UNIVERSITÄT KLAGENFURT

Curriculum

for the Master's degree programme in

Informatics

Programme code UL 066 911

Effective date
October 1, 2019

Curriculum for the Master's degree programme in

Informatics

Table of Contents

Section 1 General

(1) The Master's degree programme in Informatics is equivalent to 120 ECTS credits. This equates to an anticipated study duration of four semesters. The Master's degree programme in Informatics is assigned to the group of engineering science degree programmes pursuant to Section 54 (1) of the Universities Act 2002 (UG).

(2) The workload for the individual course units is indicated in ECTS credits; the workload for one year should amount to 1,500 full hours, for which 60 ECTS credits are awarded (Section 54 (2) UG). The workload comprises independent study as well as the semester hours/contact hours, including participation in assessment procedures.

(3) The Master's degree programme in Informatics is taught in English.

Section 2 Competency profile

The competency profile describes the academic and professional qualifications that students gain by completing the degree programme.

(1) **Initial situation:** The main focus of the Master's degree programme in Informatics at the University of Klagenfurt is on Applied Informatics. The programme aims to qualify graduates for the top-quality development of computer-assisted solutions to problems, for the efficient and effective management of the problem-solving process, and for the design of the beneficial utilization of solutions, based on methods and techniques from informatics. Above all, this requires sound knowledge and expertise in the field of informatics, and a comprehensive understanding of economic interrelations, but it also demands extensive knowledge about possible fields of application. In informatics, software systems are usually developed in organisations and embedded into social systems. Consequently, additional methodological, social and personal skills are necessary for the successful realisation, introduction, and beneficial utilisation of informatics systems.

Furthermore, the field of informatics is characterised by highly dynamic development. The continuous improvement of methods and tools as well as the rapid succession of innovations in the areas of application represent significant challenges in terms of the qualification of graduates. It must be ensured that graduates can actively contribute to this process of improvement and innovation while also being able to update their knowledge in an autonomous and timely manner. This requires not only detailed knowledge about the fundamental concepts, interrelations, and insights gained in the field, upon which the methods and tools are based, but also the reinforcement of individual competencies such as self-organisation and creative drive. A combination of research, teaching and practical application provides ideal conditions for developing these competencies.

(2) **Skills to be gained:** Building on the initial situation, there are four main fields of competence in which students completing the Master's degree programme in Informatics gain specialised skills and expertise: 1) Specialised knowledge in informatics and in areas of application, 2) Individual and leadership skills, 3) Practical and research experience and problem-solving skills, and 4) Working scientifically. The skills and expertise to be gained are described below in the form of learning outcomes for each field of competence:

- *Specialised skills in informatics and in areas of application:* Specialist subjects in practical and theoretical informatics serve to expand skills and expertise in the core area of informatics. By choosing a specialist subject – characterised by an emphasis on research-oriented teaching – the students are introduced to the state of the art in terms of research and technology. The specialist subjects enable students to create and implement their own solutions and work scientifically in their chosen area as part of the Master's degree programme. If necessary, students can complete courses in supplementary subjects to gain specific relevant knowledge not previously acquired.
- *Individual and leadership skills:* Skills consolidation courses in particular prepare students not only for working scientifically, but also for predicting the consequences of technology. The skills and expertise gained allow students to research information autonomously, summarise that information in academic papers and present it. With these skills, students can critically question scientific findings, technical solutions and their impact on society. Gender knowledge and gender competencies can be acquired by attending courses in the elective subject of Feminist Science/Gender Studies (Section 5 (3)).
- *Practical or research experience and problem-solving skills:* Students have the opportunity to work on a project to gain in-depth project experience. Thus, they can gain intensive practical experience or impressions and experiences in the industrial or research projects in which they are involved. In this way, graduates boost their skills for solving a wide range of problems in business or administration, or when addressing research questions in the academic sphere.
- *Working scientifically:* Students deliver their first scientific achievements in the seminars for the specialist subject and the Master's thesis, and are thus introduced to working scientifically. The skills and expertise they gain enable students to research a subject autonomously, develop and evaluate solutions for research and practical questions, document the findings in an academic paper and present and discuss them.

