ÅBO AKADEMI UNIVERSITY
DEPARTMENT OF INFORMATION TECHNOLOGIES

STUDY GUIDE

MASTER'S PROGRAMMES IN

❖ **COMPUTER SCIENCE**
❖ **ELECTRONIC AND MOBILE COMMERCE**
❖ **EMBEDDED COMPUTING**
❖ **SOFTWARE ENGINEERING**

2011-2012

This guide has been compiled for students that study at Åbo Akademi University in one of the Master's Degree Programmes offered by the Department of Information Technologies: **Computer Science** (CS), **Electronic and Mobile Commerce** (EMC), **Embedded Computing** (EC) and **Software Engineering** (SE). Its purpose is to give information about the department and certain procedures, the study programme and the structure of the studies.

1 The Department of Information Technologies

The Department of Information Technologies was previously a part of the Faculty of Technology, which in turn started as the Faculty of Chemical Engineering and was founded in 1920. However, Åbo Akademi University underwent an organizational change and as of 1.1.2010 the Faculty of Technology ceased to exist and the Department of Information Technologies formed its own unit. The Department of Information Technologies is now part of the **Division for Natural Sciences and Technology** at Åbo Akademi University. The other three departments in the same division are: the Department of Biosciences, the Department of Chemical Engineering, and the Department of Natural Sciences.

The Department of Information Technologies is located in the ICT-building, Joukahainengatan 3-5, 20520 Åbo.

The Department of Information Technologies has its web pages at: https://www.abo.fi/student/en/informationsteknologi

1.1 Department and decision making

The Department of Information Technologies is lead by the Department Council and the Head of Department.

The Department Council is the highest decision making body in the department. The Council consists of nine members together with deputies: three professors, three other employees and three students. The members are elected for a three-year period.

The Department Council elects a professor to be Head of Department and another person with a doctoral degree to be Deputy Head of Department. The Head of Department is the chairman of the board while the Deputy Head of Department is the deputy chairman of the board.

The Head of Department decides on educational matters and matters concerning research that are not dealt with in other administrative bodies. The Head of Department should make sure that the department's educational and research responsibilities are being carried into effect.

1.2 The Department's Student office (former Faculty office)

The Department's student office (*Studiekansliet)* is located in the Gripen-building, Tavastgatan 13, 20500 Åbo. The office is open Monday-Wednesday at 10.00-12.00, 13.00-15.00, Thursday at 9.00-16.00, Friday closed.

Head of Academic Affairs Ulla Bäckström can be met at the Student office during office hours or by mutual agreement.
Telephone (02) 215 4461, e-mail: it-studiechef@abo.fi

Study Advisor Pia-Maria Kallio can be met at the Student office by mutual agreement.
Telephone (02) 215 3321, e-mail: it-studieradgivare@abo.fi

It is recommended that you book an appointment with the Head of Student Affairs or the Study Advisor in advance by e-mail or telephone.

1.3 The academic neighbourhood

Åbo Akademi University is located in Åbo (Turku in Finnish), the oldest city in Finland, close to the medieval Cathedral and many of the University's buildings. The Gripen-building and the Department's student office (former Faculty office) are located along the street Tavastgatan. The Department of Information Technologies operates in the ICT-building, on the street Joukahainengatan, which is a bit further away from the other University buildings. You can find a map over the campus at the following address:
http://www.abo.fi/public/en/media/2141/campuskartaengelska.pdf

2 Studies

2.1 Academic year

The academic year is divided into four periods, two during the autumn and two during the spring. These are the dates for the periods for the academic year 2011-2012:

Period I	w. 36-43	5.9.2011-28.10.2011
Period II	w. 44-51	31.10.2011-21.12.2011
Period III	w. 2-10	9.1.2012-9.3.2012
Period IV	w. 11-21	12.3.2012-25.5.2012

2.2 Registration for the academic year

First-year students register for their first academic year **29.8-9.9.2011**. The Student Union fee (approximately 100 €) is paid into a bank account using the pre-printed payment slips included in the admission letter. All new students must register during the period defined above and must present an identification card (e.g. driving licence) and a certified copy of their matriculation examination certificate, as well as the receipt of the Student Union fee payment.

A student card (*studiekort*) is obtained from the Åbo Akademi Student Union office (*Studentkåren*) in connection with registration. The Student Union office is located in the Kåren-building, Tavastgatan 22, 20500 Åbo. You need to prove that you have paid the student union fee by showing a receipt of the payment. Furthermore you need to provide a photo of yourself which is attached to the student card. The student card also shows your student number.

In order to maintain their status as students at the university all students at Åbo Akademi University have to notify the Student office of Åbo Akademi University (*Studentexpeditionen*) whether they are present or not for the academic year. The Student office of Åbo Akademi University is located in the Gripen-building, ground floor, Tavastgatan 13, 20500 Åbo. Registration for second-year and older students can be done 1.8-16.9.2011. In order to register as present you first need to pay the Student Union fee. In July all students will receive a letter, a payment slip and an extract from the personal data in the Åbo Akademi University Study Register STURE. When you have been registered as present you can pick up your sticker for the academic year for the student card at the Student Union office or at the Student office of Åbo Akademi University. You do not have to present a receipt of payment of the Student Union fee at your place of registration in order to register, provided that you have paid the fee within the given time and used your personal reference number.

2.3 Course registration

Course registration at Åbo Akademi University
Registration is required for most courses. In these cases registration is done in MinPlan: http://www.abo.fi/minplan. Instructions for course registration are found at the following address: https://www.abo.fi/student/en/minplanmanualer.

Course registration at the University of Turku
Registration to courses at the IT-department is done through the department intranet. You will need your university provided user account and the e-mail password to log in there. More information can be found at http://www.it.utu.fi/en/studying/
Manuals for course registration can be found at:
http://www.utu.fi/en/studying/studies/studyregister/nettiopsu.html

Course registration at Turku School of Economics
Registration for courses is obligatory. You can register for courses using the WebOodi internet service, which requires a username and password: https://edu.tse.fi/weboodi.

