HÖGSKOLAN
I HALMSTAD

Examensbevis | *Degree Certificate*

Civilingenjörsexamen i datateknik

Degree of Master of Science in Engineering, Computer Science and Engineering

Johan Elfing

19901007-4814

har, i enlighet med högskoleförordningen (SFS 1993:100) och lokala bestämmelser,
fullgjort fordringarna för en Civilingenjörsexamen, 300 högskolepoäng.

*has, in accordance with the Higher Education Ordinance (SFS 1993:100) and local regulations,
fulfilled the requirements for a Degree of Master of Science in Engineering, 300 credits.*

Halmstad den 20 juni 2024
Halmstad, Sweden, 20 June 2024

På rektors vägnar
On behalf of the Vice-Chancellor

Jennie Törnblom

examenshandläggare
Degree Officer

Johan Elfing   **19901007-4814**
Namn/*Name*   Personnummer/*Personal identity number*

har med godkänt resultat genomgått följande kurser och uppfyller därmed fordringarna för en Civilingenjörsexamen.
has successfully completed the following courses. The requirements for a Degree of Master of Science in Engineering have thus been met.

Utbildning: Civilingenjör i datateknik
Study Programme: Computer Science and Engineering

Kurs *Course*	Högskolepoäng *Credits*	Betyg *Grade*	Datum *Date*
Algebra och diskret matematik *Algebra and Discrete Mathematics*	7,5	Godkänd[1] *Pass*	2019-11-22
Programmering *Programming*	7,5	Godkänd[1] *Pass*	2020-01-14
Perspektiv på datateknik *Perspectives on Computer Science and Engineering*	7,5	Godkänd[2] *Pass*	2020-01-29
Digitalteknik *Switching Theory and Digital Design*	7,5	Godkänd[1] *Pass*	2020-03-23
Envariabelanalys *Single Variable Calculus*	7,5	Mycket väl godkänd[1] *Pass with distinction*	2020-04-23
Datorteknik *Computer Systems Organization*	7,5	Väl godkänd[1] *Pass with credit*	2020-05-29
Algoritmer och datastrukturer *Algorithms and Data Structures*	7,5	Godkänd[1] *Pass*	2020-08-14
Linjär algebra *Linear Algebra*	7,5	Mycket väl godkänd[1] *Pass with distinction*	2020-09-08
Ellära och elektronik *Electrical Circuits and Electronics*	7,5	Väl godkänd[1] *Pass with credit*	2020-11-03
Datorsystemteknik I *Computer Systems Engineering I*	7,5	Godkänd[1] *Pass*	2021-01-22
Reglerteknik *Control Systems*	7,5	Godkänd[1] *Pass*	2021-03-28
Datorsystemteknik II *Computer Systems Engineering II*	7,5	Väl godkänd[1] *Pass with credit*	2021-04-01
Avancerad objektorienterad programmering *Advanced Object Oriented Programming*	7,5	Godkänd[1] *Pass*	2021-06-07
Transformer, signaler och system *Transforms, Signals and Systems*	7,5	Mycket väl godkänd[1] *Pass with distinction*	2021-06-18
Datakommunikation *Data Communication*	7,5	Godkänd[1] *Pass*	2021-10-28
Matematisk statistik *Mathematical Statistics*	7,5	Väl godkänd[1] *Pass with credit*	2021-11-01
Flervariabelanalys *Multi-variable Calculus*	7,5	Mycket väl godkänd[1] *Pass with distinction*	2021-11-15
Teknisk fysik *Engineering Physics*	7,5	Mycket väl godkänd[1] *Pass with distinction*	2021-11-25
Databaser *Databases*	7,5	Godkänd[1] *Pass*	2022-01-10
Innovationsprojekt *Innovation Project*	7,5	Godkänd[1] *Pass*	2022-01-16
Datasäkerhet för inbyggda system *Data Security for Embedded Systems*	7,5	Mycket väl godkänd[1] *Pass with distinction*	2022-03-15
Examensarbete i datateknik *Thesis in Computer Science and Engineering*	15,0	Väl godkänd[1] *Pass with credit*	2022-06-05
Nätverk för inbyggda system *Networks for Embedded Systems*	7,5	Godkänd[1] *Pass*	2022-10-29