(3) **Professional fields and fields of activity:** The graduates of the Master's degree programme in Informatics are experts in their specialist field with a comprehensive background in informatics. They are able to lead complex software development projects in small, medium-sized and large institutions, define novel problem solutions themselves and further develop the concepts, methods and tools of informatics or one of the areas of application. Following three years of relevant professional activity and the successful completion of the Civil Engineer examination, graduates of the Master's degree programme are entitled to work as chartered civil engineers in the field of informatics. The Master's degree programme also prepares graduates for a doctoral programme in informatics or computer science.

Section 3 Admission requirements

(1) The admission to the Master's degree programme is conditional on the successful completion of a relevant Bachelor's degree programme, a relevant university of applied sciences Bachelor's degree programme or other equivalent programme at a recognised Austrian or foreign post-secondary educational institution (Section 64 (3) UG). Examples of relevant programmes include the Bachelor's degree programme in Applied Informatics at the University of Klagenfurt, the Bachelor's degree programme in Informatics at the Universities of Vienna, Innsbruck, Linz and

Salzburg and Graz University of Technology and the Bachelor's degree programme in Software & Information Engineering at TU Wien.

(2) Students who have completed a Bachelor's degree programme in engineering science or an equivalent degree programme at another Austrian or foreign university, university of applied sciences or other recognised post-secondary educational institution not covered by Para. 1, are admitted to the Master's degree programme if they provide evidence of at least 75 ECTS credits from the core subjects for informatics. The following are examples of core subjects for informatics:

- Principles of applied informatics and software development
- Technical principles and system software
- Theoretical informatics
- Software engineering
- Databases and information systems
- Artificial intelligence, machine vision, language processing, pattern recognition
- Multimedia systems
- Computer architectures, computer networks, embedded systems
- Information and systems security and human-machine interaction

(3) If neither the prerequisites specified under Para. 1 nor Para. 2 are met and there are only a few areas where there is a lack of equivalency for the programme, the Rectorate may allow admission on the condition that the student passes certain examinations during the course of the Master's degree programme (Section 64 (3) UG).

(4) A distinction is made between two types of students admitted to the Master's degree programme:

(a) Type 1: Graduates of programmes/degree programmes according to Para 1, who have not completed any relevant work experience activities as part of their previous studies. These students can select both study variants I and II according to Section 5.

(b) Type 2: All other approved students must complete study variant II according to Section 5.

(5) Classification according to Para 4 and the supplementary subject which may need to be taken (Section 10) will be determined by the Programme Director following admission.

Section 4 Degree

Graduates of this Master's degree programme will be awarded the academic title "Diplom-Ingenieurin/Diplom-Ingenieur" (graduate of civil engineering, informatics; shortened to "Dipl.-Ing." or "DI"). If this title has been awarded, it must be placed before the graduate's name.

Section 5 Structure and organisation of the degree programme

(1) The required subjects, the specialist subject (elective) and the options must be completed as part of the Master's degree programme in Informatics. Two study variants are defined in relation to the completion of a project and/or a supplementary subject. Depending on the classification under Section 3 (4), these can be selected by the student or are specified:

- Study variant I: Project (incl. review)

- Study variant II: Supplementary subject.

In addition, a Master's thesis must be written and the associated research seminar must be completed.

Table 1 shows the structure of the Informatics Master's degree programme.

Table 1: Structure of the Informatics Master's degree programme

Subject	Designation	Intended learning outcomes	ECTS credits
Required subjects	1 Specialization in informatics	Students can: - Explain fundamental and advanced concepts and technology in the fields of data engineering, distributed computing infrastructures, software engineering, artificial intelligence and machine learning and compiler construction. - Devise, implement, test and measure complex programmes and distributed systems according to a prescribed or self-defined process using modern tools and frameworks. - Make profitable use of methods and technology from data engineering, artificial intelligence and machine learning to develop solutions and to make informed decisions in relation to controlling decision-making processes.	22
	2 Advanced Social and Academic Skills	Students can: - Explain the structure of an academic paper and analyse and discuss it using example articles. - Explain methods for predicting the consequences of technical solutions and apply them to practical examples. - Explain the interrelationships in the fields of gender, technology and science in informatics and critically question them.	12