2.4 Examinations

Examinations at Åbo Akademi University
Exams at the IT-department are arranged on Fridays during the whole academic year. The exams are held in auditorium Alpha, ICT-building, ground floor, from 12 am to 4 pm. Students should register for exams at least a week before the day of the exam. The registration is done in MinPlan: http://www.abo.fi/minplan. Instructions for registration for examinations are found at the following address: https://www.abo.fi/student/en/minplanmanualer.

The person responsible for examinations in the Department of Information Technologies at Åbo Akademi University is Department Secretary Christel Engblom (christel.engblom@abo.fi).

Each course usually has 1-2 course exams. The first course exam is arranged at the end of the course and the second course exam is usually arranged in about a month after the course has finished. In addition to the course exams there are usually 3 general exams arranged for each course every academic year. The general exams can be taken in the same academic year as the course is completed, but also in the following academic year.

The course exams in Information Systems do not require registration. For general exams in Information Systems, however, the student should register for the exam in MinPlan. Registration in MinPlan is also required for course exams as well as general exams in Computer Science and Computer Engineering.

There are only three opportunities to take an exam in the same course, after that the course lecturer should be contacted and the matter discussed. Registering for an exam counts as one of these three times even if the student does not show up at the actual exam occasion.

Students are usually not allowed to bring the course material with them to the exams, so always check with the course lecturer what material is allowed in each exam. Coats, bags, mobile phones etc. should be left outside the exam room or at the back of the room. If requested by the exam supervisor, students should be prepared to show proof of identification, e.g. a student card.

The results of the exams are posted on the notice board at the 3rd floor of the ICT-building. The results of the courses are registered in Åbo Akademi's study register (STURE). Department Secretary Christel Engblom registers the results of the courses at the IT-department. If several weeks have passed since the course finished but the result is still not in the register, please contact the lecturer of the course.

Examinations at the University of Turku
The exams are held in ICT-building, in lecture rooms Alpha, Beta and Lambda. However, you should always check the location! Small, course specific exam sessions during the last week of a period are also arranged in lecture rooms at the ICT-building. The registration to exams held by the IT-department is done through "nettiopsu": https://nettiopsu.utu.fi/. Registration ends exactly one week before the exam day. Late registrations are not accepted. After the registration has ended, a registration may be cancelled only in cases of sickness. A registration counts as taking the exam. Manuals exam registration can be found at:
 http://www.utu.fi/en/studying/studies/studyregister/nettiopsu.html.

The person responsible for examinations in the Department of Information Technologies at the University of Turku is Maria Prusila (maria.prusila@it.utu.fi).

Examinations at Turku School of Economics
Each term consists of two periods, with an examination week between the periods. Examinations are also held during the term on Fridays. The examination

schedule is available at http://www.tse.fi/en/studying/curriculum. The halls for the exams are announced in the main lobby approximately one hour before the exam begins.

You may participate in exams only if you have registered. The registration must be made latest 7 days before the exam. You can register for exams using the WebOodi internet service, which requires a username and password: https://edu.tse.fi/weboodi. Late registrations must be handed directly to the examiner, who will decide whether they will be accepted.

2.5 Flexible study right: studies at the University of Turku or Turku School of Economics

Åbo Akademi University has an agreement of flexible study right with the University of Turku and with Turku School of Economics. According to this agreement students from Åbo Akademi University can take courses that are offered by the University of Turku and by Turku School of Economics. Available courses are e.g. courses offered within TUCS: http://www.tucs.fi (Education → Courses).

The selection of courses should always be approved by the responsible professor of the programme: Ion Petre (CS), Pirkko Walden (EMC), Jerker Björkqvist (EC) or Ivan Porres (SE). When the selection of courses is approved by the professor, the student should send in an electronic application for flexible study right which has to be approved of by Åbo Akademi University as well as by the University of Turku or Turku School of Economics. The application is found at http://www.joopas.fi (→ Joopas Application System). Without this application the student does not have the right to study at the University of Turku or Turku School of Economics and will not get the credits registered.

2.6 Ceritificates and study transpcripts

Certificates and copies regarding study achievements and other study related issues can be obtained from the Student office of Åbo Akademi University in the Gripen-buildning, ground floor (Tavastgatan 13) or from the Department's student office (former Faculty office) in the Gripen-buildning, 2nd floor (Tavastgatan 13). An unofficial transcript can be requested on the Internet at the following address: https://www.abo.fi/personal/sv/minsture.

Study achievements from other Universities (e.g. the University of Turku or Turku School of Economics) are not transferred automatically to Åbo Akademi University. The student must get a study transcript from the other university and bring it to the Study Advisor, who will see to it that the study achievements are transferred into the study record at Åbo Akademi University.

2.7 Graduation and diploma

When all courses are completed and the Master's thesis is approved, the student can graduate and get his or her diploma. The diplomas are handed out once a month during the semester. To obtain the diploma, please contact the Head of Student

Affairs, Ulla Bäckström, at the Department's student office in the Gripen-building, 2nd floor, Tavastgatan 13. More information about graduating and getting the diploma is found here: https://www.abo.fi/student/en/it_nastanfardig

3 Services

3.1 Computers, printers and copying machines

The computers in the computer classes in the ICT-building, B-building, 3rd floor, rooms B3031 and B3032, as well as the computer classes located in other University buildings, are available for all the students studying at the Department. A username, password and a license to use the computers are needed. These can be obtained from the Help Desk at the Computing Centre *(Datacentralen)* in the ASA-building, B-buliding, Fänriksgatan 3B, 20500 Åbo. With the password it is possible to log on to all of the public computers located in any of the University's computer classes. The following page lists all available computer classes: https://www.abo.fi/student/en/studclass. Remember always to log off after use, so that no one else can use your computer domain.

Students can print about 180 pages for free in a three-month period. If this amount is exceeded the student will pay for the pages printed (3.3 cents per page). An invoice is then sent to the student via e-mail.

Copying machines are available e.g. in the libraries and in the Student office of Åbo Akademi University in the Gripen-building, ground floor. Copying cards can be bought e.g. at the Student office of Åbo Akademi University.

3.2 Libraries

To be able to borrow from the libraries students need to have a student card *(studiekort)*. The loan time for books is usually 2–4 weeks. More information about the libraries and opening hours etc. is found at https://www.abo.fi/student/en/bibinfo.

