PROGRAMME SYLLABUS

User Experience Design and IT Architecture (master), 120 credits

Programmestart: Autumn 2020

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Programme code:	TAIU7	**Programmestart:**	Autumn 2020
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Version:	4		

Title of qualification
Degree of Master (120 credits) with a major in Informatics, specialisation in User Experience Design and IT Architecture

Programme overview
Background
Personal devices such as tablets, smartphones, and wearables are replacing desktop computers at the workplace and in the home. Work is often done on the go, in a mobile and ever changing environment – switching from one device to another and moving first from the office to the bus stop, and then home.

Since the emergence of the iPhone, user experience design has become central to making our interactions with all kinds of digital devices functional, productive, and inspiring – thus raising expectations when we use business IT systems. IT architectures fuel cross-channel, mobile, and cloud-based solutions. Companies and individuals move their data to the cloud, they use software as a service, and they engage both socially and commercially via the Internet. Meanwhile, in the workplace, manufacturers have introduced intelligent robotics to automate production.

The underlying information systems supporting this shift are changing too, introducing new constraints and goals. This requires a new mindset, a rethinking of the way IT solutions are designed and architected to transform enterprise objectives into a creative user experience and to deliver a supportive IT architecture.

Objectives
The Masters programme is intended for students with a bachelor in informatics, computer science, computer engineering, interaction design or similar who want to study user experience design and IT architecture as the driving forces for creation of usable products and services that can best achieve an expected impact in an organisational context.

This masters will equip you with knowledge and skills to tackle the challenge of transforming enterprise objectives into a creative user experience and delivering a supportive IT architecture. You will learn user experience design, IT architecture and enterprise architecture. You will be able to design and develop mobile and server-side solutions, and master the fundamentals of service design and cloud computing.

Post-graduation employment areas

The programme prepares the students for work in industry or for third-cycle courses and study programmes. With the experience provided by the programme, students will be able to work in a number of various positions after their graduation. Students will be qualified to work in different roles such as user experience designer, interaction designer, information architect, cloud solution architect, or after accumulating relevant work experiance as enterprise architech, IT architect or IT strategist.

Students will also be prepared for doctoral studies.

Research

A Masters degree qualifies to apply for further third-cycle education leading to a licentiate or doctoral degree.

Programme Supporting Research

The master's programme is grounded in the research areas at the Department of Computer Science and Informatics: human-computer interaction, enterprise architecture, and data analytics artificial intelligence.

Human-computer interaction is a discipline that concerns with how humans use and are affected by information technologies, and to create solutions to problems that are both accessible and useful for in everyday life. As technologies are becoming increasingly pervasive and ubiquitous, almost every aspect in modern life involves the interaction with technologies in some way. Hence, this makes the area a multi- and interdisciplinary field of study that draws on principles from different fields such as computer science, psychology, arts, and many more.

In product driven enterprise architecture the research aims at enterprise improvement through the combination of Product-IT and Enterprise-IT and knowledge intensive products/services. Emerging new products and services require a tight integration of what often is separated in many enterprises into enterprise-IT (i.e. the IT supporting business and administrative parts) and product-IT (i.e., what is built into the products or supporting industrial automation). One of the main tools for working in this area is enterprise modelling or business modelling where methods and theories are developed.

The exponential growth of the digital society, particularly in the form of storage and computing power in recent decades, enables companies to accumulate vast amounts of data at a moderate cost. Accompanying this technological shift is a widespread realisation that the collected data contain potentially valuable information. Exploiting this stored data, in order to extract useful and actionable information, is the overall goal of the generic activity termed data analytics. Data analytics focuses on developing machine learning algorithms for data analytics. The newly established Jönköping AI Lab (JAIL) carries out interdisciplinary and applied AI-research in collaboration with the surrounding society and industry. JAIL focuses on developing and applying theory and methods from data mining, machine learning, and semantic technologies.

Educational concept at the School of Engineering

All degree programmes at the School of Engineering at Jönköping University (JTH) follow an education concept. The concept can be seen as consisting of a number of different aspects that have to be included in the degree programmes in order to guarantee their quality and appeal as well as their ability to produce professionally skilled, in-demand students. The concept places special emphasis on collaboration with industry and internationalisation as two essential tools in developing successful programmes attracting many applicants.