Elective	3 Artificial Intelligence	Students know the essential concepts and methods of artificial intelligence, particularly in the fields of knowledge representation and processing, and machine learning and can put these into practice in appropriate areas of application, such as - Automatic planning - Recommendation systems - Semantic web - Diagnostics - Configuration - Verification - Decision support systems - Natural language processing - Cognitive robotics	32
	4 Business Information Systems	Students can: - Explain fundamental concepts and principles of information systems for recommendation and decision-making processes and apply the associated methods, technologies and systems. - Manage small-scale IT projects and introduce IT management methods in the business world. - Determine, devise, document and implement business processes. - Devise, select and implement e-commerce systems.	
	5 Data Science and Engineering	Students can: - Devise, implement and optimise large-scale data pools (databases, data warehouses, data lakes). - Integrate heterogeneous data pools. - Select methods for evaluating large quantities of data (in particular data mining processes) for areas of interest; implement and apply them to modern architectures. - Analyse and guarantee data quality.	
	6 Distributed Systems	Students can: - Explain and apply fundamental concepts, architecture principles, and types of organisation and communication for modern distributed systems. - Localise and analyse a range of problems of distributed systems and devise creative solutions for these problems.	

7 Human-Computer Interaction	Students can: - Describe and apply fundamental methods and tools for analysing usability/user experiences (including empirical approaches, in particular). - Design and develop classic graphical user interfaces (desktop-based or mobile). - Design and develop non-classical user interfaces (gestures, haptics, voice recognition and synthesis, etc.), determine and understand usage scenarios and quality criteria, and devise and develop prototypical solutions from at least one of these categories.
8 Information and System Security	Students can: - Explain the role of IT security as well as IT security combined with risk management along with various security infrastructures (types, structure, purpose, etc.). - Explain basic fundamental mechanisms of cryptology, along with their effects and interaction. - Evaluate threats and associated risks from different perspectives (software, hardware, network, algorithmic, etc.) and identify and implement appropriate countermeasures.
9 Multimedia Systems	Students can: - Explain and apply the essential concepts, mechanisms, methods, protocols and components of (distributed) multimedia systems and services. - Apply the fundamental methods and tools for the development of (distributed) multimedia systems and services and use them for the development of simple to moderately complex systems. - Comprehend and analyse simple to moderately complex problems, the recording, processing (incl. compression), communication, storage, analysis, search and retrieval, and high-quality representation of multimedia data and develop solutions for this purpose.

	10 Software Engineering	Students can: - Explain reengineering concepts, methods and techniques for analysing and continuously improving the internal quality of complex software systems and apply them to small and medium-size software systems. - Explain the methods and techniques of formal methods and software testing for improving the external quality of complex software systems and apply them to small and medium-size software systems. - Explain the concepts, methods and techniques of continuous integration/ continuous delivery for developing complex software systems and apply them to small and medium-size projects.	
Options	11 Optional Subjects	Students acquire further individually selected skills.	6
Project	12 Study Variant I: Project (incl. Cross-Project Review)	Students can: - Define, plan, carry out, document and present a specified area of interest from the field of industry or research according to the rules of well-founded engineering work. - Reflect upon the solution process and the solution to make potential improvements in future.	18

or **Supplementary Subject**	13 Study Variant II: Supplementary Subject	Students can: - Plan, devise, implement, test and measure programmes and software systems according to a development process. - Explain the mathematical principles and concepts of machines, automatic machines and context-free language in informatics and apply them to problems in informatics. - Explain the components, organisation and working methods of modern computers and networks and implement them in examples. - Explain the risks and threats faced by modern IT systems and apply fundamental methods to avert these threats.	
Master's thesis	14 Master's thesis (incl. research seminar)	Students can: - Research and summarise the latest scientific and technological knowledge in a sub-area of informatics and its applications. - Apply the knowledge gained to design and implement a solution for a problem. - Validate the solution and compare it with other solutions. - Describe, present and discuss a problem, its solution and the results of the validation in the Master's thesis.	30
Final overall examination	15 Final overall examination		
Total:			**120**

(2) Observe Section 14 for Study Variant I, Project incl. Review, and Section 10 for Study Variant II and the form of the supplementary subject.

Section 6 Semester abroad/mobility

It is recommended that at least one semester is spent at an international post-secondary educational institution. In particular, students are advised of the possibility to complete the project (Study Variant I according to Section 5 (1)) abroad. Existing offers, such as Erasmus+ or double degree agreements in the field of informatics, should ideally be used for this. It is also advisable to obtain a "pre-recognition notice" according to Section 78 (6) UG from the Programme Director before beginning any studies abroad.

Section 7 Types of course

(1) Lectures (LE) are courses by which knowledge is transferred by means of talks given by lecturers. The examination takes place as a one-off (written and/or oral) examination.