The Department has its own library on the ground floor in the ICT-building, Joukahaninengatan 3-5, 20500 Åbo, telephone (02) 215 4085, e-mail: ictlib@abo.fi.

The main library of Åbo Akademi is located in Domkyrkogatan 2-4, 20500 Åbo, telephone (02) 215 4180, e-mail: hblan@abo.fi. The main library offers reading facilities and a reference library. Certain books can also be borrowed, but have to be reserved in advance.

The student library in the ASA-building, Fänriksgatan 3A, 20500 Åbo, telephone (02) 215 4192, offers course books, which can be borrowed on site, and reading facilities.

3.3 Career Services

The Career Services at Åbo Akademi University *(Arbetsforum)* are located in the Agricola-building, Henriksgatan 1 b, 20500 Åbo. They provide information for both graduates and students. Their main task is to help students enter the labour market and

to advice them on issues dealing with job-hunting. The Career Services offer employers direct access to highly skilled students and graduates. They work in close co-operation with the Career Services at the University of Turku, the Turku School of Economics and the Turku Employment office. More information can be found at http://www.abo.fi/public/en/arbetsforumaa.

3.4 Student tutor and teacher tutor

All first-year students are assigned a student tutor and a teacher tutor. The student tutor is an older student who helps the new students adapt to student life in Åbo whereas the teacher tutor gives advice in study-related matters.

3.5 Student activities

The Student Union at Åbo Akademi University

All students at Åbo Akademi University are required to be members of the Student Union (*Åbo Akademis Studentkår*), https://www.abo.fi/karen, which takes care of its members' interests in several ways. The annual membership fee of the Student Union is around 100 €. By being a member you receive a student card with which you obtain student discounts for trains, buses, hostels, students' restaurants, theatres etc. As a member, you are also entitled to use the services of the Student Health Care Centre (*Studenthälsan*) at Kyrkovägen 13, 20540 Åbo, telephone 043 710 1002.

MK

Merkantila Klubben r.f. (MK) is the student organization for students of economic subjects, i.e. student studying for a M.Sc. (Economics and Business Administration) degree. The organization has its own student premises and office in the Hanken-building, Henriksgatan 7, 20500 Åbo, telephone (02) 231 6255, e-mail: mk@abo.fi.

DaTe

Datateknologerna vid Åbo Akademi r.f. (DaTe) is the student organization for students of Computer Engineering. It organises both formal and informal events, varying from company and industry excursions to parties. The organization has its office in the Axelia-buildning, 3rd floor, Biskopsgatan 8, 20500 Åbo, e-mail: date@abo.fi.

Infå

Infå vid Åbo Akademi r.f. (Infå) is the student organization for all students at the department of Information Technologies *Computer Engineering, Computer Science* and *Information Systems*. The organization has its office in the ICT-building (in the basement). E-mail:infa@abo.fi

http://www.infa.fi/home/

4 Master's programme – Computer Science

Åbo Akademi follows the so called Bologna reform concerning studies and credits. According to the new degree structure starting in 2005, the studies will be measured in credits (cr) (*studiepoäng, sp*). Even if the term "credit" has already been used for a long time, these new credits do *not* have the same meaning as before. One old credit (*studievecka, sv*) is approximately equal to 1.8 new credits.

4.1Structure of the studies

The Master's Programme in Computer Science has a duration of two academic years and accounts for 120 cr. This means that the student should complete 60 cr each academic year. The structure of the programme as well as the courses are available in MinPlan, http://www.abo.fi/minplan. The student is required to make his or her own study plan using MinPlan. Furthermore, the registration for courses (if registration is required) and the registration for exams are done in MinPlan.

The Master of Science degree in the Master's Degree Programme in Computer Science has the following structure:

Advanced studies in Computer Science, (60 cr)	Master's thesis in Computer Science (30 sp)
Swedish for foreigners (5 cr)	Free optional studies (25 cr)

5.1.1 Main subject

The main subject studies consist of:

Advanced studies
Mandatory (50 cr)

451000.0 Project course, 10 cr.

456509.0 Logic for computer science, 5 cr.

456309.0 Specification methods, 5 cr.

456794.0 Master's thesis in Computer Science, 30 cr

Selectable (40 cr are chosen)

Other studies, 40 cr **.** to be selected from the following modules. Parts of modules may be combined into an individual study plan

Software theory
Formal methods
Invariant-based programming
Program derivations
Program verification
Adv. text algorithms

Software systems
Software safety
Software architectures
Software quality
Network software

Computational systems biology
Introd. to bioinformatics
Introd. to computational and systems biology
Computational biomodeling
Formal methods for biology

High-performance computing
Parallel programming
Code optimization
Introd. to computer graphics
Adv. computer graphics

4.1.2 Mandatory Swedish language course

A language course in Swedish is mandatory for all foreign students studying at Åbo Akademi University. Language courses are offered by the Centre for Language and Communication (*språkcentret*), http://www.abo.fi/csk

909970.0   Swedish as a foreign language, level 1   5 cr

4.1.3 Free optional studies

The student has the opportunity to complete free optional courses to an extent of 25 cr. These courses can be any courses offered by a subject at Åbo Akademi University.

6.2 Course information: lecture dates and times

Courses offered by Åbo Akademi University:

Autumn 2011

Period I

Course	Code	Lecturer	Weeks	Time	Place
Software Architectures	456502.0	L. Petre	36-43	Tue 10-12 Thu 10-12	Cobol (3040) Algol (3039)
Specification Methods	456309.0	Walden	36-43	Mon 10-12 Wed 13-15	Algol (3039) Algol (3039)
Code Optimization	455304.0	Aspnäs	36-43	Tue 15-17 Thu 13-15	Fortran A3058 Fortran A3058
Project course (will continue in periods II - III)	451000.0	Rönnholm Björkqvist L. Petre Truscan	36-43	Fri 8-10	Fortran (A3058)
Introduction to computational and systems biology	456511.0	I.Petre	36-43	Mon 13-15 Wed 13-15	Fortran (A3058) Fortran (A3058)
Neural Networks	424501.0	Saxén		Intensive course	
Swedish as a foreign language level 1 (will continue in period II) *There are four groups available in periods I-II and three groups available in periods III-IV. Each group has two lectures each week. Please choose <u>one</u> of these groups.*	909970.0	Sandberg	37-	Mon 8-10 Wed 8-10 Mon 15-17 Wed 15-17 Tue 13-15 Thu 13-15 Tue 15-17 Thu 15-17	B306 M 227 B306 M227 B302 B302 B302/306 B302

