AALBORG UNIVERSITET

MASTER OF INFORMATION AND COMMUNICATION TECHNOLOGIES, 2016

MASTER
COPENHAGEN

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Curriculum for the Master of Information and Communication Technologies, 2020

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§ 1: PREFACE

Pursuant to Act 261 of March 18, 2015 on Universities (the University Act) with subsequent changes, the following curriculum for the Master programme in Information and Communication Technologies (MICT) is stipulated. The programme also follows the Joint programme regulations and the Examination Policies and Procedures for the Faculty of IT and Design.

§ 2: BASIS IN MINISTERIAL ORDERS

The Professional Master's Degree programme is organised in accordance with the Ministry of Science's Order no. 1187 of December 7, 2009 on Professional Master's Degree Programmes, Ministerial order no. 1188 of 7. December 2009 (the Part-Time Order), and Ministerial Order no. 1062 of June 30, 2016 on University Examinations (the Examination Order). Further reference is made to Ministerial Order no. 114 of February 3, 2015 (the Grading Scale Order) with subsequent changes.

§ 3: CAMPUS

The programme is offered in Copenhagen.

§ 4: FACULTY AFFILIATION

The Master programme falls under the Technical Faculty of IT and Design, Aalborg University (AAU).

§ 5: STUDY BOARD AFFILIATION

The Master programme falls under the Board of Studies for Electronics and IT.

§ 6: AFFILIATION TO CORPS OF EXTERNAL EXAMINERS

The Master programme is associated with the body of external examiners for engineering educations: electro (in Danish: censorkorps for Ingeniøruddannelsernes landsdækkende censorkorps; elektro).

§ 7: ADMISSION REQUIREMENTS

Admission to the master programme in ICT (MICT) presupposes a relevant higher education at least at bachelor level and at least 2 years of relevant professional experience pursuant to the completion of a qualifying exam.

Relevant bachelor educations are:

- Bachelor of science (BSc) or Bachelor of Engineering ("diplomingeniør") degree within the fields of IT, Communication or electronics.
- Bachelor degree within the area of Computer Science or Software Technologies

or other relevant education within technical IT.

Aalborg University can provide access to the study for candidates who do not meet the academic conditions of access, but who are considered to have the necessary prerequisites to accomplish this. The requirements of relevant professional experience cannot be exempted.

§ 8: THE PROGRAMME TITLE IN DANISH AND ENGLISH

The master programme entitles students to the title:

- Master i informations- og kommunikationsteknologier / Master of Information and Communication Technologies

§ 9: PROGRAMME SPECIFICATIONS IN ECTS CREDITS

The education is the equivalent of a one-year full-time study (60 ECTS) offered as: a) two years of part-time study or b) three years of part-time study. Invididual modules of the programme can also be followed to the extent that the necessary prerequisites are met.

The study form consists of courses as well as project work, individually and in groups.

§ 10: RULES CONCERNING CREDIT TRANSFER (MERIT), INCLUDING THE POSSIBILITY FOR CHOICE OF MODULES THAT ARE PART OF ANOTHER PROGRAMME AT A UNIVERSITY IN DENMARK OR ABROAD

The Study Board can approve that passed programme elements from other educational programmes at the same level replaces programme elements within this programme (credit transfer).

Furthermore, the Study Board can, upon application, approve that parts of this programme is completed at another university or a further education institution in Denmark or abroad (pre-approval of credit transfer).

The Study Board's decisions regarding credit transfer are based on an academic assessment.

§ 11: EXEMPTION

The Study Board's possibilities to grant exemption, including exemption to further examination attempts and special examination conditions, are stated in the Examination Policies and Procedures published at this website: https://www.studieservice.aau.dk/regler-vejledninger

§ 12: RULES FOR EXAMINATIONS

The rules for examinations are stated in the Examination Policies and Procedures published at this website: https://www.studieservice.aau.dk/regler-vejledninger

§ 13: RULES CONCERNING WRITTEN WORK

In the assessment of all written work, regardless of the language it is written in, weight is also given to the student's formulation and spelling ability, in addition to the academic content. Orthographic and grammatical correctness as well as stylistic proficiency are taken as a basis for the evaluation of language performance. Language performance must always be included as an independent dimension of the total evaluation. However, no examination can be assessed as 'Pass' on the basis of good language performance alone; similarly, an examination normally cannot be assessed as 'Fail' on the basis of poor language performance alone.

The Board of Studies can grant exemption from this in special cases (e.g., dyslexia or a native language other than Danish).

The Master's project must include an English summary. If the project is written in English, the summary can be in Danish. The summary is included in the evaluation of the project as a whole.

§ 14: REQUIREMENTS REGARDING THE READING OF TEXTS IN A FOREIGN LANGUAGE

It is assumed that the student can read academic texts in his or hor native language as well as in English and use referance works etc.

§ 15: COMPETENCE PROFILE ON THE DIPLOMA

The following competence profile will be given in the diploma:

A graduate of the Master programme has competencies acquired through the course of an educational programme based in the integration of research results and practical experiences.