(2) Courses with ongoing assessment are courses in which the assessment does not take place in a one-off examination, but on the basis of written and/or oral contributions by the participants. If, in the framework of a course with ongoing assessment, a seminar paper or a paper requiring a comparable degree of effort is to be written, papers for courses taking place in the winter semester can be handed in up until the following 30 June; papers for courses taking place in the summer semester can be handed in up until 31 January of the following year.

Courses with ongoing assessment comprise:

(a) Exercise class (EC): Exercise classes involve carrying out specific tasks in order to consolidate what has been learnt in a lecture.

(b) Lecture with workshop (LW): This course consists of a lecture component and a workshop component. These have common taught content and are assessed together.

(c) Practical work (PR): In addition to scientific education and professional education and training, practical work contributes to the practical and professional objectives of the degree programme. Particular emphasis is placed on working on real tasks and projects. A project study is practical work in which small, applied research or development work is carried out in consideration of all necessary work steps, ideally as a team. A written assignment documenting the course of the project and its results is an inherent part of a project study.

(d) Seminar (SE): Seminars are used to reflect upon and discuss special scientific problems and/or work. Students make their own oral and written contributions, whereby written work must exhibit an independent academic character both in terms of form and content.

(e) Research seminar (RS): The purpose of the research seminar is to provide ongoing supervision and quality assurance to students as they write their Master's thesis.

(3) In terms of courses from other curricula, the definitions found in the respective other curricula apply.

Section 8 Required subjects

Required subjects are subjects significant to the degree programme and for which examinations must be taken. The courses for the required subjects can be found in **Table 2** below.

Table 2: Required subjects and assigned courses

	Course code	**S.h. and course type**	**ECTS credits**
Informatics specialist course	1.1 Data Engineering	2LW	4
	1.2 Distributed Computing Infrastructures	2LW	4
	1.3 Advanced Software Engineering	2LW	4
	1.4 Artificial Intelligence & Machine Learning	2LW	4
	1.5 Compiler Construction	2LE + 2EC	2 + 4
Total:			**22**

Skills consolidation	2.1 Scientific Writing	2SE	4
	2.2 Technology Assessment	2LW	4
	2.3 Selection of one of the following courses - 2.3.1 Reflecting on the Limits of Formal Sciences - 2.3.2 Course from the elective programme in Feminist Science/Gender Studies		4
Total:			**12**

Section 9 Electives

(1) Electives are subjects that students are able to select according to the regulations of the curriculum. A total of 32 ECTS credits must be obtained from electives.

(2) Electives serve to extend knowledge, methods and skills in the selected area and are therefore regarded as and called specialist subjects. Students must select one of the following subjects as a specialist subject:

- Artificial Intelligence
- Business Information Systems
- Data Science and Engineering
- Distributed Systems
- Human-Computer Interaction
- Information and System Security
- Multimedia Systems
- Software Engineering

Table 3 shows the structure of each specialist subject. In the selected specialist subject, courses totalling at least 16 ECTS credits are to be completed, including exactly 1 seminar in the specialisation totalling 4 ECTS credits.

(3) Students can complete further courses totalling 16 ECTS credits from the selected or other specialisations. Note that only 1 seminar (which is to be completed according to Para. 2 in the selected specialisation) is taken into account for the electives in the Master's degree programme.

Table 3: Structure of a specialist subject (X denotes the selected specialist subject according to Para. 2)

	Course code	**S.h. and course type**	**ECTS credits**
Specialist subject	X.1 seminar	2SE	4
	X.2 Further courses from the selected specialist subject		12

	X.3 Further courses from the selected specialist subject or other specialist subjects		16
Total:			**32**

Section 10 Supplementary subject

Depending on a student's classification according to Section 3 (4), a supplementary subject can or must be completed (Study Variant II according to Section 5). In the supplementary subject, courses from the required subjects or electives of the Bachelor's degree in Applied Informatics at the University of Klagenfurt must be completed totalling 18 ECTS credits. Note that the supplementary subject courses must always be determined in advance with the Programme Director.

Section 11 Options

(1) Options are courses that can be freely chosen from a range of different course offerings at recognised Austrian or international universities. Courses that the student completed in order to be entitled to study or to gain general or special eligibility for university admission are excluded from this. A total of 6 ECTS credits must be obtained from optional subjects.