In the concept for the Master's programmes, there are common learning outcomes regarding the areas leadership, project management, internationalisation, and sustainable development. There is also an Industrial Placement Course (IPC) included in all programmes, whereby students put their theoretical knowledge into practice. IPC is a 7,5 credit course (5 weeks practise at a company), and it is also possible to complete the course abroad.

Internationalisation means that, for example, the opportunity is provided to practise languages and intercultural communication through student exchanges with foreign universities. JTH has around 70 partner universities around the world, and takes part in a number of international student exchange programmes. There is an opportunity to spend part of the study period abroad and to accredit studies abroad towards the degree. All Master's programmes at JTH are given completely in English.

Objectives
After the completion of the programme, students must meet the intended learning outcomes, as described in the Higher Education Ordinance by Degree of Master, (1-9) and also the intended learning outcomes, as described by JTH:

Common learning outcomes

Knowledge and understanding

1. demonstrate knowledge and understanding in the main field of study, including both broad knowledge of the field and a considerable degree of specialised knowledge in certain areas of the field as well as insight into current research and development work
2. demonstrate specialised methodological knowledge in the main field of study

Skills and Abilities

3. demonstrate the ability to critically and systematically integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations even with limited information
4. demonstrate the ability to identify and formulate issues critically, autonomously and creatively as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames and so contribute to the formation of knowledge as well as the ability to evaluate this work
5. demonstrate the ability in speech and writing both nationally and internationally to clearly report and discuss his or her conclusions and the knowledge and arguments on which they are based in dialogue with different audiences
6. demonstrate the skills required for participation in research and development work or autonomous employment in some other qualified capacity

JTH. prove ability to apply acquired knowledge in practical work

JTH. prove ability to collaborate effectively in teams, especially in the presence of a strong multicultural dimension

Judgement and Approach

7. demonstrate the ability to make assessments in the main field of study informed by relevant disciplinary, social and ethical issues and also to demonstrate awareness of ethical aspects of research and development work
8. demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used
9. demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning

JTH. prove understanding of future professional engineering roles, including a sound awareness of an engineer's ethical responsibilities towards society and the need for economic, social and ecological sustainable development

JTH. prove ability to embrace interdisciplinary approaches through the application of a system perspective

Programme-specific learning outcomes
Upon completion of the program, the intended learning outcomes provided for programme must also be met.

Knowledge and Understanding
10. display knowledge of the concepts and techniques of user experience design, cross-channel design and service design,
11. demonstrate comprehension of information architecture, information structuring and information modelling,
12. demonstrate comprehension of enterprise architecture, information system architecture and technology architecture,
13. demonstrate comprehension of the value of IT and the importance of its governance in organizations

Skills and Abilities
14. demonstrate skills of managing a design process for products or services that results in a good user experience on different Web and mobile platforms,
15. demonstrate the ability to use semantic technologies and open data in an information product,
16. demonstrate the ability to create a cross-platform mobile application and a service-based server application,
17. demonstrate skills of creating a model of enterprise architecture and a high-level requirements specification based on an enterprise architecture
18. demonstrate the ability to work in cross-discipline teams during development of a product for the needs of specific users, organizations, or businesses,

Judgement and Approach
19. demonstrate the ability to make asessment of how the role of usability, user needs, information architecture, channels, and services contribute to a successful user experience
20. demonstrate the ability to ground the design of services within a business strategy and its deployment through an IT infrastructure,
21. demonstrate an insight into how enterprise architecture and IT architecture can contribute to business and IT alignment

Contents
Programme principles
Instruction is in the form of lectures, seminars, exercises, laboratory sessions and project work. All courses are held in English. All final course examinations are in English.

The programme includes collabortation with other Masters programmes in a number of areas of common interest. Design Philosophy and Practice is given jointly with the Master's Industrial Design. Three courses (Product Development in Cross-discipline Teams 1 & 2, and Data Science are common with the Master's Programme AI Engineering.