Kurs *Course*	Högskolepoäng *Credits*	Betyg *Grade*	Datum *Date*
Inbyggda realtidssystem *Real-Time Embedded Systems*	7,5	Godkänd[1] *Pass*	2022-11-16
Programmering av distribuerade system *Distributed Systems Programming*	7,5	Väl godkänd[1] *Pass with credit*	2023-01-10
Tekniska beräkningar *Scientific Computing*	7,5	Väl godkänd[1] *Pass with credit*	2023-01-13
System-on-chip design *System-on-chip Design*	7,5	Väl godkänd[1] *Pass with credit*	2023-03-17
Intelligenta fordon *Intelligent Vehicles*	7,5	Godkänd[1] *Pass*	2023-05-22
Industriell ekonomi *Industrial Management*	7,5	Godkänd[1] *Pass*	2023-05-25
Robotik *Robotics*	7,5	Godkänd[1] *Pass*	2023-09-01
Testning och verifikation av inbyggda system *Testing and Verification of Embedded Systems*	7,5	Väl godkänd[1] *Pass with credit*	2023-10-25
Arbetsplatsförlagd utbildning *Industry Based Learning*	15,0	Godkänd[2] *Pass*	2024-02-15
Läraktiga system *Learning Systems*	7,5	Väl godkänd[1] *Pass with credit*	2024-03-15
Parallelldatorer i inbyggda system *Embedded Parallel Computing*	7,5	Godkänd[1] *Pass*	2024-05-23
Examensarbete för civilingenjör i datateknik *Thesis for Master of Science in Engineering, Computer Science and Engineering*	30,0	Mycket väl godkänd[1] *Pass with distinction*	2024-06-07

Examensarbetets titel:
Title of Degree Project:
V2X Intention Sharing for E-bikes and E-scooters - Design and implementation of a vehicular network protocol for Vulnerable Road Users intention sharing

Noter/*Notes*
1   Betygsskala: Mycket väl godkänd (5), Väl godkänd (4), Godkänd (3)
     Grading scale: Pass with distinction (5), Pass with credit (4), Pass (3)

2   Betygsskala: Godkänd (G)
     Grading scale: Pass (G)

DIPLOMA SUPPLEMENT

The purpose of the Diploma Supplement is to provide sufficient independent data to improve the international "transparency" and fair academic and professional recognition of qualifications (diplomas, degrees, certificates etc.). It is designed to provide a description of the nature, level, context, content and status of the studies that were pursued and successfully completed by the individual named on the original qualification to which this supplement is appended. It is free from any value judgements, equivalence statements or suggestions about recognition. This Diploma Supplement model was developed by the European Commission, Council of Europe and UNESCO.

1. Information identifying the holder of the qualification

1.1 **Last name(s)** Elfing

1.2 **First name(s)** Johan

1.3 **Date of birth (dd/mm/yy)** 7 October 1990

1.4 **Student identification number or code (if available)** 19901007-4814

2. Information identifying the qualification

2.1 **Name of qualification and (if applicable) title conferred (in original language)**
Civilingenjörsexamen i datateknik (Degree of Master of Science in Engineering, Computer Science and Engineering)

2.2 **Main field(s) of study for the qualification**
Not applicable.

2.3 **Name and status of awarding institution (in original language)**
Högskolan i Halmstad (Halmstad University). State recognised university college with the right to award third-cycle qualifications.

2.4 **Name and status of institution (if different from 2.3) administering studies (in original language)**
Not applicable.

2.5 **Language(s) of instruction/examination**
Swedish and English

3. Information on the level and duration of the qualification

3.1 **Level of the qualification**
Avancerad nivå/Second-cycle QF-EHEA SeQF 7/EQF 7. For information on the Swedish higher education system, see section 8.

3.2 **Official duration of programme in credits and/or years**
300 högskolepoäng (credits)/300 ECTS. Duration of 5 years of full-time studies. A normal 40-week academic year corresponds to 60 credits (högskolepoäng). One credit corresponds to 1 ECTS credit.

3.3 **Access requirement(s)**
There are general and (additional) specific entry requirements that should be fulfilled for access to higher education within all cycles. The general entry requirements for first-cycle studies are the same for all higher education. General entry requirements can be attained by completing an upper-secondary school programme, via adult education at upper-secondary school level or the applicants achieving a comparable level of learning outcomes through other education, practical experience or other circumstances.
The specific entry requirements vary according to the field of higher education.

4. Information on the programme completed and the results obtained

4.1 **Mode of study**
Full-time equivalent.