(2) In the case of courses that have been completed at other recognised Austrian or international post-secondary educational institutions, the responsible university body will decide whether recognition as an option makes sense academically or with regard to professional activities for the chosen programme of study.

Section 12 Courses with a limited number of participants

(1) The maximum number of participants permitted on each of the following courses is as follows:

- Exercise class (EC): 30
- Lecture with workshop (LW): 30
- Practical work (PR): 15
- Seminar (SE): 15
- Research seminar (RS): 15

For courses from other curricula, the maximum numbers found in the respective curricula apply.

(2) If the number of applications for these courses exceeds the number of places available, students will be accepted in accordance with the following procedure:

(a) Students for whom the course is a required subject or elective in their curriculum are given priority.

(b) If the number of applications still exceeds the number of available places, the students are ordered based on the already acquired ECTS credits for the curriculum that stipulates the course in question as a required subject/ elective. A higher total is ranked higher. If the number of ECTS credits is the same, students will be drawn at random.

(c) Up to 10% of the places available will be allocated on a priority basis to students completing a portion of their programme of study at University of Klagenfurt as part of a mobility programme.

(3) Depending on the financial resources available, parallel courses may be offered for the course in question.

Section 13 Master's thesis

(1) The Master's thesis is the academic paper that demonstrates the student's ability to achieve adequate standards of content and methodology when independently addressing scholarly topics. The assignment for the Master's thesis will be so chosen that it is reasonable to expect a student to complete it within six months. A number of students may jointly address a topic, provided that the performance of individual students can be assessed.

(2) The topic to be covered in the Master's thesis must be chosen from one of required subjects or electives.

(3) The Master's thesis comprises 28 ECTS credits. In relation to the Master's thesis, the research seminar (2 ECTS credits) must be completed with the Master's thesis supervisor.

(4) Pursuant to Part B, Section 18 (4) and (2a) of the Statute, the topic and the Master's thesis supervisor must be approved by the Rector of Studies. The application must be made prior to starting work. The student is permitted to change supervisor until the time that the Master's thesis is submitted. Supervision by two persons who are authorised to supervise shall be permissible on a case-by-case basis, where there is good reason to do so (interdisciplinary focus of the topic).

(5) The completed Master's thesis must be submitted to the Rector of Studies in electronic format. On the request of the supervisor, the author must provide them with a bound copy of the thesis. The supervisor will have two months from the date of submission to assess the Master's thesis.

Section 14 Regulations related to completing relevant work experience

(1) During the course of the Master's degree programme – under the conditions of Section 3 (4) and Sections 5, 9 and 10 – relevant work experience, subsequently referred to as a project, can be completed to test and apply in practice and extend the knowledge and skills students have gained.

(2) The project is a guided project study, supervised by a university teacher, in which work is carried out on a self-contained, pre-defined project. The latter applies in particular to working students. Students can suggest the topic/assignment of the project from the specialist subjects (Section 9) and the institution for the project or select them from a list of suggestions. Before beginning the project, approval must be obtained from the supervisor. If necessary due to geographical distance, students are supervised by means of technical tools for communication and collaboration, so that the teaching objectives of the project can be achieved.

(3) A written report to document the content, results and experiences must be drawn up as part of the project. The supervising university teacher evaluates the project on the basis of this report and a discussion.

(4) Following the project, normally in the same or following semester, students must present the content of the written report in a presentation as part of a common course "Cross-Project Review" (1 ECTS credit). The "Cross-Project Review" course is evaluated separately from the project.

Section 15 Use of languages other than English

As a rule, the courses and oral and written examinations for the Master's degree programme in Informatics will be held and taken in English; the Master's thesis must be written in English.

Section 16 Examination regulations

(1) Course examinations for lectures (LE) – preferably in written form – are taken at the end of or after the course as a single examination and cover the course material. The purpose is to assess how successfully students have participated in the course and demonstrate the students' mastery of the knowledge, methods and skills gained in the lecture. In particular, the educational objectives defined in the competency profile (Section 2) are to be used as a benchmark.

(2) All other types of course have ongoing assessment; attendance is compulsory. Exercise classes (EC) and practical work (PR) are assessed through accompanying checks and also through written and oral examinations as well as on the basis of practical activities. Students' written and oral contributions (especially seminar work, seminar talks and participation in discussions) are used as a benchmark for assessment in seminars (SE) and research seminars (RS). In a lecture with workshop (LW), the mode of examination is to be determined based on the character of the course and the educational objectives.