Period II

Course	Code	Lecturer	Weeks	Time	Place
Software Testing	452502.0	Truscan	44-51	Tue 13-15 Thu 13-15	Algol (B3039) Algol (B3039)
Project course (continues)	451000.0	Rönnholm Björkqvist L. Petre Truscan	44-51	Fri 8-10	Fortran (A3058)
Swedish as a foreign language level 1 (continues) *There are four groups available in periods I-II and three groups available in periods III-IV. Each group has two lectures each week. Please choose <u>one</u> of these groups.*	909970.0	Sandberg	-51	See period I	

Spring 2012

Period III

Course	Code	Lecturer	Weeks	Time	Place
Specification Methods	456309.0	Walden	2-10	Mon 10-12 Thu 13-15	Fortran (A3058) Fortran (A3058)
Project course (continues)	451000.0	Rönnholm Björkqvist L. Petre Truscan	2-10	Fri 8-10	Fortran (A3058)
Network Software (will continue in period IV)	456504.0	L. Petre	2-10	Wed 10-12	Cobol (B3040)
Advanced computer graphics	455302.0	Westerholm	2-10	Wed 10-12 Fre 10-12	Cobol (B3040) Cobol (B3040)
Cryptography and Network Security	456506.0	I.Petre	2-10	Tue 15-17	Gamma
Development of Web Applications and Web Services	452501.0	Porres	2-10	Thu 13-16	Fortran (A3058)
Swedish as a foreign language level 1 (will continue in period IV) *There are four groups available in periods I-II and three in periods III-IV. Each group has two lectures each week.* *Please choose <u>one</u> of these groups.*	909970.0	Sandberg	2-	Mon 8-10 Wed 8-10 Tue 13-15 Thu 13-15 Tue 15-17 Thu 15-17	M227 B306 M223 B306 B301 B306

Period IV

Course	Code	Lecturer	Weeks	Time	Place
Network Software (continues)	456504.0	L. Petre	11-21	Wed 10-12	Cobol (B3040)
Neural Networks	424501.0	Saxén		Intensive course	
Computability and computational complexity	456508.0	L. Petre	11-21	Tue 10-12 Thu 10-12	Cobol (B3040) Cobol (B3040)
Evolutionary Algorithms	424511.0	Pettersson		Intensive course	
Swedish as a foreign language level 1 (continues) *There are four groups available in periods I-II and three in periods III-IV. Each group has two lectures each week.* *Please choose <u>one</u> of these groups.*	909970.0	Sandberg	-17	See period III	

Please note that some courses are lectured every second year.

Algol, Catbert, Cobol, Fortran and Gamma are located in the ICT-building, Joukahainengatan 3
Salin and Ringbom are located in the Axelia II building, Biskopsgatan 8
B301, B302, B306 and M205 are located in the Arken-building, Fabriksgatan 2

Campus map: http://www.abo.fi/public/en/media/2141/campuskartaengelska.pdf

Courses offered by the University of Turku:
The lecture dates and times for courses lectured in the autumn (period I and II) will be confirmed in August and lecture dates and times for courses lectured in the spring (period III and IV) will be confirmed in December. Please check the following web page for the updated information: http://mars.cs.utu.fi/julkkari/opetus/

4.3 General information about studies

General information about the studies at Åbo Akademi University can be found in this Study guidebook, the Teaching Programme (*Undervisningsprogram*), MinPlan and the Computer Science web pages.

Study guide – Master Studies in Computer Science
The Study guide gives general information about studies at the Department of Information Technologies as well as a description of certain procedures. The guide also gives information about the structure of the Master Studies, the courses that are included in the degree as well as information about lecture times and dates. The Study guide is handed out to all new students and can also be found at

The Teaching Programme
The Teaching Programme (*Undervisningsprogram*) gives information about all the courses offered by Åbo Akademi University, i.e. lecture dates and times, as well as information about exam dates for the courses offered by the Department of Information Technologies. The Teaching Programme can be collected from the Student office of Åbo Akademi University in the Gripen-building, ground floor (Tavastgatan 13) and can also be found at https://www.abo.fi/student/undervisningabo

MinPlan

MinPlan is used to make individual study plans and for registering for courses and exams. MinPlan also contains information about all courses. MinPlan is found at http://www.abo.fi/minplan

5 Master's degree programme – Electronic and Mobile Commerce

Åbo Akademi follows the so called Bologna reform concerning studies and credits. According to the new degree structure starting in 2005, the studies will be measured in credits (cr) (*studiepoäng, sp*). Even if the term "credit" has already been used for a long time, these new credits do *not* have the same meaning as before. One old credit (*studievecka, sv*) is approximately equal to 1.8 new credits.

5.1 Structure of the studies

The Master's Degree Programme in Electronic and Mobile Commerce has a duration of two academic years and accounts for 120 cr. This means that the student should complete 60 cr each academic year. The structure of the programme as well as the courses are available in MinPlan, http://www.abo.fi/minplan. The student is required to make his or her own study plan using MinPlan. Furthermore, the registration for courses (if registration is required) and the registration for exams are done in MinPlan.

The Master of Science (Economics and Business Administration) degree in the Master's Degree Programme in Electronic and Mobile Commerce has the following structure:

Advanced studies in Information Systems (25 cr)	Master's thesis (35 cr)	Advanced seminars (7 cr)
Basic studies in minor subject (25 sp)		Academic writing (3 cr)
Free optional studies (15 cr)	Swedish for foreigners (5 cr)	Philosophy (5 cr)

5.1.1 Main subject

The main subject studies consist of:

Advanced studies   **67 cr**
Mandatory
457790.0   Advanced Seminars in Information Systems   7 cr
457795.0   Master's thesis in Information Systems   35 cr

5.1.2 Minor subject

The degree requires minor subject studies consisting of basic studies in an optional subject, 25 cr. A minor subject that is offered specifically for Nordic Master School students, thus also students of Electronic and Mobile Commerce, is the Innovation and Entrepreneurship module. This module is offered by Turku School of Economics (www.tse.fi) and thus a flexible study right agreement is required (see 1.13 above). More information about this module and its courses is found at http://www.nordicict.eu → I&E.

