EXAMENSBEVIS

DEGREE CERTIFICATE

Civilingenjörsexamen - Datateknik

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

[redacted]

Linköpings universitet den 2 maj 2022
Linköping University 2 May 2022

På Tekniska fakultetens vägnar
On behalf of the Faculty of Science and Engineering

[Beslutsfattare avgörs vid utfärdande]

Samordnare/Examen
Officer of Degree Administration

LINKÖPINGS UNIVERSITET

www.liu.se/examen

[redacted] Namn/*Name*

[redacted] Personnummer/ *Personal identity number*

Inriktning/Specialisering: AI och maskininlärning
Branch of Studies/Specialisation: AI and Machine Learning

Kurs *Course*	Högskolepoäng *Credits*	Betyg *Grade*	Datum *Date*
Datorsystem och programmering *Computer Systems and Programming*	4,0	Godkänd [1] *Pass*	2015-10-21
Diskret matematik *Discrete Mathematics*	6,0	Fyra [2] *Pass with credit*	2015-11-24
Ingenjörsprofessionalism, del 1 *Professionalism for Engineers, part 1*	1,0	Fyra [2] *Pass with credit*	2016-01-15
Funktionell och imperativ programmering i Python *Functional and Imperative Programming in Python*	6,0	Fyra [2] *Pass with credit*	2016-01-17
Perspektiv på datateknik/datavetenskap *Perspectives to Computer Technology*	7,0	Godkänd [1] *Pass*	2016-01-17
Inledande matematisk analys *Introductory Course in Calculus*	6,0	Fem [2] *Pass with distinction*	2016-01-22
Elektronik *Electronics*	5,0	Tre [2] *Pass*	2016-05-27
Digitalteknik *Switching Theory and Logical Design*	6,0	Fyra [2] *Pass with credit*	2016-06-03
Ingenjörsprofessionalism, del 6 *Professionalism for Engineers, part 6*	1,0	Fyra [2] *Pass with credit*	2016-06-09
Objektorienterad programmering och Java *Object Oriented Programming and Java*	6,0	Fyra [2] *Pass with credit*	2016-09-22
Envariabelanalys 2 *Calculus in One Variable 2*	6,0	Tre [2] *Pass*	2016-10-18
Datorteknik *Computer Hardware and Architecture*	4,0	Godkänd [1] *Pass*	2016-10-26
Datastrukturer, algoritmer och programmeringsparadigm *Data Structures, Algorithms and Programming Paradigms*	11,0	Fyra [2] *Pass with credit*	2017-01-13
Ingenjörsprofessionalism, del 3 *Professionalism for Engineers, part 3*	1,0	Fyra [2] *Pass with credit*	2017-01-17
Linjär algebra *Linear Algebra*	8,0	Fyra [2] *Pass with credit*	2017-04-18
Envariabelanalys 1 *Calculus in One Variable 1*	6,0	Tre [2] *Pass*	2017-04-19
Matematisk statistik *Mathematical Statistics*	6,0	Fyra [2] *Pass with credit*	2017-05-30
Processprogrammering och operativsystem *Concurrent Programming and Operating Systems*	6,0	Fyra [3] *Pass with credit*	2017-06-07
Datorkonstruktion *Computer Hardware and Architecture*	8,0	Godkänd [1] *Pass*	2017-06-20
Ingenjörsprofessionalism, del 2 *Professionalism for Engineers, part 2*	1,0	Fyra [2] *Pass with credit*	2017-06-21
Kombinatorisk optimering gk *Combinatorial Optimization, Introductory Course*	4,0	Tre [2] *Pass*	2017-11-07
Ingenjörsprofessionalism, del 5 *Professionalism for Engineers, part 5*	1,0	Fyra [2] *Pass with credit*	2017-12-22
Logik *Logic*	5,0	Fyra [2] *Pass with credit*	2018-01-09

Kurs *Course*	Högskolepoäng *Credits*	Betyg *Grade*	Datum *Date*
Konstruktion med mikrodatorer, projektkurs *Microcomputer, Project Laboratory*	8,0	Godkänd [1] *Pass*	2018-01-10
Signaler och system samt transformer *Signals and Systems, and Transform Theory*	8,0	Tre [2] *Pass*	2018-01-12
Interaktiva system *Interactive Systems*	4,0	Tre [2] *Pass*	2018-03-23
Linjär algebra, överkurs *Linear Algebra, Honours Course*	6,0	Tre [2] *Pass*	2018-05-15
Reglerteknik *Automatic Control*	6,0	Tre [2] *Pass*	2018-06-08
Ingenjörsprofessionalism, del 4 *Professionalism for Engineers, part 4*	1,0	Fyra [2] *Pass with credit*	2018-06-11
Kandidatprojekt i programvaruutveckling *Software Engineering - Bachelor Project*	15,0	Godkänd [1] *Pass*	2018-06-19
Programutvecklingsmetodik, teori *Software Engineering Theory*	4,0	Fem [2] *Pass with distinction*	2018-08-30
Fysik *Physics*	5,0	Tre [2] *Pass*	2018-11-02
Artificiell intelligens *Artificial Intelligence*	6,0	Tre [2] *Pass*	2018-11-14
Logikprogrammering *Logic Programming*	6,0	Tre [2] *Pass*	2018-11-16
Abstrakt algebra *Abstract Algebra*	6,0	Fyra [2] *Pass with credit*	2019-01-15
Datatekniska beräkningar *Numerical Algorithms in Computer Science*	4,0	Fyra [2] *Pass with credit*	2019-01-15
Multidimensionell signalanalys *Multidimensional Signal Analysis*	6,0	Fem [2] *Pass with distinction*	2019-01-17
Maskininlärning *Machine Learning*	6,0	Fyra [2] *Pass with credit*	2019-01-25
Flervariabelanalys *Multivariable Calculus*	4,0	Tre [2] *Pass*	2019-03-21
Konstruktion och analys av algoritmer *Design and Analysis of Algorithms*	6,0	Fem [2] *Pass with distinction*	2019-03-22
Språkteknologi *Natural Language Processing*	6,0	Fem [2] *Pass with distinction*	2019-04-11
Big Data Analytics *Big Data Analytics*	6,0	Fyra [2] *Pass with credit*	2019-05-29
Grön IT *Green Computing*	4,0	Fyra [2] *Pass with credit*	2019-06-10
Bayesianska metoder *Bayesian Learning*	6,0	Fyra [2] *Pass with credit*	2019-08-06
Signaler, information och kommunikation *Signals, Information and Communication*	4,0	Tre [2] *Pass*	2019-08-20
Avancerad maskininlärning *Advanced Machine Learning*	6,0	Fem [2] *Pass with distinction*	2019-11-25
Mekanik *Engineering Mechanics*	6,0	Fem [2] *Pass with distinction*	2020-01-14
Vetenskaplig metod *Scientific Method*	6,0	Godkänd [1] *Pass*	2020-01-27
Avancerad projektkurs: AI och maskininlärning *Advanced Project Course - AI and Machine Learning*	6,0	Godkänd [1] *Pass*	2020-01-30
Text Mining *Text Mining*	6,0	Fem [2] *Pass with distinction*	2020-02-07