4.2 **Programme learning outcomes**
The Swedish Higher Education Act takes account of 1) courses and study programmes based on scholarship or artistic practice and on proven experience, and 2) research and artistic research as well as development work. Reference to research below also applies to artistic research.

According to the Swedish Higher Education Act, second-cycle courses and study programmes shall (in addition to the requirements for first-cycle courses and study programmes): further develop the ability of students to integrate and make autonomous use of their knowledge; develop the ability to deal with complex phenomena, issues and situations; and develop the potential for professional activities that demand considerable autonomy, or for research and development work. (For further information, see The Swedish Higher Education Act and The Higher Education Degree Ordinance: www.uhr.se/en)

4.3   Programme details, individual credits gained and grades/marks obtained
A Degree of Master of Science in Engineering is awarded after the student has completed the courses required to gain 300 credits.

A requirement for the award of a Degree of Master of Science in Engineering is completion by the student of an independent project (degree project) for at least 30 credits.
For more information, see Degree Certificate/Official Transcript.

4.4   Grading system and, if available, grade distribution table
There is no national grading system in Sweden. Higher education institutions may determine which grading system is to be used. For more information, see Degree Certificate/Official Transcript.

4.5   Overall classification of the qualification (in original language)
Not applicable for Swedish qualifications, since no overall grade is awarded for a degree and students are not ranked. For example, Grade Point Average (GPA) and other ranking systems are not used in Sweden.

5. Information on the function of the qualification
5.1   Access to further study
The degree gives access to third-cycle studies (doctoral studies).

5.2   Access to a regulated profession (if applicable)
Civilingenjörsexamen (Degree of Master of Science in Engineering) constitutes regulated education and training as defined in Article 3(1)(e) of Directive 2005/36/EC. The provisions of Article 13(2) last paragraph of Directive 2005/36/EC apply for the holders of the Civilingenjörsexamen (Degree of Master of Science in Engineering).

The Degree of Master of Science in Engineering corresponds to the qualification level referred to in point (e) of Article 11 of Directive 2005/36/EC.

6. Additional information
6.1   Additional information
None.

6.2   Further information sources
Halmstad University (Högskolan i Halmstad)
Box 823
SE-301 18 Halmstad
Sweden
Phone: +46 35 16 71 00
www.hh.se

You can verify the issued qualification by logging on to Ladok, the Swedish national student registry. For this you need a unique code provided by the student.

The Swedish Council for Higher Education (Universitets- och högskolerådet) has been commissioned to act as the Swedish NARIC and is also part of ENIC. The ENIC-NARIC office provides information on education in Sweden. Please see: http://www.uhr.se

For information on Professional Qualifications Directive, Swedish National Assistance Centre for the Recognition of Professional Qualifications (Professional Qualifications Directive 2005/36/EC): pqinfo@uhr.se

For information on quality assurance, Swedish Higher Education Authority: http://english.uka.se

7. Certification of the supplement
7.1   Date 20 June 2024
7.2   Signature
This document has an electronic stamp. For information on how to verify the document, see last page.
7.3   Capacity Not applicable.
7.4   Official stamp or seal
Not applicable.

8. Information on the national higher education system

The following description is approved by the Swedish Council for Higher Education.

The Swedish higher education system is based on The Swedish Higher Education Act (SFS 1992:1434) and the 1 January 2007 amendments to The Higher Education Ordinance (1993:100). The following description is a short summary based on the legislation regulating the Swedish higher education system.

Qualifications from all higher education institutions (universities, university colleges and independent higher education providers) that are recognized by the Government are of equal official value. The same legislation governs all state higher education institutions. All Swedish degrees are issued in accordance with the same degree ordinances.

Quality assurance
The Swedish Higher Education Authority (UKÄ), a member of the European Association for Quality Assurance in Higher Education (ENQA), has been responsible for the quality assurance system for all higher education since 1 January 2013. Before 2013 The Swedish National Agency for Higher Education was the responsible agency. For more information, please visit www.uka.se. Evaluation reports are available to the public.

National Qualifications Framework
The Swedish Higher Education Act and The Higher Education Ordinance have been amended in accordance with the agreements reached as part of the Bologna Process, including the Qualifications Frameworks in the European Higher Education Area (QF-EHEA). Legislation for a three-cycle structure of higher education started to apply in July 2007, and is now the only one in use in all Swedish higher education. Transitional provisions apply to courses and programmes that started prior to this. For more information, please visit www.uhr.se/en or www.enic-naric.net.

