

# Computer Science, Master's programme

120 credits

Computer Science, masterprogram

6MICS

Valid from:

**Determined by** Faculty Board of Institute of Technology

Date determined 2015-01-16

## Introduction

The complete syllabus is available at http://kdb-5.liu.se/liu/lith/studiehandboken/enutbplan.lasso? &up\_year=2017&up\_ladokkod=6MICS

## **Entry requirements**

## **Degree in Swedish**

Master of Science (120 credits) with a major in Computer Science and Engineering

#### **Degree in English**

Master of Science (two years) with a major in Computer Science and Engineering



# Curriculum

#### Semester 2 (Spring 2017)

Period 1TATA64Graph Theory6A1X2ETBM126Neural Networks and Learning Systems6A1X2ETDDB68Concurrent Programming and Operating Systems6G2X3ETDDD17Information Security, Second Course6A1X2ETDDD25Distributed Systems6A1X2ETDDD38Advanced Programming in C++6A1X2ETDDD41Data Mining - Clustering and Association Analysis6G2X3ETDDD97Web Programming6G2X3ETDDD97Web Programming6G2X3ETDDD97Web Programming6A1X2ETDTS07System Design and Methodology6A1X1ETNM048Information Visualisation6A1X3ETNM0613-D Computer Graphics6G2X1ETACP24Optimization, Advanced Course6A1X2ETDDD78Programming of Parallel Computers - Methods and Tools6A1X3ETDDD05Compoent Based Software6A1X3ETDDD27Advanced Web Programming6A1X3ETDDD17Information Security, Second Course6A1X3ETDDD17Information Security, Second Course6A1X3ETDDD17 <td< th=""><th>Course code</th><th>Course name</th><th>Credits</th><th>Level</th><th>Timetable module</th><th>ECV</th></td<>	Course code	Course name	Credits	Level	Timetable module	ECV
TBMI26Neural Networks and Learning Systems6A1X2ETDDB68Concurrent Programming and Operating Systems6G2X3ETDDD17Information Security, Second Course6A1X4ETDDD25Distributed Systems6A1X2ETDDD38Advanced Programming in C++6A1X2ETDDD41Data Mining - Clustering and Association Analysis6A1X3ETDDD97Web Programming6G2X3ETDDD97Web Programming6G2X3ETDDD97Web Programming6A1X2ETDTS07System Design and Methodology6A1X1ETNM048Information Visualisation6A1X3ETNM0613-D Computer Graphics6G2X1ETAOP24Optimization, Advanced Course6G2X1ETDDC78Programming of Parallel Computers - Methods and Tools6A1X2ETDDD27Advanced Web Programming6A1X3ETDDD05Component Based Software6A1X4ETDDD27Advanced Web Programming6A1X3ETDDD27Advanced Web Programming6A1X3ETDDD28Advanced Web Programming6A1X3ETDDD29IT-Project Management6A1X <th>Period 1</th> <th></th> <th></th> <th></th> <th></th> <th></th>	Period 1					
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IDDB68Systems6G2X3ETDDD17Information Security, Second Course6A1X4ETDDD25Distributed Systems6A1X2ETDDD38Advanced Programming in C++6A1X2ETDDD41Data Mining - Clustering and Association Analysis6A1X3ETDDD97Web Programming6G2X3ETDDD97Web Programming6G2X3ETDD097Web Programming6A1X2ETDD097Web Programming6A1X2ETDTS07System Design and Methodology6A1X1ETNM048Information Visualisation6A1X3ETNM0613-D Computer Graphics6G2X1ETAOP24Optimization, Advanced Course6G2X1ETDD078Programming of Parallel Computers - Methods and Tools6A1X2ETDDD27Advanced Web Programming6A1X1ETDDD17Information Security, Second Course6A1X1ETDDD17Information Security, Second Course6A1X3ETDDD29IT-Project Management6A1X3ETDDD29IT-Project Management6A1X3ETDDD29IT-Project Management6A1X-E	TBMI26	Neural Networks and Learning Systems	6	A1X	2	E