The graduate of the Master programme can through scientifically grounded personal and professional competencies perform highly qualified functions inthe labor market.

§ 16: COMPETENCE PROFILE OF THE PROGRAMME

Knowledge:

- has knowledge on information and communication technologies (ICT) that is based on the highest level of international research
- has in-depth knowledge and understanding of issues within the areas: service development, ICT infrastructures, markets and business models
- can understand and, on a scientific basis, reflect on the technical, organizational and market drivers in the convergence of ICT as well as the interplay between technology, market and user issues
- can reflect on the knowledge, theory, methodologies and practice within the field of ICT, and identify scientific issues

- understands the importance of innovation, creativity and entrepreneurship for ICT solutions and services
- understands the relevance of the needs of the end users, their use of ICT, and the mechanisms that influence the user experience and the acceptance of new technologies
- has a holistic understanding of the environment of ICT services and solutions: Scenarios of use, target users, stakeholders, business aspects, etc.
- Depending on the track:
  - mICT-MII 1) : has understanding of the work processes and process optimisations in the companies
  - mICT-MII: has understanding of cognitive psychology theories that are relevant for product and service design
  - mICT-ISP 2) : has knowledge about future Internet both from a network and a service architecture perspective
  - mICT-ISP: has knowledge about development tools for ICT and media services
  - mICT-CIS 3): has an overall knowledge about the latest cyber security and cybercrime law including regulation on personal data and privacy
  - MICT-CIS: has knowledge about latest cyber threats and possible tools to mitigate those threats.

Skills:

- excels in scientific methods, tools and general skills within the field of communication technologies and markets,
- can evaluate and select among relevant scientific theories, methods, tools and general skills and, on a scientific basis, advance new analyses and solutions within the subject areas
- can communicate research-based knowledge and discuss professional and scientific problems with both peers and non-specialists
- excels in scientific writing: Articles, reports, documentation, etc.
- can identify and select among relevant standards, technologies and methods for development of ICT solutions and services
- can assess and compare different technologies for optimal technology selection, strategic decisions and business development
- can assess the market, ethical and regulatory framework for application of the technologies.
- can develop innovative services, applications and solutions at a conceptual level, which are relevant in a user perspective.
- can assess the implications and business potential of new ICT solutions and services and develop viable business models
- depending on the track:
  - mICT-MII: are able to optimise the service and product development processes within the companies
  - mICT-ISP: can develop prototypes or demonstrators of viable ICT solutions and services, based on in-depth analysis of user requirements, technology and market issues and using state-ofthe-art methods, technologies and tools
  - MICT-CIS: are able to assist technical designers in design and development of secure software solutions for enterprises keeping cyber security challenges and legal perspectives in mind.

Competences:

- can manage work and development situations that are complex, unpredictable and require new solutions
- can independently initiate and implement discipline-specific and interdisciplinary cooperation and assume professional responsibility
- can independently take responsibility for own professional development and specialization
- has competencies in project work and problem based learning in a global/multicultural environment
- has competencies in business development in a holistic perspective, based on a thorough understanding of the interplay between technology, market and users in ICT and media
- can contribute creatively and innovatively to identify and propose new business opportunities and develop services/solutions, which can empower the users and assist them in solving their current and future tasks on a daily basis
- can mediate collaboration and exchange between development- and business-related functions in organizations

1) mICT-MII: Management of ICT Innovations
2) mICT-ISP: ICT Services and Platforms

3) mICT-CIS: ICT Cyber and Information Security

§ 17: STRUCTURE AND CONTENTS OF THE PROGRAMME

The programme is structured in modules and organized as a problem-based study. A module is a programme element or a group of programme elements, which aims to give students a set of professional skills within a fixed time frame specified in ECTS credits, and concluding with one or more examinations within specific exam periods. Examinations are defined in the curriculum.

The programme is based on a combination of academic, problem-oriented and interdisciplinary approaches and organized based on the following work and evaluation methods that combine skills and reflection:

- lectures
- classroom instruction
- project work
- workshops
- exercises (individually and in groups)
- teacher feedback
- self-study
- reflection
- portfolio work

Furthermore, in this programme advanced teaching and learning tools, including E-learning and video conferencing tools will be used intensively.

§ 18: OVERVIEW OF THE PROGRAMME

Within the mICT programme three tracks are offered:

- ICT Services and Platforms (mICT-ISP)
- Management of ICT Innovations (mICT-MII)
- ICT Cyber and Information Security (mICT-CIS)

All tracks have the interdisciplinary approach combining the above mentioned academic areas. The mICT-ISP track has a more technical focus and provides theories, tools and methods for development of ICT and media services while the mICT-MII track has a more managerial focus and includes the theories, methods and tools for understanding the business processes and service design. And mICT-CIS track focuses on cyber security and crime from a technological and law perspective.

An overview of the curriculum is depicted in Table 1.

Throughout the education 3 main academic areas are covered:

- Networks and services
- Design and users
- Market and business

These are depicted in the main rows of Table 1.