The teaching approach in the programme is based on learning from real-life scenarios and group learning to a large extent. Lectures and labs ofthen include examples from real projects, which put the theoretical matreial inLto a practical context. In course assignments students work in groups of several members to independently plan and carry out the solution of an assignment that is based on a real-life case. This lays the ground for learning communication and leadership in a group. The resulting solution is reported in both written and oral form.

The problem-based learning is in the focus of the course Product Development in Cross-discipline Teams. The aim is to develop a product for a customer. Each project team independently works on a number of problems connected to the product during the develpoment process. The scenario for the product may originatefrom an external company or organisation, from a need internal to the University, or from an original idea from the students. The product is

developed through an Agile lifecycle, with clearly defined intermediate deliverable points.

The programme includes an independent degree project representing 30 higher education credits, in which students, individually or in groups of two students, prepare and present an assignment in the field of study of User Experience Design and IT Architecture, applying the knowledge accumulated during the programme and demonstrating the acquired skills. The degree project is as a rule carried out during the last term of the programme and preferably in close collaboration with a company or an organisation. The degree project might be also done at a foreign university, possibly in cooperation with local business.

Programme progression

The programmes' progression goes along three themes: design, technology, and business. The course Design Philosophy and Practice paves the way for design thinking and creativity, which form the ground for user experience design. The course User Experience Design continues with the theoretical foundations of user experience, and details the core hands-on principles, methods, techniques, and deliverables that form the foundations of a sound design process. The resulting design process offers a user-centered approach not only to Web applications but also to mobile and wearable apps as well as to more traditional information systems. The design theme is continued in the course Development for Mobile, Wearable and Smart Devices, which starts with high-fidelity prototypes and wire-frames for mobile and wearable devices, and then proceeds with the design for smart devices and for the technology of connected devices. The course Next Generation Web builds upon the previous ones and details the role of information architecture as a meaning-making structure and explains methods and techniques for modelling and structuring information including standard vocabularies and schemas.

The technology theme starts in the course Data Science with techniques that provide insights into data about visitors of a web page or users of an application and how this can help to improve the application. The course Next Generation Web introduces linking to open datasets on the web as a means to enrich the information architecture of a digital product. Creation of semantic models and querying datasets are covered next to allow for richer semantic description to be included in an application. The course Development for Mobile, Wearable and Smart Devices proceeds with cross-platform development of mobile applications with the help of mobile application frameworks and libraries based on JavaScript, HTML and CSS.

The business theme is encompassed in the course Design of Smart Enterprises that provides the knowledge and skills of applying a holistic and systemic perspective on enterprises and enterprise architecture. The course explains how business objectives, technology developments and human needs meet in the enterprise design proceess. Enterprise Architecture Management is introduced as one of the key activities to keep the IT of an organization aligned with the business challenges and activities. Creating an enterprise architecture can help to specify IT solutions.

There are several courses that are cross-discipline but the real synergy of the three themes is leveraged in the course Product Development in Cross-discipline Teams (parts 1 & 2). This course focuses on development of a product in a real-life-like scenario. The scenario may originate from an external company or organisation, from a need internal to the University, or from an original idea from the students. The course draws upon the rest of the programme and puts into a joint action the skills from the areas of design, technology, and business. It requires analysis of a business to identify goals and process to be supported by an IT solution, be it a simple web app or enterprise system, transformation of the goals into design providing engaging user experience, and creation of an IT solution prototype based on the design.

The Industrial Placement course gives the students possibility to apply their knowledge and skills to practical problems. During a degree project the students need to enhance and deepen their knowledge on modern trends and discoveries in User Experience Design and IT Architecture as well as contribute with their own results to these areas. This requires abilities to understand the problem, compare different solutions to the problem, choose an appropriate solution and estimate the effect of this solution on the business.