TDDD25Distributed Systems6A1X2ETDDD38Advanced Programming in C++6A1X2ETDDD41Data Mining - Clustering and Association Analysis6A1X3ETDDD97Web Programming6G2X3ETDD097Web Programming6G2X3ETDD097Web Programming6A1X2ETDD097Web Programming6A1X2ETDD097System Design and Methodology6A1X1ETNM048Information Visualisation6A1X3ETNM0613-D Computer Graphics6G2X1ETSBK35Audio and Image Compression6A1X2EPeriod 2Image Compression6A1X2ETDDC78Programming of Parallel Computers - Methods and Tools6A1X3ETDDD17Information Security, Second Course6A1X1ETDDD27Advanced Web Programming6A1X3ETDDD27Information Security, Second Course6A1X3ETDDD29IT-Project Management6A1X3ETDDD38Advanced Programming in C++6A1X-E	TDDB68		6	G2X	3	E
TDDD38Advanced Programming in C++6A1X2ETDDD41Data Mining - Clustering and Association Analysis6A1X3ETDDD97Web Programming6G2X3ETDD097Web Programming6G2X3ETDD09Natural Language Processing6A1X2ETDTS07System Design and Methodology6A1X1ETNM048Information Visualisation6A1X3ETNM0613-D Computer Graphics6G2X1ETSBK35Audio and Image Compression6A1X2EPeriod 2ETDDC78Programming of Parallel Computers - Methods and Tools6A1X3ETDDD77Information Security, Second Course6A1X3ETDDD74Information Security, Second Course6A1X4ETDDD75Advanced Web Programming6A1X3ETDDD29IT-Project Management6A1X3ETDDD38Advanced Programming in C++6A1X-E	TDDD17	Information Security, Second Course	6	A1X	4	E
TDD011Data Mining - Clustering and Association Analysis6A1X3ETDD041Data Mining - Clustering and Association Analysis6A1X3ETDD097Web Programming6G2X3ETDD09Natural Language Processing6A1X2ETDTS07System Design and Methodology6A1X1ETNM048Information Visualisation6A1X3ETNM0613-D Computer Graphics6G2X1ETSBK35Audio and Image Compression6A1X2EPeriod 2ETAOP24Optimization, Advanced Course6G2X1ETDDC78Programming of Parallel Computers - Methods and ToolsA1X3ETDDD77Information Security, Second Course6A1X1ETDDD17Information Security, Second Course6A1X4ETDDD27Advanced Web Programming6A1X3ETDDD27IT-Project Management6A1X3ETDDD38Advanced Programming in C++6A1X-E	TDDD25	Distributed Systems	6	A1X	2	E
IDDD41Analysis6A1X3ETDDD97Web Programming6G2X3ETDDE09Natural Language Processing6A1X2ETDTS07System Design and Methodology6A1X1ETNM048Information Visualisation6A1X3ETNM0613-D Computer Graphics6G2X1ETSBK35Audio and Image Compression6A1X2EPeriod 2ETAOP24Optimization, Advanced Course6G2X1ETDDC78Programming of Parallel Computers - Methods and Tools6A1X3ETDDD05Component Based Software6A1X1ETDDD17Information Security, Second Course6A1X3ETDDD27Advanced Web Programming6A1X3ETDDD29IT-Project Management6A1X3ETDD038Advanced Programming in C++6A1X-E	TDDD38	Advanced Programming in C++	6	A1X	2	E
TDDE09Natural Language Processing6A1X2ETDDE09Natural Language Processing6A1X2ETDTS07System Design and Methodology6A1X1ETNM048Information Visualisation6A1X3ETNM0613-D Computer Graphics6G2X1ETSBK35Audio and Image Compression6A1X2EPeriod 2TAOP24Optimization, Advanced Course6G2X1ETAA64Graph Theory6A1X2ETDDC78Programming of Parallel Computers - Methods and Tools6A1X3ETDDD05Component Based Software6A1X1ETDDD17Information Security, Second Course6A1X3ETDDD27Advanced Web Programming6A1X3ETDDD29IT-Project Management6A1X3ETDDD38Advanced Programming in C++6A1X-E	TDDD41		6	A1X	3	E
TDTS07System Design and Methodology6A1X1ETNM048Information Visualisation6A1X3ETNM0613-D Computer Graphics6G2X1ETSBK35Audio and Image Compression6A1X2EPeriod 2TAOP24Optimization, Advanced Course6G2X1ETATA64Graph Theory6A1X2ETDDC78Programming of Parallel Computers - Methods and Tools6A1X3ETDDD05Component Based Software6A1X1ETDDD17Information Security, Second Course6A1X3ETDDD27Advanced Web Programming6A1X3ETDDD29IT-Project Management6A1X3ETDDD38Advanced Programming in C++6A1X-E	TDDD97	Web Programming	6	G2X	3	E