(3) The course instructors must provide students with information about the course objectives, contents, methods and the criteria of course assessment and examinations prior to the start of each semester.

(4) Examinations that have already been used for the completion of studies regarded as admission requirements cannot be used again to complete the programme of studies in the Master's degree programme.

(5) To graduate from the Master's degree programme in Informatics, students are required to successfully complete the following course components:

   (a) The courses for the required subjects, electives and options according to Sections 8, 9 and 11

   (b) The work experience or the supplementary subject courses according to Sections 10 and 14

   (c) The Master's thesis and the associated research seminar according to Section 13

   (d) The final comprehensive oral examination before a committee according to Para. 6

(6) The prerequisite for applying for the comprehensive examination before a committee is the successful completion of the parts listed under Para. 5, points a–c. The comprehensive oral examination before a committee takes place in front of a three-person examination committee and covers: (a) The subject that the topic of the Master's thesis falls under (in the form of a presentation and defence of the Master's thesis), (b) Another subject from the Master's degree programme which is to be selected from the informatics specialist course (Section 8), the

electives (Section 9) or, where applicable, the supplementary subject (Section 10), and is different to point a) in terms of content

(7) The regulations of the Statute of the University of Klagenfurt, Part B and the Universities Act as amended from time to time apply to the implementation and repetition of examinations.

Section 17 Effective validity

This curriculum will enter into force after announcement in the University of Klagenfurt university bulletin as of 1 October 2019 and will apply to all students who commence their Master's degree programme from the 2019/20 winter semester onwards.

Section 18 Transitional provisions

(1) Students who began their Master's degree programme before the 2019/20 winter semester are able to complete their programme of study in line with the previously applicable regulations within a period corresponding to the intended duration of study plus one semester, i.e. by no later than 30 April 2022. If the programme of study is not completed within the appointed period of notice, the student will be subject to the new curriculum for the further programme of study. Furthermore, students can voluntarily agree to study under the new curriculum at any time.

(2) Specific regulations relating to the equivalence of examinations from the previously applicable and modified curriculum can be found in Appendix 1 (equivalence tables, see page 17).

(3) Students who, after expiry of the transition period according to Para. 1, are subject to the new curriculum are entitled to complete the Master's thesis in German.

APPENDIX 1 Equivalence tables

Required subjects according to Section 8:

Master's degree programme in Informatics (2019)			**Master's degrees programme in Applied Informatics (2013)**		
Course	**S.h. Course type**	**ECTS credits**	**Course**	**S.h. Course type**	**ECTS credits**
1.1 Data Engineering	2LW	4	Recognition of 4 ECTS credits from supplementary subjects that were not taken into account in the informatics specialist course as a required subject or from the electives		4
1.2 Distributed Computing Infrastructures	2LW	4	Recognition of 4 ECTS credits from supplementary subjects that were not taken into account in the informatics specialist course as a required subject or from the electives		4
1.3 Advanced Software Engineering	2LW	4	Control of Software Projects	2LW	4
1.4 Artificial Intelligence & Machine Learning	2LW	4	Recognition of 4 ECTS credits from supplementary subjects that were not taken into account in the informatics specialist course as a required subject or from the electives		4
1.5 Compiler Construction	2LE + 2EC	2 + 4	Recognition from the following required subjects: - Algorithms and Complexity Theory - Specification and Verification - Compiler Construction	2LE + 2EC	2 + 4
2.1 Scientific Writing	2SE	4	Scientific Writing	2SE	4
2.2 Technology Assessment	2LW	4			
2.3 Selection of one of the following courses - 2.3.1 Reflecting on the Limits of Formal Sciences - 2.3.2 Course from the elective programme in Feminist Science/ Gender Studies		4	Informatics Academic Reflection	2LW	4

Electives (specialist subjects) according to Section 9:

Master's degree programme in Informatics (2019)		**Master's degrees programme in Applied Informatics (2013)**	
Specialist subject	**ECTS credits**	**Specialist subject**	**ECTS credits**
3 Artificial Intelligence	16	16 ECTS credits from the specialist module of Knowledge and Data Engineering, of which exactly 1 seminar (SE) from this specialist module	16
4 Business Information Systems	16	16 ECTS credits from the specialist module Business Information Systems, of which exactly 1 seminar (SE) from this specialist module	16
5 Data Science and Engineering	16	16 ECTS credits from the specialist module of Knowledge and Data Engineering, of which exactly 1 seminar (SE) from this specialist module	16
6 Distributed Systems	16	16 ECTS credits from the specialist module of Distributed Multimedia Systems, of which exactly 1 seminar (SE) from this specialist module	16
7 Human-Computer Interaction	16	16 ECTS credits from the specialist module of Software Engineering, of which exactly 1 seminar (SE) from this specialist module	16
8 Information and System Security	16	16 ECTS credits from the specialist module of Information and System Security, of which exactly 1 seminar (SE) from this specialist module	16
9 Multimedia Systems	16	16 ECTS credits from the specialist module of Distributed Multimedia Systems, of which exactly 1 seminar (SE) from this specialist module	16
10 Software Engineering	16	16 ECTS credits from the specialist module of Software Engineering, of which exactly 1 seminar (SE) from this specialist module	16

Further courses passed from the electives in the Master's degrees programme in Applied Informatics (2013) are to be fully recognised. Also note that a maximum of 1 seminar is recognised for the electives.

Further subjects according to Sections 10 and 14:

Master's degree programme in Informatics (2019)			**Master's degrees programme in Applied Informatics (2013)**		
Course	**S.h. Course type**	**ECTS credits**	**Course**	**S.h. Course type**	**ECTS credits**
12 Study Variant I: Project (incl. Cross-Project Review)	PR	17 + 1	Shortened project semester	PR	15 + 1
			Recognition of 18 ECTS credits from the full project semester	PR	17 + 1
13 Study Variant II: Supplementary Subject		18	Recognition of 10 ECTS credits from the full project semester and 8 ECTS credits from supplementary subjects which were not taken into account in the informatics specialist course as a required subject		18
			Recognition of 18 ECTS credits from supplementary subjects that were not taken into account in the informatics specialist course as a required subject and from the electives		18

APPENDIX 2 Non-binding recommended route for orientation and planning purposes

The following tables suggest how the ECTS credits could be distributed across the semesters.

Non-binding recommended route for Study Variant I according to Section 5 (1):

	1st semester	2nd semester	3rd semester	4th semester
1.1 Data Engineering	4 ECTS credits			
1.2 Distributed Computing Infrastructures	4 ECTS credits			
1.3 Advanced Software Engineering	4 ECTS credits			
1.4 Artificial Intelligence & Machine Learning		4 ECTS credits		
1.5 Compiler Construction		6 ECTS credits		
2.1 Scientific Writing		4 ECTS credits		
2.2 Technology Assessment			4 ECTS credits	
2.3 Selection of one of the following courses - 2.3.1 Reflecting on the Limits of Formal Sciences - 2.3.2 Course from the elective programme in Feminist Science/Gender Studies			4 ECTS credits	
3-10 Elective Subject	12 ECTS credits	16 ECTS credits	4 ECTS credits	
11 Optional Subjects	6 ECTS credits			
12 Project (incl. Cross-Project Review)			18 ECTS credits	
14 Master's thesis (incl. research seminar)				30 ECTS credits
Total:	**30 ECTS credits**	**30 ECTS credits**	**30 ECTS credits**	**30 ECTS credits**

Non-binding recommended route for Study Variant II according to Section 5 (1):

	1st semester	2nd semester	3rd semester	4th semester
1.1 Data Engineering	4 ECTS credits			
1.2 Distributed Computing Infrastructures	4 ECTS credits			
1.3 Advanced Software Engineering	4 ECTS credits			
1.4 Artificial Intelligence & Machine Learning		4 ECTS credits		
1.5 Compiler Construction		6 ECTS credits		
2.1 Scientific Writing		4 ECTS credits		
2.2 Technology Assessment			4 ECTS credits	
2.3 Selection of one of the following courses - 2.3.1 Reflecting on the Limits of Formal Sciences - 2.3.2 Course from the elective programme in Feminist Science/ Gender Studies			4 ECTS credits	
3-10 Elective Subject	8 ECTS credits	8 ECTS credits	16 ECTS credits	
11 Optional Subjects			6 ECTS credits	
13 Supplementary subject	12 ECTS credits	6 ECTS credits		
14 Master's thesis (incl. research seminar)				30 ECTS credits
Total:	**32 ECTS credits**	**28 ECTS credits**	**30 ECTS credits**	**30 ECTS credits**