

Computer Science and Software Engineering education @LUT

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Contents

- LUT School of Business and Management
- CS & SWE Education
 - B.Sc programme
 - M.Sc programmes
 - International programmes



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CS & SWE Education

- Degree programme in Computer Science from 1987
 - Focus on Software Engineering
- Accredited BSc and MSc programmes
 - ASIIN, EQUANIE
- International programmes
 - PERCCOM
 - Double degree programmes, MSc and PhD



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Focus and Goals



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- The CS programmes educate software engineering centric workers, leaders and experts
 - Our graduates will have good knowledge and skills on software engineering theories and practice
 - Our graduates will be entrepreneurial and collaborative problem solvers
 - Our graduates will be able to communicate effectively
 - Our graduates will be sustainability oriented ethical project managers and experts
- BSc focus: The Bachelors graduated from the programme are able to **participate in software projects as developers**
- MSc focus: The Masters graduated from the programme are able to **participate in software projects in the role of an expert or as a leader**

BSc programme



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- Bachelor's programme provides a "general" degree enabling further specialization
- Focus on general Computer Science
- Implemented in close collaboration with Industrial Engineering and Management programme

<i>BSc 180 ects</i>	<i>vsk 1 / ects</i>	<i>vsk 2 / ects</i>	<i>vsk 3 / ects</i>	<i>Total</i>
General studies	55	32	2	89
Major studies	5	10	35	50
Minor Studies	0	18	12	30
Elective studies	0	0	11	11
<i>Total</i>	60	60	60	180

MSc programmes



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- Master's Programme in Computer Science
 - Default for our own BSc graduates and open for international students
 - Major: Software Engineering
- Double Degree Programme in Computer Science
 - Open for students from the double degree partners
 - Cooperation between the two universities (education, research)
 - 60/60 model in education
 - 1 year of studies at home university, 1 year of studies at LUT
 - Predefined set of courses to assure timely graduation
- Erasmus Mundus PERCCOM
 - European Erasmus funded programme on Green IT and Sustainable Computing
 - France, Finland, Russia, Sweden

MSc educational themes



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- First year fall: Analyze
 - Learning objectives: Research methods, problem analysis, project planning and management, literature review
- First year spring: Design and Implement
 - Learning objectives: Design, implement, taking a special requirement into account – sustainability
- Second year fall: Innovate
 - Learning objectives: Design, Innovate, Implement
- Second year spring: Thesis
 - Learning objectives: Synthesis of all studies as the Master's thesis

Basic Degree Structure



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- Master of Science (Technology) 120 ECTS cr

<i>MSc 120 ects</i>	<i>Year 1 / ects</i>	<i>Year 2 / ects</i>	<i>Total</i>
General studies	15	0	15
Major studies	35	40	75
Minor studies	5	15	20
Elective studies	5	5	10
<i>Total</i>	60	60	120

Main elements



Core studies

<i>Obligatory (ECTS cr)</i>	<i>year</i>	<i>ECTS</i>
CT10A0015 Introduction to M.Sc. Studies in Computer Science	M.Sc. 1	1
CT10A9510 Research Methods in Software Engineering	M.Sc. 1	6
CT60A7500 Object-Oriented Programming Techniques	M.Sc. 1	6
CT60A5300 Software projects, processes, and entrepreneurship	M.Sc. 1	6
CT10A7010 Running a Software Project	M.Sc. 1	3
FV11A9800 Academic Writing in English Course 1	M.Sc. 1	2
FV11A9900 Academic Writing in English Course 2	M.Sc. 1	2
FV18A9101 ^(*) Finnish 1		2

Specialisation studies: Software Engineering

<i>Obligatory Studies (ECTS cr)</i>	<i>year</i>	<i>ECTS</i>
CT30A8903 Software Systems as a Service: Technology and Engineering	M.Sc. 2	6
CT60A5101 Models and Methods of Software Engineering	M.Sc. 1	6
CT10A6001 Master's Thesis	M.Sc. 2	30

<i>Elective Studies</i>		<i>year</i>	<i>ECTS</i>
CT10A7001 ⁽¹⁾	Green IT and Sustainable Computing	M.Sc. 1-2	6
CT30A8920	User and design research in software engineering	M.Sc. 1	6
CT10A9520	Research Project in Software Engineering	M.Sc. 1	1-10
CT60A7321	Software Business Development	M.Sc. 1-2	6
CS30A7401	Software and Application Innovation	M.Sc. 2	6
CT30A5002	Games and Networking	M.Sc. 1	6
CT60A7201	Architecture in Systems and Software Development	M.Sc. 1	7
CT60A5400	Fundamentals of Game Development	M.Sc. 1	6
CT10A7020	Personal Literature Study	M.Sc. 1-2	1-6
CT10A7030	Personal Design Science Study	M.Sc. 1-2	1-10
CT10A7040	Code Camp	M.Sc. 1-2	1-5
CT10A7061	Visitor's Viewpoint on Software Engineering	M.Sc. 1-2	1-6
CT60A7101	Seminar on Software Engineering	M.Sc. 1	6
BL40A1000	Real-time Operating Systems and Programs	M.Sc. 2	5
BL40A1100	Embedded System Programming	M.Sc. 1	4
BM40A0000	International Summer School in Novel Computing	M.Sc. 2	1-3

Graduates and Intake



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– Graduates

	2015	2016
BSc	23	28
MSc	38	43

– Intake

	2015	2016	2017
BSc	30	30	30
MSc	50	50	50

PERCCOM: International programme in Green ICT



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- Erasmus Mundus (Erasmus+)
 - The European Union's programme that aims to enhance quality in higher education through **scholarships** and **academic cooperation** between Europe and the rest of the world.
- PERCCOM 2013-
 - The Erasmus Mundus Master program in Pervasive Computing and Communications for Sustainable Development aims at combining advanced Information and Communication Technologies (ICT) with environmental awareness to enable world-class education and unique competences for ICT professionals who can build cleaner, greener, more resource and energy efficient cyber-physical systems.

PERCCOM: Agenda



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- Semester 1 : **Eco-design and Green networking** (University of Lorraine, France)
- Semester 2 : **Green software and services, Green computing** (Lappeenranta University of Technology, Finland and St Petersburg University of ITMO, Russia)
- Semester 3 : **Smart systems** (Luleå University of Technology, Sweden)
- Semester 4 : Master Thesis (*Academia*: Leeds, Bremen, Harz, CSIRO, ... *Companies*: Orange, Cisco, Ericsson,... *Associations* : Ellen Mac Arthur Foundation, Fondaterra)

Triple degree programme, diploma supplement approach

Double degree programmes



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- Goals
 - Improved outcome
 - Efficient education
 - Benefits for all stakeholders
- Double degree programmes should use best parts of both party and to create something bigger than the sum of the elements
 - Fitting programmes together
 - Extending programmes
- Extension to PhD level

Programme development



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- Content development
 - Streamlining MSc level courses
 - Collaboration in LUT considering LBM mission
- Process development
 - Improving the efficiency
 - PBL and other approaches
 - Data based continuous improvement
- Collaboration development