TNM048Information Visualisation6A1X3ETNM0613-D Computer Graphics6G2X1ETSBK35Audio and Image Compression6A1X2EPeriod 2TAOP24Optimization, Advanced Course6G2X1ETATA64Graph Theory6A1X2ETDDC78Programming of Parallel Computers - Methods and Tools6A1X3ETDDD05Component Based Software6A1X1ETDDD17Information Security, Second Course6A1X3ETDDD27Advanced Web Programming6A1X3ETDDD29IT-Project Management6A1X3ETDDD38Advanced Programming in C++6A1X-E	TDDE09	Natural Language Processing	6	A1X	2	E
TNM0613-D Computer Graphics6G2X1ETSBK35Audio and Image Compression6A1X2EPeriod 2TAOP24Optimization, Advanced Course6G2X1ETATA64Graph Theory6A1X2ETDDC78Programming of Parallel Computers - Methods and Tools6A1X3ETDDD05Component Based Software6A1X1ETDDD17Information Security, Second Course6A1X3ETDDD27Advanced Web Programming6A1X3ETDDD29IT-Project Management6A1X3ETDDD38Advanced Programming in C++6A1X-E	TDTS07	System Design and Methodology	6	A1X	1	E
TSBK35Audio and Image Compression6A1X2EPeriod 2TAOP24Optimization, Advanced Course6G2X1ETATA64Graph Theory6A1X2ETDDC78Programming of Parallel Computers - Methods and Tools6A1X3ETDDD05Component Based Software6A1X1ETDDD17Information Security, Second Course6A1X3ETDDD27Advanced Web Programming6A1X3ETDDD29IT-Project Management6A1X3ETDDD38Advanced Programming in C++6A1X-E	TNM048	Information Visualisation	6	A1X	3	E
Period 2TAOP24Optimization, Advanced Course6G2X1ETATA64Graph Theory6A1X2ETDDC78Programming of Parallel Computers - Methods and Tools6A1X3ETDDD05Component Based Software6A1X1ETDDD17Information Security, Second Course6A1X4ETDDD27Advanced Web Programming6A1X3ETDDD29IT-Project Management6A1X3ETDDD38Advanced Programming in C++6A1X-E	TNM061	3-D Computer Graphics	6	G2X	1	E
TAOP24Optimization, Advanced Course6G2X1ETATA64Graph Theory6A1X2ETDDC78Programming of Parallel Computers - Methods and Tools6A1X3ETDDD05Component Based Software6A1X1ETDDD17Information Security, Second Course6A1X4ETDDD27Advanced Web Programming6A1X3ETDDD29IT-Project Management6A1X3ETDDD38Advanced Programming in C++6A1X-E	TSBK35	Audio and Image Compression	6	A1X	2	E
TATA64Graph Theory6A1X2ETDDC78Programming of Parallel Computers - Methods and Tools6A1X3ETDDD05Component Based Software6A1X1ETDDD17Information Security, Second Course6A1X4ETDDD27Advanced Web Programming6A1X3ETDDD29IT-Project Management6A1X3ETDDD38Advanced Programming in C++6A1X-E	Period 2					
TDDC78Programming of Parallel Computers - Methods and Tools6A1X3ETDDD05Component Based Software6A1X1ETDDD17Information Security, Second Course6A1X4ETDDD27Advanced Web Programming6A1X3ETDDD29IT-Project Management6A1X3ETDDD38Advanced Programming in C++6A1X-E	TAOP24	Optimization, Advanced Course	6	G2X	1	E
IDDC/8 and Tools6AIX3ETDDD05Component Based Software6AIX1ETDDD17Information Security, Second Course6AIX4ETDDD27Advanced Web Programming6AIX3ETDDD29IT-Project Management6AIX3ETDDD38Advanced Programming in C++6AIX-E	TATA64	Graph Theory	6	A1X	2	E
TDDD17Information Security, Second Course6A1X4ETDDD27Advanced Web Programming6A1X3ETDDD29IT-Project Management6A1X3ETDDD38Advanced Programming in C++6A1X-E	TDDC78		6	A1X	3	E
TDDD27Advanced Web Programming6A1X3ETDDD29IT-Project Management6A1X3ETDDD38Advanced Programming in C++6A1X-E	TDDD05	Component Based Software	6	A1X	1	E
TDDD29IT-Project Management6A1X3ETDDD38Advanced Programming in C++6A1X-E	TDDD17	Information Security, Second Course	6	A1X	4	E
TDDD38 Advanced Programming in C++ 6 A1X - E	TDDD27	Advanced Web Programming	6	A1X	3	E
	TDDD29	IT-Project Management	6	A1X	3	E
TDDD48 Automated Planning 6 A1X 1 E	TDDD38	Advanced Programming in C++	6	A1X	-	E
	TDDD48	Automated Planning	6	A1X	1	E
TNM0613-D Computer Graphics6G2X4E	TNM061	3-D Computer Graphics	6	G2X	4	E
TNM079 Modelling and Animation 6 A1X 2 E	TNM079	Modelling and Animation	6	A1X	2	E