The minor subject can be replaced with intermediate studies in Information Systems if the student lacks enough knowledge in Information Systems to immediately begin with the advanced studies. This option is discussed with professor Pirkko Walden, who is responsible for the Master's Degree Programme.

5.1.3 Mandatory Swedish language course

A language course in Swedish is mandatory for all foreign students studying at Åbo Akademi University. Language courses are offered by the Centre for Language and Communication (*språkcentret*), http://www.abo.fi/csk

909970.0	Swedish as a foreign language, level 1	5 cr

5.1.4 Mandatory course in philosophy

A course in philosophy is mandatory for everyone studying for a M.Sc. (Economics and Business Administration) degree.

100009.2	Philosophy of Science	5 cr

5.1.5 Free optional studies

The student has the opportunity to complete free optional courses to an extent of 15 cr. These courses can be any courses offered by a subject at Åbo Akademi University. The free optional studies can be replaced with basic studies in Information Systems if

the student lacks enough knowledge in Information Systems to immediately begin with the advanced studies. This option is discussed with professor Pirkko Walden, who is responsible for the Master's Degree Programme.

All students that have no previous background in Information Systems should start with the course:

457106.0 IT bridge course for EMC students

5.2 Course information: lecture dates and times

Autumn 2011

Period I

Course	Code	Lecturer	Weeks	Time	Place
Project course (will continue in periods II and III)	451000.0	Rönnholm Björkqvist L. Petre Truscan	36-43	Fri 8-10	Fortran (A3058)
Business Intelligence	457512.0	Back	36-43	Tue 15-17 Thu 15-17	Catbert (B3028) Dilbert (B3029)
Computational Intelligence and Management	457517.0	Carlsson	36-43	Mon 10-12	Catbert (B3028)
Academic Skills for Masters Students *There are three groups available, one each in periods I, III and IV. Please choose one of these groups.*	903800.0	Gattoni			
Swedish as a foreign language level 1(will continue in period II) *There are four groups available in periods I-II and three groups available in periods III-IV. Each group has two lectures each week.* *Please choose one of these groups.*	909970.0	Sandberg	37-	Mon 8-10 Wed 8-10 Mon 15-17 Wed 15-17 Tue 13-15 Thu 13-15 Tue 15-17 Thu 15-17	B306 M 227 B306 M227 B302 B302 B302/306 B302

Period II

Course	Code	Lecturer	Weeks	Time	Place
Project course (continues)	451000.0	Rönnholm Björkqvist L. Petre Truscan	44-51	Fri 8-10	Fortran (A3058)
Data Mining and Text Mining	457513.0	Back Eklund	44-51	Tue 15-17 Thu 15-17	Catbert (B3028) Dilbert (B3029)
Analytics and Soft Computing	457515.0	Carlsson	44-51	Mon 10-12	Catbert (B3028)
Advanced seminars in IS (will continue in period IV)	457790.0	Back Carlsson Walden	44-51	Mon 15-17	Catbert (B3028)

Course	Code	Lecturer	Weeks	Time	Place
Philosophy of Science	100009.2	Nybom	44-50	Thu 12-15	Armfelt (A102)
Swedish as a foreign language level 1 (continues) *There are four groups available in periods I-II and three groups available in periods III-IV. Each group has two lectures each week.* *Please choose <u>one</u> of these groups.*	909970.0	Sandberg	-51	See period I	

Spring 2012

Period III

Course	Code	Lecturer	Weeks	Time	Place
Project course (continues)	451000.0	Rönnholm Björkqvist L. Petre Truscan	2-10	Fri 8-10	Fortran (A3058)
Electronic Commerce	457502.0	Walden	2-10	Tue 10-12	Fortran (A3058)
Academic Skills for Masters Students *There are three groups available, one each in periods I, III and IV.* *Please choose <u>one</u> of these groups.*	903800.0	Gattoni	2-8	Tue 17-18.30 Thu 17-18.30	B302 B302
Swedish as a foreign language level 1 (will continue in period IV) *There are four groups available in periods I-II and three in periods III-IV. Each group has two lectures each week.* *Please choose <u>one</u> of these groups.*	909970.0	Sandberg	2-	Mon 8-10 Wed 8-10 Tue 13-15 Thu 13-15 Tue 15-17 Thu 15-17	M227 B306 M223 B306 B301 B306

Period IV

Course	Code	Lecturer	Weeks	Time	Place
Mobile Value Services	457516.0	Walden	11-21	Tue10-12	Fortran (A3058)
ICT and the changes in work	457511.0	Karsten	11-21	Mon 15-17	Catbert (B3028)
Advanced seminars in IS (continues)	457790.0	Back Carlsson Walden	11-21	Mon 15-17	Catbert (B3028)
Academic Skills for Masters Students *There are three groups available, one each in periods I, III and IV.* *Please choose <u>one</u> of these groups.*	903800.0	Gattoni	11-16	Tue 17-18.30 Thu 17-18.30	B302 B302
Swedish as a foreign language level 1 (continues) *There are four groups available in periods I-II and three in periods III-IV. Each group has two lectures each week.* *Please choose <u>one</u> of these groups.*	909970.0	Sandberg	-17	See period III	

Catbert, Dilbert and Fortran are located in the ICT-building, Joukahainengatan 3
B301, B302, B306, M205, Armfelt and Westermarck are located in the Arken-building, Fabriksgatan 2

Campus map: http://www.abo.fi/public/en/media/2141/campuskartaengelska.pdf

5.3 General information about studies

General information about the studies at Åbo Akademi University can be found in this Study guide, the Teaching Programme (*Undervisningsprogram*), MinPlan and the Electronic and Mobile Commerce web pages.