The education is provided in 3 trimesters, where a trimester in the part time (two years) version is equivalent to 8 months and in the part time (three years) version is equivalent to one year.

Each trimester has a topic, which is depicted in the main columns of Table 1.

The project work in the 3rd trimester of the education constitutes the final project work and has a workload of 15 ECTS points. The final thesis project will be carried out either individually or in groups. If the final project is done in groups the

preferable size for a group is 2 and the maximum size is 3. Each student will be given an individual mark according to the 7-point scale.

Individual examinations will take place in all courses. The examinations will be either oral or written exams. The evaluation form is indicated in the course descriptions.

The 60 ECTS include:

- 25 ECTS courses
- 35 ECTS projects

25 ECTS will be evaluated with external examiner. This includes the project in the first trimester and the final thesis project.

In Table 1 it is indicated which courses belong to mICT-ISP, mICT-MII and mICT-CIS tracks. Also courses common for all tracks are indicated in the table. Furthermore in the 3rd trimester two elective courses are offered.

	1st trimester Theme: ISP: Services and platforms MII: Organizations and Innovations CIS: Enterprises Cyber Security			2nd trimester Theme: ISP: Application development MII: Design and Innovation CIS: Privacy & Security frameworks in Organizations			3rd trimester Theme: Master Project		
	Course Title	ECTS	Track	Course title	ECTS	Track	Course title	ECTS	Track
Networks and services	Communication technologies and service architectures	5	ISP	Development of ICT and media services	5	ISP	Identity and access management	5	Elective
				Cyber security and trust	5	CIS			
Design & Users				Interaction design	5	All*			
				Cognitive Psychology	5	MII			
Market and business	Entrepreneurship, Innovation and Business Models	5	All*				Markets, regulation and standardization	5	Elective
	Technology Management and Business Processes	5	MII						
	Cybercrime and Information Security Law	5	CIS						
Project (ECTS)		10			10			15	

*) These courses are common for all tracks

**) Only one of the elective cources can be selected for the third trimester

Offered as: 1-professional

Study programme: ICT Service and Platforms (mICT-ISP)

Module name	Course type	ECTS	Applied grading scale	Evaluation method	Assessment method	Language
1 SEMESTER						
Services and Platforms	Project	10	7-point grading scale	External examination	Oral exam based on a project	English
Entrepreneurship, Innovation and Business Models	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Communication Technologies and Service Architectures	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
2 SEMESTER						
Application Development	Project	10	7-point grading scale	Internal examination	Oral exam based on a project	English
Interaction Design	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Development of ICT and Media Services	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
3 SEMESTER						
Master's Thesis	Project	15	7-point grading scale	External examination	Oral exam based on a project	English
Elective course module package Choose 1 course module	Course	5				

Offered as: 1-professional

Study programme: Management of ICT Innovations (mICT-MII)

Module name	Course type	ECTS	Applied grading scale	Evaluation method	Assessment method	Language
1 SEMESTER						
Organizations and Innovations	Project	10	7-point grading scale	External examination	Oral exam based on a project	English
Entrepreneurship, Innovation and Business Models	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Technology Management and Business Processes	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
2 SEMESTER						
Design and Innovation	Project	10	7-point grading scale	Internal examination	Oral exam based on a project	English
Interaction Design	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Cognitive Psychology	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
3 SEMESTER						
Master's Thesis	Project	15	7-point grading scale	External examination	Oral exam based on a project	English
Elective course module package Choose 1 course module		5				

Offered as: Study programme: ICT Cyber and Information Security (mICT-CIS)						
Module name	Course type	ECTS	Applied grading scale	Evaluation method	Assessment method	Language
1 SEMESTER						
Enterprises Cyber Security	Project	10	7-point grading scale	External examination	Oral exam based on a project	English
Entrepreneurship, Innovation and Business Models	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Cybercrime and Information Security Law	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
2 SEMESTER						
Privacy & Security frameworks in Organizations	Project	10	7-point grading scale	Internal examination	Oral exam based on a project	English
Interaction Design	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Cyber Security and Trust	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
3 SEMESTER						
Master's Thesis	Project	15	7-point grading scale	External examination	Oral exam based on a project	English
Elective course module package Choose 1 course module	Course	5				

Elective course module package Choose 1 course module						
Module name	Course type	ECTS	Applied grading scale	Evaluation Method	Assessment method	Language
Markets, Regulation and Standardization	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Identity and Access Management	Course	5	7-point grading scale	Internal examination	Written or oral exam	English

§ 19: ADDITIONAL INFORMATION

§ 20: COMMENCEMENT AND TRANSITIONAL RULES

The curriculum adopted by the Study Board of Electronics and IT and approved by the Dean of the Faculty of Engineering and Science and comes into force on 01.09.2016.

Students who wish to complete their studies under the previous curriculum from the Master in Information and Communication Technologies must conclude their education by the summer examination period 2017 at the latest, since examinations under the previous curriculum are not offered after this time.

§ 21: AMENDMENTS TO THE CURRICULUM AND REGULATIONS

Minor editorial changes have been made in connection with the digitisation of the study curriculum.