Course code	Course name	Credits	Level	Timetable module	ECV
TNM096	Artificial Intelligence - Principles and Techniques	6	G2X	1	E
TNM098	Advanced Visual Data Analysis	6	A1X	4	E

#### Semester 3 (Autumn 2017)

Course code	Course name	Credits	Level	Timetable module	ECV
Period 1					
TATA55	Abstract Algebra	6	G2X	3	E
TBMI19	Medical Information Systems	6	A1X	2	E
TDDB84	Design Patterns	6	A1X	4	E
TDDC34	Technical, Economic and Societal Evaluation of IT-products	6	A1X	3	E
TDDC88	Software Engineering	12	A1X	1	E
TDDD04	Software Testing	6	A1X	2	E
TDDD08	Logic Programming	6	A1X	4	E
TDDD23	Design and Programming of Computer Games	6	A1X	2	E
TDDD38	Advanced Programming in C++	6	A1X	2	E
TDDD43	Advanced Data Models and Databases	6	A1X	2	E
TDDE19	Advanced Project Course - Al and Machine Learning	6	A1X	4	Ε
TDDE21	Advanced Project Course: Secure Distributed and Embedded Systems	6	A1X	4	E
TNCG15	Advanced Global Illumination and Rendering	6	A1X	4	E
TNM067	Scientific Visualization	6	A1X	3	E
TNM095	Artificial Intelligence for Interactive Media	6	A1X	2	E
TSEA26	Design of Embedded DSP Processor	6	A1X	1	E
TSIN01	Information Networks	6	A1X	3	E
TSIT03	Cryptology	6	A1X	2	E
TSKS02	Telecommunication	6	G2X	1	E
TSKS12	Modern Channel Coding, Inference and Learning	6	A1X	1	E
TSTE86	Digital Integrated Circuits	6	A1X	2	E
Period 2					



Course code	Course name	Credits	Level	Timetable module	ECV
TDDD89	Scientific Method	6	A1X	3	С
TATA55	Abstract Algebra	6	G2X	3	E
TBMI19	Medical Information Systems	6	A1X	3	E
TDDB44	Compiler Construction	6	A1X	1	E
TDDC88	Software Engineering	12	A1X	1	E
TDDC90	Software Security	6	A1X	1	E
TDDD38	Advanced Programming in C++	6	A1X	-	E
TDDD43	Advanced Data Models and Databases	6	A1X	2	E
TDDD56	Multicore and GPU Programming	6	A1X	2	E
TDDE13	Multi Agent Systems	6	A1X	1	E
TDDE16	Text Mining	6	A1X	2	E
TDDE19	Advanced Project Course - AI and Machine Learning	6	A1X	4	E
TDDE21	Advanced Project Course: Secure Distributed and Embedded Systems	6	A1X	4	E
TNM086	Virtual Reality Techniques	6	A1X	2	E
TSIN02	Internetworking	6	A1N	1	E
TSKS02	Telecommunication	6	G2X	2	E

#### Semester 4 (Spring 2018)

Course name	Credits	Level	Timetable module	ECV
Degree project - Master's Thesis	30*	A1X	-	С
Degree project - Master's Thesis	30*	A1X	-	С
	Degree project - Master's Thesis	Degree project - Master's Thesis 30*	Degree project - Master's Thesis 30* A1X	Course name Credits Level Instants module   Degree project - Master's Thesis 30* A1X -

ECV = Elective / Compulsory /Voluntary \*The course is divided into several semesters and/or periods