Study guide - Master's Degree Programme in Electronic and Mobile Commerce
The Study guide gives general information about studies at the Department of Information Technologies as well as a description of certain procedures. The guide also gives information about the structure of the Master's Degree Programme, the courses that are included in the degree as well as information about lecture times and dates. The Study guide is handed out to all new students and can also be found at https://www.abo.fi/student/en/emc_studyinformation

The Teaching Programme
The Teaching Programme (*Undervisningsprogram*) gives information about all the courses offered by Åbo Akademi University, i.e. lecture dates and times, as well as information about exam dates for the courses offered by the Department of Information Technologies. The Teaching Programme can be collected from the Student office of Åbo Akademi University in the Gripen-building, ground floor (Tavastgatan 13) and can also be found at https://www.abo.fi/student/undervisningabo

MinPlan
MinPlan is used to make individual study plans and for registering for courses and exams. MinPlan also contains information about all courses. MinPlan is found at http://www.abo.fi/minplan

Electronic and Mobile Commerce web pages
The Electronic and Mobile Commerce web pages give general information about the Master's Degree Programme in Electronic and Mobile Commerce and also contain study information and guides. Please visit the pages at https://www.abo.fi/emc

6 Master's degree programme – Embedded Computing

Åbo Akademi follows the so called Bologna reform concerning studies and credits. According to the new degree structure starting in 2005, the studies will be measured in credits (cr) (*studiepoäng, sp*). Even if the term "credit" has already been used for a long time, these new credits do *not* have the same meaning as before. One old credit (*studievecka, sv*) is approximately equal to 1.8 new credits.

6.1 Structure of the studies

The Master's Degree Programme in Embedded has a duration of two academic years and accounts for 120 cr. This means that the student should complete 60 cr each academic year. The structure of the programme as well as the courses are available in MinPlan, http://www.abo.fi/minplan. The student is required to make his or her own study plan using MinPlan. Furthermore, the registration for courses offered by Åbo Akademi University (if registration is required) and the registration for exams at Åbo Akademi University are done in MinPlan.

The Master of Science (Technology) degree in the Master's Degree Programme in Embedded Computing has the following structure:

Advanced module I in Embedded Systems (20 cr)		Advanced module II in Embedded Systems (30 cr)	
Master's thesis in Embedded Systems (30 sp)			
Minor subject: Innovation and Entrepreneurship (20 cr)		Swedish for foreigners (5 cr)	Free optional studies (15 cr)

6.1.1 Advanced module I in Embedded Systems

The courses in the advanced module I (20 cr) consist of mandatory courses offered by Åbo Akademi University (ÅAU) and the University of Turku (UTU).

Mandatory			*20 cr*
453306.0	Real-Time Systems	ÅAU	5 cr
453502.0	Programming Embedded Systems	ÅAU	5 cr
DTEK1018	System Modelling with System C	UTU	5 cr
ETT_2006	HDL Based Design	UTU	5 cr

6.1.2 Advanced module II in Embedded Systems

The courses in the advanced module II (30 cr) consist of mandatory as well as selectable courses offered by Åbo Akademi University (ÅAU) and the University of Turku (UTU).

Mandatory			*15 cr*
453503.0	Modeling of Embedded Systems	ÅAU	5 cr
453504.0	Design Methods for Embedded Systems	ÅAU	5 cr
ETT_2014	SoC Design	UTU	5 cr

Selectable (15 cr are chosen)			*15 cr*
454506.1	Applied Signal Processing, theory	ÅAU	5 cr
455304.0	Code Optimization	ÅAU	5 cr
ETT_2062	Multiprocessor Architectures	UTU	5 cr
ETT_3053	Reconfigurable Computing	UTU	5 cr
ETT_2061	System Verification	UTU	5 cr
DTEK8053	Seminar on Computer Systems	UTU	5 cr

6.1.3 Master's thesis in Embedded Systems

The Master's Thesis accounts for 30 cr and should be written in the last year of study, i.e. during the second academic year. Contact professor Johan Lilius to discuss a possible topic for the thesis.

453795.0	Master's Thesis in Embedded Systems		30 cr

6.1.4 Minor subject: Innovation and Entrepreneurship

The minor subject Innovation and Entrepreneurship (20 cr) is mandatory. The courses are offered by Turku School of Economics (TSE), http://www.tse.fi. Information about the Innovation and Entrepreneurship module is also found here: http://www.nordicict.eu/innovation.php

Innovation and entrepreneurship in ICT context	TSE	5 cr
New business models	TSE	5 cr
Business competence and innovations	TSE	5 cr
Innovations and global growth	TSE	5 cr

6.1.5 Mandatory Swedish language course

A language course in Swedish is mandatory for all foreign students studying at Åbo Akademi University. Language courses are offered by the Centre for Language and Communication (*språkcentret*), http://www.abo.fi/csk

909970.0	Swedish as a foreign language, level 1	5 cr

6.1.6 Free optional studies

The student has the opportunity to complete free optional courses to an extent of 15 cr. These courses can be any courses offered by a subject at Åbo Akademi University.

6.2 Course information: lecture dates and times

Courses offered by Åbo Akademi University:

Autumn 2011

Period I

Course	Code	Lecturer	Weeks	Time	Place
Code Optimization	455304.0	Aspnäs	36-43	Tue15-17 Thu 13-15	Fortran (3058) Fortran (3058)
Design Methods for Embedded Systems	453504.0	Lafond	36-43	Mon 13-15 Thu 13-15	Algol (B3039) Cobol (B3040)
Swedish as a foreign language level 1 (will continue in period II) *There are four groups available in periods I-II and three groups available in periods III-IV. Each group has two lectures each week. Please choose <u>one</u> of these groups.*	909970.0	Sandberg	37-	Mon 8-10 Wed 8-10 Mon 15-17 Wed 15-17 Tue 13-15 Thu 13-15 Tue 15-17 Thu 15-17	B306 M 227 B306 M227 B302 B302 B302/306 B302

Period II

Course	Code	Lecturer	Weeks	Time	Place
Swedish as a foreign language level 1 (continues) *There are four groups available in periods I-II and three groups available in periods III-IV. Each group has two lectures each week. Please choose <u>one</u> of these groups.*	909970.0	Sandberg	-51	See period I	