In 2015, the Swedish Government decided on a national qualifications framework (SeQF), based on the European Qualifications Framework for Lifelong Learning (EQF). The SeQF has eight levels that are in accordance with the EQF levels. Higher education qualifications are at levels six to eight. For more information, please visit www.seqf.se.

Credit system
Sweden has a system of credits (högskolepoäng, hp); a normal 40-week academic year corresponds to 60 credits. The system is compatible with European Credit Transfer System (ECTS) credits.

Grading system
There is no national grading system in Sweden. Higher education institutions may determine which grading system is to be used. No overall grade is awarded for a degree and students are not ranked. For example, Grade Point Average (GPA) and other ranking systems are not used in Sweden.

Access and admission
There are general and specific entry requirements for access to higher education within all cycles. The specific entry requirements vary according to the field of higher education and should be essential for students to be able to benefit from the course or study programme. The number of places is limited on all study programmes and courses.

The general entry requirements for first-cycle studies are the same for all higher education. General entry requirements can be attained by completing an upper-secondary school programme, via adult education at upper-secondary school level or the applicants achieving a comparable level of learning outcomes through other education, practical experience or other circumstances.

The general entry requirements for second-cycle studies are a first-cycle qualification of at least 180 credits, or a corresponding foreign qualification. An applicant may also be accepted on the basis of a comparable level of learning outcomes obtained through other education, practical experience or other circumstances. The general entry requirements for some specific second-cycle professional qualifications are a prior specific qualification or a specific professional registration.

The general entry requirements for third-cycle studies are a second-cycle qualification, or completed courses worth at least 240 credits (of which 60 credits are at second-cycle level) or the equivalent level of knowledge acquired in Sweden or abroad.

Qualifications
All courses, study programmes and qualifications are on one of three levels: first-, second- or third-cycle. In The Higher Education Ordinance, the Government has determined which qualifications may be awarded, as well as their scope, requirements and intended learning outcomes. There are three categories of qualifications: general; the fine, applied and performing arts; and professional qualifications. For some more information, please see below.

General qualifications
First-cycle (SeQF/EQF 6)
Högskoleexamen (Higher Education Diploma) requires 120 credits and an independent project (degree project).
Kandidatexamen (Degree of Bachelor) requires 180 credits. At least 90 credits must be completed in the main field of study, including an independent project (degree project) worth 15 credits.

Second-cycle (SeQF/EQF 7)
Magisterexamen (Degree of Master, 60 credits) requires 60 credits. At least 30 credits must be completed in the main field of study, including an independent project (degree project) worth 15 credits. In addition, the student must normally hold a kandidatexamen, or a professional degree of at least 180 credits, or an equivalent foreign degree.
Masterexamen (Degree of Master, 120 credits) requires 120 credits. At least 60 credits must be completed in the main field of study, including an independent project (degree project) worth at least 30 credits. In addition, the student must normally hold a kandidatexamen, or a professional degree of at least 180 credits or an equivalent foreign degree.

Third-cycle (SeQF/EQF 8)
Licentiatexamen (Degree of Licentiate) requires at least 120 credits, including a research thesis worth at least 60 credits. A higher education institution may decide that a licentiatexamen can be awarded as a separate qualification or as a step on the way to doktorsexamen (see below).
Doktorsexamen (Degree of Doctor) requires 240 credits, including a research thesis (doctoral thesis) worth at least 120 credits. The thesis must be presented at a public defence.

Qualifications in the fine, applied and performing arts
Qualifications in the fine, applied and performing arts are awarded at all three cycles and corresponding SeQF levels. At first-cycle level: konstnärlig högskoleexamen (Higher Education Diploma) and konstnärlig kandidatexamen (Degree of Bachelor of Fine Arts). At second-cycle level: konstnärlig magisterexamen (Degree of Master of Fine Arts, 60 credits) and konstnärlig masterexamen (Degree of Master of Fine Arts, 120 credits). Two third-cycle qualifications are awarded: konstnärlig licentiatexamen (Degree of Licentiate) and konstnärlig doktorsexamen (Degree of Doctor).

Professional qualifications
Professional qualifications are offered at either first- or second-cycle level and corresponding SeQF levels. These qualifications may stretch over two cycles and are awarded in areas that include engineering, health care, agriculture, law, and education. Professional qualifications are regulated by national legislation and are considered regulated education subject to the Professional Qualifications Directive 2005/36/EC.