Courses

Mandatory courses

Course Name	Credits	Main field of study	Specialised in	Course Code
Data Science	7.5	Informatics	A1N	TDSR29
Design of Smart Enterprises	7.5	Informatics	A1N	TSF428
Design Philosophy and Practice (Human Factors 1)	6	Product Development	A1N	TDPR29
Development for Mobile, Wearable and Smart Devices	7.5	Informatics	A1N	TDWR29
Final Project Work in Informatics	30	Informatics	A2E	TEIV25
Industrial Product Realization in Collaboration	6	Production Systems, Product Development	A1N	TIPR28
Next Generation Web	9	Informatics	A1F	TNWS20
Product Development in Cross-discipline Teams – 1	3	Informatics, Product Development	A1F	TP1S29
Product Development in Cross-discipline Teams - 2	6	Informatics, Product Development	A1F	TP2S20
Research Methods	7.5	Informatics	A1N	TRER20
User Experience Design	7.5	Informatics	A1N	TUER29
Web Personalization	7.5	Informatics	A1F	TWPS20

Elective credits
The programme curriculum includes 15 credits of elective courses in the areas Informatics, Computer Engineering, Business Administration, Production Systems, or Mathematics. The elective courses are selected by a student.

Several examples of course that are given by Jönköping University are (note that these courses may be not given every year):
Artificial Intelligence 7,5 Credits (Informatics)
Consumer Behavior 7,5 Credits (Business Administration)
Client-Server Communication 7,5 Credits (Informatics)
Industrial Placement Course 7,5 Credits (Informatics)
Human Factors Engineering 7,5 Credits (Production Systems)
Digital Entrepreneurship 7,5 Credits (Business Administration)
iOS Development 7,5 Credits (Computer Engineering)

Programme overview

Year 1

Semester 1		Semester 2	
Period 1	Period 2	Period 3	Period 4
Design Philosophy and Practice (Human Factors 1), 6 credits	Data Science, 7.5 credits	Design of Smart Enterprises, 7.5 credits	Web Personalization, 7.5 credits
Industrial Product Realization in Collaboration, 6 credits	Product Development in Cross-discipline Teams – 1, 3 credits	Next Generation Web, 9 credits	
	User Experience Design, 7.5 credits	Product Development in Cross-discipline Teams - 2, 6 credits	

Year 2

Semester 3		Semester 4	
Period 1	Period 2	Period 3	Period 4
Research Methods, 7.5 credits	Development for Mobile, Wearable and Smart Devices, 7.5 credits	Final Project Work in Informatics, 30 credits	
Optional credits, 15,00 credits			

Teaching and examination

Throughout the academic year, typically, two courses are taken in parallel. Examination forms and grades are given by each course module, respectively. The programme overview shows the programme structure for both years and may be changed during the programme. For updated programme overview visit http://www.ju.se

Prerequisites

The applicant must hold the minimum of a bachelor's degree (i.e the equivalent of 180 ECTS credits at an accredited university) with at least 90 ECTS credits in informatics, computer science, computer engineering, interaction design (with relevant courses in webprogramming), or equivalent. Proof of English proficiency is required.

Continuation Requirements

In order to begin the second year, at least 30 credits from the programme's first year must be completed.

Qualification Requirements

To obtain a Degree of Master (120 credits) with a major in Informatics, specialisation in User Experience Design and IT Architecture, students must complete a minimum of 120 credits in accordance with the current programme syllabus, at least 60 of which must be in the main field of Informatics.
In addition a Degree of Bachelor of Science in Engineering/Degree of Bachelor of Science or an equivalent Swedish or foreign qualification is required.

Quality Development

The School of Engineering's quality assurance process involves continuous development and quality assurance of degree programmes and courses. This means, among other things, that great importance is attributed to student feedback and that a proactive approach is taken to the development of degree programmes and courses. The quality assurance process is carried out following applicable steering documents.

Other Information

If formal competence is missing, the applicant's substantial competence is tested if the applicant has acquired equivalent knowledge in some other way. The aim is to assess the collective competence and if the applicant has the opportunity to meet selected training. Substantial competence can be about knowledge and experience from working life, long-term mobility or other courses.

Course included in the programme can be read as a separate course, subject to availability.
Prerequisites are stated in the syllabus.
Admission is under "Admission arrangements for first and second level" at Jönköping
University.

This syllabus is based on "Regulations and guidelines for education at undergraduate,
postgraduate and doctoral studies at Jönköping"