Spring 2012

Period III

Course	Code	Lecturer	Weeks	Time	Place
Real-Time Systems	453306.0	Lilius	2-10	Mon 15-17 Wed 15-17	Fortran (A3058) Fortran (A3058)
Programming Embedded Systems	453502.0	Björkqvist	2-10	Tue 10-12	Cobol (B3040)
Modelling of Embedded Systems (will continue in period IV)	453503.0	Lafond	2-10	Thu 13-15	Algol (B3039)
Swedish as a foreign language level 1 (will continue in period	909970.0	Sandberg	2-	Mon 8-10 Wed 8-10	M227 B306

				Tue 13-15	M223
IV) *There are four groups available in periods I-II and three in periods III-IV. Each group has two lectures each week. Please choose one of these groups.*				Thu 13-15 Tue 15-17 Thu 15-17	B306 B301 B306

Period IV

Course	Code	Lecturer	Weeks	Time	Place
Modelling of Embedded Systems (continues)	453503.0	Lafond	11-21	Thu 13-15	Algol (B3039)
Swedish as a foreign language level 1 (continues) *There are four groups available in periods I-II and three in periods III-IV. Each group has two lectures each week. Please choose one of these groups.*	909970.0	Sandberg	-17	See period III	

Please note that some courses are lectured every second year..

Algol, Cobol and Fortran are located in the ICT-building, Joukahainengatan 3
B301, B302, B306 and M205 are located in the Arken-building, Fabriksgatan 2

Campus map: http://www.abo.fi/public/en/media/2141/campuskartaengelska.pdf

Courses offered by the University of Turku:
The lecture dates and times for courses lectured in the autumn (period I and II) will be confirmed in August and lecture dates and times for courses lectured in the spring (period III and IV) will be confirmed in December. Please check the following web page for the updated information: http://mars.cs.utu.fi/julkkari/opetus/

Courses offered by Turku School of Economics:
The lecture dates and times will be confirmed later. Please consult the following web pages for information about the lectures: http://www.nordicict.eu/innovation.php

6.3 General information about studies

General information about the studies at Åbo Akademi University can be found in this Study guidebook, the Teaching Programme (*Undervisningsprogram*), MinPlan and the Embedded Computing web pages.

Study guide - Master's Degree Programme in Embedded Computing
The Study guide gives general information about studies at the Department of Information Technologies as well as a description of certain procedures. The guide also gives information about the structure of the Master's Degree Programme, the courses that are included in the degree as well as information about lecture times and dates. The Study guide is handed out to all new students and can also be found at https://www.abo.fi/student/en/ec_studyinformation

The Teaching Programme

The Teaching Programme (*Undervisningsprogram*) gives information about all the courses offered by Åbo Akademi University, i.e. lecture dates and times, as well as information about exam dates for the courses offered by the Department of Information Technologies. The Teaching Programme can be collected from the Student office of Åbo Akademi University in the Gripen-building, ground floor (Tavastgatan 13) and can also be found at https://www.abo.fi/student/undervisningabo

MinPlan

MinPlan is used to make individual study plans and for registering for courses and exams. MinPlan also contains information about all courses. MinPlan is found at http://www.abo.fi/minplan

Embedded Computing web pages

The Embedded Computing web pages give general information about the Master's Degree Programme in Embedded Computing and also contain study information and guides. Please visit the pages at https://www.abo.fi/ec

6 Master's programme – Computer Engineering / Software Engineering

Åbo Akademi follows the so called Bologna reform concerning studies and credits. According to the new degree structure starting in 2005, the studies will be measured in credits (cr) (*studiepoäng, sp*). Even if the term "credit" has already been used for a long time, these new credits do *not* have the same meaning as before. One old credit (*studievecka, sv*) is approximately equal to 1.8 new credits.

6.1 Structure of the studies

The Master Studies in Computer Engineering/ Software Engineering have a duration of two academic years and accounts for 120 cr. This means that the student should complete 60 cr each academic year. The structure of the programme as well as the courses are available in MinPlan, http://www.abo.fi/minplan. The student is required to make his or her own study plan using MinPlan. Furthermore, the registration for courses offered by Åbo Akademi University (if registration is required) and the registration for exams at Åbo Akademi University are done in MinPlan.

The Master of Science (Technology) degree in the Computer Engineering/ Software Engineering has the following structure:

Advanced studies in Software Engineering (20 cr)	Master's thesis in Software Engineering (30 sp)	
Minor subject 1: Network Software (20 cr)	Minor subject 2: Information Systems and Management Sciences (20 cr)	
Free optional studies (15 cr)	Project course (10 cr)	Swedish for foreigners (5 cr)

6.1.1 Advanced studies in Software Engineering

The courses in the advanced module (20 cr) consist of two mandatory courses (10 cr) and a selection of selectable courses from which two (10 cr) are chosen.

Mandatory		*20 cr*
452501.0	Development of Web Applications and Web Services	5 cr
456502.0	Software Architectures	5 cr

Selectable (10 cr are chosen)		
456309.0	Specification Methods	5 cr

456501.0	Software Safety	5 cr
456503.0	Software Quality	5 cr
452502.0	Software Testing	5 cr
452400	Special course in Software Engineering	5 cr

6.1.2 Master's thesis in Software Engineering

The Master's Thesis accounts for 30 cr and should be written in the last year of study, i.e. during the second academic year. Contact professor Ivan Porres to discuss a possible topic for the thesis.

453795.0	Master's Thesis in Software Engineering	30 cr

6.1.3 Mandatory Project course

A Project course is mandatory for students studying Software Engineering.

451000.0	Project course	10 cr

6.1.4 Minor subject 1: Network Software

The minor subject Network Software (20 cr) is mandatory. The minor subject consists of four mandatory courses, three of which are offered by Åbo Akademi University and one of which is offered by the University of Turku (UTU).

Mandatory

455303.0	Parallel Programming	5 cr
456504.0	Network Software	5 cr
456506.0	Cryptography and Network Security	5 cr
TKO_5706	Distributed Systems (UTU)	5 cr

6.1.5 Minor subject 2: Information Systems and Management Sciences

The minor subject Information Systems and Management Sciences (20 cr) is mandatory. The minor subject consists of selectable courses from which 20 cr are chosen.

