g., OpenMP).



40 credits == compact major

Choose at least 20 ECTS			
Computer science core courses			
CS-C3130	Information Security	5	I/1st year
CS-E3190	Principles of Algorithmic Techniques	5	I-II/1st year
CS-E4715	Supervised Machine Learning	5	I-II/1st year
ELEC-E7852	Computational Design and Interaction	5	II/1st year
CS-C3100	Computer Graphics	5	2026-2027: no teaching, 2027-2028: I-II
CS-E4700	Logic and Hard Computational Problems	5	I-II
CS-C3170	Web Software Development	5	I-II, III-V, summer/1st year
CS-E4190	Cloud Software and Systems	5	I-II/1st year
CS-E4780	Scalable Systems and Data Management		I-II/1st year

Choose at least 15 ECTS			
Quantum-Aware Software Systems (QSS) study track courses			
CS-C3141	Operating Systems: From Classical to Quantum	5	I-II/1st year
CS-E4800	Artificial Intelligence	5	III-IV/1st year
CS-E4690	Programming Parallel Supercomputers	5	I-II/2nd year
CS-E4013	Seminar in Computer Science - Quantum Software	5	III-V/1st year

20 credits computer science (e.g. CS-C3130+CS-E4715+CS-E4700+CS-C3170)

+

15 credits quantum-aware software systems (e.g. **CS-C3141**+CS-E4690+**CS-E4013**)

+

5 credits declarative programming (CS-E3220, compulsory)

60 credits == compact major + 20 credits == long major

CS-C3260	Practical Quantum Computing	5	I-II/2nd year
ELEC-C9440	Quantum Information	5	V/1st year
PHYS-C0254	Quantum Circuits	5	IV
ELEC-E8125	Reinforcement Learning	5	I-II / 2nd year
CS-E4890	Deep Learning	5	III-IV / 1st year
CS-E4500	Advanced Course in Algorithms	5	III-IV
CS-E5740	Complex Networks	5	I-II
ELEC-C7420	Basic Principles in Networking*	5	III-IV/1st year
CS-E4641	Principles and Techniques of Data Platforms	5	III-IV/first year or 2nd year
CS-E4300	Network Security	5	II
CS-E4770	Designing and Building Scalable Web Applications	5	III-V
ELEC-C7440	Computer Architectures with RISC-V	5	III-IV/2nd year
CS-E4580	Programming Parallel Computers	5	V/1st year
CS-E4003	Special Assignment in Computer Science	1-10	Agreed with a teacher
CS-E4006	Research Experience Project in Computer Science	5	Agreed with a teacher

20 more credits, e.g.:

- **CS-C3260**
- **ELEC-C9440**
- **CS-E4003** for 10 credits

at this stage you have 60 credits and you can

- select any 30 credits of elective studies
- write the Master thesis for 30 credits

$60 + 30 + 30 = 120$ credits → MSc title

More questions?

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