Kurs *Course*	Högskolepoäng *Credits*	Betyg *Grade*	Datum *Date*
Examensarbete *Degree Project - Master's Thesis*	30,0	Godkänd [1] *Pass*	2020-06-18

Examensarbete
Degree Project

Anchor-based Topic Modeling with Human Interpretable Results

Civilingenjörsexamen är en yrkesexamen på avancerad nivå

The Degree of Master of Science in Engineering is a professional degree within the second cycle

Datum för avslutade studier den 18 juni 2020

The degree requirements were fulfilled 18 June 2020

Noter/*Notes*

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

2 Betygsskala: Fem (5), Fyra (4), Tre (3)
Grading scale: Pass with distinction (5), Pass with credit (4), Pass (3)

3 Betygsskala: Fem (5), Väl godkänd (VG), Fyra (4), Tre (3), Godkänd (G)
Grading scale: Pass with distinction (5), Pass with distinction (VG), Pass with credit (4), Pass (3), Pass (G)

1,5 högskolepoäng motsvarar en veckas heltidsstudier, 30 högskolepoäng motsvarar en termins heltidsstudier.
Denna examen omfattar 300 högskolepoäng.

1.5 credits correspond to one week of full time studies, 30 credits correspond to one semester of full-time studies.
The scope of this degree is 300 credits.

Examen har avlagts i enlighet med bestämmelserna i högskoleförordningen (SFS 1993:100).

The degree has been awarded in accordance with the regulations governing Swedish higher education (SFS 1993:100).

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DIPLOMA SUPPLEMENT

This Diploma Supplement model was developed by the European Commission, Council of Europe and UNESCO/CEPES. The purpose of the 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 should be free from any value judgements, equivalence statements or suggestions about recognition. Information in all eight sections should be provided. Where information is not provided, an explanation should give the reason why.

1. Information identifying the holder of the qualification

1.1 Family name(s) [redacted]

1.2 Given name(s) [redacted]

1.3 Date of birth (day/month/year) 5 July 1996

1.4 Student identification number or code (if available) [redacted]

2. Information identifying the qualification

2.1 Name of qualification and (if applicable) title conferred (in original language)
Civilingenjörsexamen - Datateknik (Degree of Master of Science in Engineering - Computer Science and Engineering)

2.2 Main field(s) of study for the qualification
AI and Machine Learning

2.3 Name and status of awarding institution (in original language)
Linköpings universitet (Linköping University).
State recognised university.

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
Mainly Swedish.

3. Information on the level of the qualification

3.1 Level of 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 length of programme
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.

4. Information on the contents and results gained

4.1 Mode of study
Full-time equivalent.

4.2 Programme requirements
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)

In each of the first six compulsory semesters, the students study both computer hardware and software to the extent that they can choose to specialize and have a future career in either direction. This broad knowledge is the strength of the programme compare to other programmes in the area.

4.3 Programme details (e.g. modules or units studied), and the individual grades/marks/credits obtained (if this information is available on an official transcript this should be used here)
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 scheme and, if available, grade distribution guidance
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 Professional status (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
Linköpings universitet, SE-581 83 Linköping, Sweden
Phone: +46 13 28 10 00, www.liu.se

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 provide 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 2 May 2022

7.2 Signature
Digitally signed. See electronic seal at the end of the document.

7.3 Capacity Officer of Degree Administration.

7.4 Official stamp or seal
Not applicable.

8. Information on the national higher education system

See attached information on the The Swedish higher education system.

Swedish Council for Higher Education

europass

The Swedish higher education system

According to legislation **after** 1 January 2007.
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 has been responsible for the quality assurance system for all higher education since 1 January 2013. For more information, please visit www.uka.se. Evaluation reports are available to the public.

National Qualification Frameworks

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 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); a normal 40-week academic year corresponds to 60 credits. The system is compatible with 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/or 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.

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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. Furthermore, for entry to third-cycle studies, the applicant must be deemed able to benefit from the education.

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 e.g. filosofie kandidatexamen or medicine doktorsexamen or/ and add a major field of studies e.g. civilingenjörsexamen i maskinteknik.