Selectable (20 cr are chosen)

414303.0	Project Management	5 cr
457104.0	Financial Planning	5 cr
457305.0	Management Science and Inventory Analysis	5 cr
457510.0	User-centred Design of Information Systems	5 cr
457512.0	Business Intelligence	5 cr
457513.0	Data Mining and Text Mining	5 cr
457516.0	Mobile Value Services	5 cr

6.1.6 Mandatory Swedish language course

A language course in Swedish is mandatory for all foreign students studying at Åbo Akademi University. Language courses are offered by the Centre for Language and Communication (*språkcentret*), http://www.abo.fi/csk

| 909970.0 | Swedish as a foreign language, level 1 | 5 cr |

6.1.7 Free optional studies

The student has the opportunity to complete free optional courses to an extent of 15 cr. These courses can be any courses offered by a subject at Åbo Akademi University.

6.2 Course information: lecture dates and times

Courses offered by Åbo Akademi University:

Autumn 2011

Period I

Course	Code	Lecturer	Weeks	Time	Place
Software Architectures	456502.0	L. Petre	36-43	Tue 10-12 Thu 10-12	Cobol (3040) Algol (3039)
Specification Methods	456309.0	Walden	36-43	Mon 10-12 Wed 13-15	Algol (3039) Algol (3039)
Project course (will continue in periods II - III)	451000.0	Rönnholm Björkqvist L. Petre Truscan	36-43	Fri 8-10	Fortran (A3058)
Business Intelligence	457512.0	Back	36-43	Tue 15-17 Thu 15-17	Catbert (B3028) Dilbert (B3029)
Swedish as a foreign language level 1 (will continue in period II) *There are four groups available in periods I-II and three groups available in periods III-IV. Each group has two lectures each week. Please choose <u>one</u> of these groups.*	909970.0	Sandberg	37-	Mon 8-10 Wed 8-10 Mon 15-17 Wed 15-17 Tue 13-15 Thu 13-15 Tue 15-17 Thu 15-17	B306 M 227 B306 M227 B302 B302 B302/306 B302

Period II

Course	Code	Lecturer	Weeks	Time	Place
Software Testing	452502.0	Truscan	44-51	Tue 13-15 Thu 13-15	Algol (B3039) Algol (B3039)
Project course (continues)	451000.0	Rönnholm Björkqvist L. Petre Truscan	44-51	Fri 8-10	Fortran (A3058)
Management Science and Inventory Analysis	457305.0	Björk	44-51	Wed 10-12	Fortran (A3058)

Data Mining and Text Mining	457513.0	Back	43-50	Tue 15-17 Thu 15-17	Catbert (B3028) Dilbert (B3029)
Swedish as a foreign language level 1 (continues) *There are four groups available in periods I-II and three groups available in periods III-IV. Each group has two lectures each week. Please choose <u>one</u> of these groups.*	909970.0	Sandberg	-51	See period I	

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Period III

Course	Code	Lecturer	Weeks	Time	Place
Specification Methods	456309.0	Walden	2-10	Mon 10-12 Thu 13-15	Fortran (A3058) Fortran (A3058)
Project course (continues)	451000.0	Rönnholm Björkqvist L. Petre Truscan	2-10	Fri 8-10	Fortran (A3058)
Network Software (will continue in period IV)	456504.0	L. Petre	2-10	Wed 10-12	Cobol (B3040)
Project Management	414303.0	Liinamaa	2-8	Mon 13-15 Thu 13-15	Salin Ringbom
Financial Planning	457104.0	NN	2-10	Mon 15-17 Wed 15-17	Gamma (B1026) Gamma (B1026)
Development of Web Applications and Web Services	452501.0	Porres	2-10	Thu 13-16	Fortran (A3058)
Swedish as a foreign language level 1 (will continue in period IV) *There are four groups available in periods I-II and three in periods III-IV. Each group has two lectures each week.* *Please choose <u>one</u> of these groups.*	909970.0	Sandberg	2-	Mon 8-10 Wed 8-10 Tue 13-15 Thu 13-15 Tue 15-17 Thu 15-17	M227 B306 M223 B306 B301 B306

Period IV

Course	Code	Lecturer	Weeks	Time	Place
Network Software (continues)	456504.0	L. Petre	11-21	Wed 10-12	Cobol (B3040)
Mobile Value Services	457516.0	Walden	11-21	Tue10-12	Fortran (A3058)
Swedish as a foreign language level 1 (continues) *There are four groups available in periods I-II and three in periods III-IV. Each group has two lectures each week.* *Please choose <u>one</u> of these groups.*	909970.0	Sandberg	-17	See period III	

Please note that some courses are lectured every second year.

Algol, Catbert, Cobol, Fortran and Gamma are located in the ICT-building, Joukahainengatan 3
Salin and Ringbom are located in the Axelia II building, Biskopsgatan 8
B301, B302, B306 and M205 are located in the Arken-building, Fabriksgatan 2

Campus map: http://www.abo.fi/public/en/media/2141/campuskartaengelska.pdf

Courses offered by the University of Turku:
The lecture dates and times for courses lectured in the autumn (period I and II) will be confirmed in August and lecture dates and times for courses lectured in the spring (period III and IV) will be confirmed in December. Please check the following web page for the updated information: http://mars.cs.utu.fi/julkkari/opetus/

6.3 General information about studies

General information about the studies at Åbo Akademi University can be found in this Study guidebook, the Teaching Programme (*Undervisningsprogram*), MinPlan and the Computer Engineering/ Software Engineering web pages.

Study guide – Master Studies in Computer Engineering/ Software Engineering
The Study guide gives general information about studies at the Department of Information Technologies as well as a description of certain procedures. The guide also gives information about the structure of the Master Studies, the courses that are included in the degree as well as information about lecture times and dates. The Study guide is handed out to all new students and can also be found at https://www.abo.fi/student/en/se_studyinformation

The Teaching Programme
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MinPlan

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Computer Engineering/ Software Engineering web pages

The Computer Engineering/ Software Engineering web pages give general information about the Master Studies in Computer Engineering/ Software Engineering and also contain study information and guides. Please visit the pages at https://www.abo.fi/se