Titles of qualifications

Translations into English of all titles of qualifications are regulated at the national level. Higher education institutions may decide to add a prefix to a qualification title (for example "filosofie kandidatexamen") and add a major field of studies (for example "civilingenjörsexamen i maskinteknik").

	QUALIFICATIONS	SeQF	EQF	Bologna
Forskarnivå (third-cycle)	General Qualifications Doktorsexamen (Degree of Doctor), 240 hp/ECTS credits Licentiatexamen (Degree of Licentiate), 120 hp/ECTS credits Qualifications in the fine, applied and performing arts Konstnärlig doktorsexamen (Degree of Doctor), 240 hp/ECTS credits Konstnärlig licentiatexamen (Degree of Licentiate), 120 hp/ECTS credits	8	8	3
Avancerad nivå (second-cycle)	General Qualifications Masterexamen (Degree of Master, 120 credits), 120 hp/ECTS credits Magisterexamen (Degree of Master, 60 credits), 60 hp/ECTS credits Qualifications in the fine, applied and performing arts Konstnärlig masterexamen (Degree of Master of Fine Arts, 120 credits), 120 hp/ECTS credits Konstnärlig magisterexamen (Degree of Master of Fine Arts, 60 credits), 60 hp/ECTS credits Professional qualifications Degree of Master*, 60 hp/ECTS credits, 240–360 hp/ECTS credits Postgraduate Diploma*, 60–90 hp/ECTS credits *Degrees and diplomas within different professional fields.	7	7	2
Grundnivå (first-cycle)	General Qualifications Kandidatexamen (Degree of Bachelor), 180 hp/ECTS credits Högskoleexamen (Higher Education Diploma), 120 hp/ECTS credits Qualifications in the fine, applied and performing arts Konstnärlig kandidatexamen (Degree of Bachelor of Fine Arts), 180 hp/ECTS credits Konstnärlig högskoleexamen (Higher Education Diploma), 120 hp/ECTS credits Professional qualifications Degree of Bachelor*, 180–210 hp/ECTS credits Higher Education Certificate*, 60 hp/ECTS credits *Degrees, diplomas and certificates within different professional fields.	6	6	1

E-stämplat dokument
E-stamped document

Digitalt beslut om examen

Beslut om examen har fattats digitalt i Ladok. Detta dokument är en representation av beslutet och innehåller all information som ingår i beslutet, samt beslutsfattare och beslutsdatum. Beslutet sparas i Ladok och studenten kan hämta sitt examensbevis utifrån det beslut som finns sparat.

Verifiera dokument

Examensbeviset är e-stämplat. Det betyder att du som mottagare av dokumentet kan kontrollera att det inte har ändrats sedan hämtningen från Ladok. Detta gör du genom att ladda upp det mottagna dokumentet på Ladoks sida för verifiering: www.student.ladok.se/student/verifiera-dokument. Ladok intygar då om dokumentet du har laddat upp är identiskt med det som studenten hämtade. Det är också möjligt att verifiera e-stämpeln via etablerade pdf-läsare. E-stämpeln är giltig i två år från det att beviset hämtas.

Kontrollera beslutet om examen

Förutom att verifiera dokumentet går det även att kontrollera själva beslutet om examen direkt emot Ladok: www.student.ladok.se/student/kontrollera. För att du ska kunna göra det behöver studenten förmedla en kontrollkod till dig.

Digital decision on qualification

Decision on qualification has been made digitally in Ladok. This document is a representation of the decision and contains all information included in the decision, decision-maker and decision date. The decision is digitally stored in Ladok and the student can download his or her degree certificate based on the saved decision.

Verify the document

The degree certificate is e-stamped. This means that you, as recipient of the document, can control that it has not been changed since downloaded from Ladok. You do this by uploading the received document on Ladok's page for verifying the document: www.student.ladok.se/student/verifiera-dokument/en. Ladok will then verify if the document you have uploaded is identical to the one downloaded by the student. It is also possible to verify the e-stamp by using established PDF readers. The e-stamp is valid for two years from the date the certificate is retrieved.

Control the decision on qualification

In addition to verifying the document it is also possible to check the actual decision on qualification directly against Ladok: www.student.ladok.se/student/kontrollera/en. To do this, the student needs to provide you with a control code.

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