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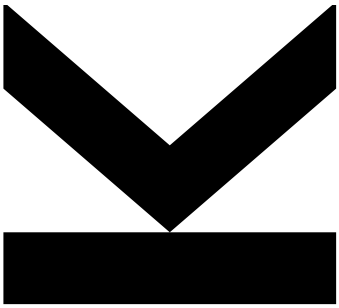
CURRICULUM FOR THE MASTER'S PROGRAM IN **COMPUTER SCIENCE.**



(in English)

JOHANNES KEPLER
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Contents

§ 1 Qualification Profile

(1) The Master's program in Computer Science at Johannes Kepler University (JKU) Linz offers six areas of specialization: *Computational Engineering, Data Science, Intelligent Information Systems, Networks and Security, Pervasive Computing, and Software Engineering*. Graduates of the program have acquired in-depth knowledge of the selected area of specialization in addition to a broad skill set for problem solving.

General profile

(2) Computer Science encompasses concepts, methods, and tools for systematic and automated information processing. Its roots lie in mathematics and electrical engineering. Today, computer science is an established scientific discipline in its own right, and permeates numerous aspects of business and technology as well as our daily life.

(3) The Master's program in Computer Science aims at fostering problem solving skills. Based on the foundations of computing, covered by the Bachelor's program in Computer Science at JKU, the Master's program offers research-oriented education in contemporary areas of computer science. Graduates are experts in their area of specialization. They are equipped with a solid background in information technology and are capable of solving complex IT problems using scientific methods.

(4) Computer Science at JKU distinguishes itself as an application-oriented engineering discipline with a balanced emphasis on theory and practice. Besides cultivating technical skills the curriculum's educational mission accentuates proficiency in scientific methods, creativity, multidisciplinarity, team spirit, social skills as well as leadership skills, and prepares for life-long learning.

Computational Engineering

(5) Computer Science continues to be a fast growing discipline. It is shaping our lives by enabling new technologies well beyond the traditional engineering of technical and physical systems. At JKU the specialization of Computational Engineering focuses on discrete methods of modeling and computation in informatics and mathematics, and their applications to innovative engineering disciplines from computer systems and robotics to biological systems and fine arts. The Master's program emphasizes the value of new computational methods as a driver for entirely new areas of engineering and prepares graduates with foundational knowledge to solve problems within the broad arena of systems engineering.

Data Science

(6) Recent advances in data analysis technologies along with rapidly growing amounts of data allow for completely new opportunities to solve hard real-world problems in a data-driven manner. This is demonstrated impressively by the latest achievements in language and speech processing (e.g. machine translation) or image recognition (as used, for example, in self-driving cars). Data science is an interdisciplinary field at the interface of computer science and statistics which focuses on data analysis technologies, such as, machine learning, pattern recognition, data mining, and data visualization. The specialization in Data Science aims at providing an understanding of these technologies both from a computer science and statistics perspective, and accompanies them by the necessary background in database and software technologies. Data scientists are highly demanded in industry across various domains, such as, medicine, smart production, finance and marketing.

Intelligent Information Systems

(7) The large amounts of structured, unstructured, or multimedia data produced in various domains, especially the World Wide Web, require intelligent strategies for analysis, semantic modeling, processing, retrieval, extraction, and integration of information. Intelligent information systems require engineering approaches, concepts, methods, and tools for information and services provided in a machine-interpretable way. This includes areas like relational databases, web information systems, non-standard storage, (Web) search strategies, data and web mining, social/semantic web intelligence, pattern recognition, artificial intelligence, recommendation systems, personalized and context-aware systems, and cooperative situation awareness. Additionally, eAccessibility and assistive technologies have become key aspects of intelligent information systems. Comprehensive competences in these fields enable graduates to work in both research and development, in industry as well as in high-profile research facilities around the world.

Networks and Security

(8) The protection of IT systems against internal or external attacks is a strategically important task for planning and operating such systems. Industry and economy require more security experts with a profound knowledge in computer science and especially networks. Important aspects in the application of security measures are the systematic configuration and monitoring of IT infrastructures. Graduates of this specialization area have broad job opportunities ranging from the design, implementation, and administration of security strategies, the administration of systems, networks, and security policies, the application of cryptography as well as knowledge of the legal environment in the security area. The profound technical education in this area allows a career in research and development as well.

Pervasive Computing

(9) The design of miniaturised systems, which are invisibly integrated in their environment and are connected in a spontaneous and wireless way require special computer science methods. The specialization in Pervasive Computing therefore deals with a combination of technologies (e.g., sensors, actuators, wireless communication, miniaturized memories and processors), paradigms (e.g., context-aware and adaptive systems, autonomous and self-organizing systems, organic and bio-inspired systems) and methods (e.g., for inter-action, coordination, computational perception, reasoning and learning, artificial intelligence, virtual reality, semantic interoperability, system reliability, security and user friendliness). The educational goals are decision and evaluation skills as well as skills for designing and developing pervasive computing systems such as "information appliances", "wearable systems" or "ambient intelligence systems".

Software Engineering

(10) Business and industry have a considerable demand for well-trained software engineers, who are able to manage large software projects, to apply cutting-edge software development techniques as well as to understand and to direct all phases of the software development process. The specialization in Software Engineering aims at educating such experts. It covers formal foundations as well as methods and tools for all project phases, such as requirements engineering, system modelling, architectural design, implementation, testing, deployment and maintenance of software systems. The focus is on scientific methods and their application in building high-quality software in an economic way. Since most Computer Science graduates work in software development, a specialization in Software Engineering is an excellent preparation for their professional career.

§ 2 Admissions

(1) In accordance with § 54 (1) UG the Master's program in Computer Science belongs to the category of engineering degrees.

(2) The Master's program in Computer Science is based on the Bachelor's program in Computer Science (K033/521) at JKU. Graduates of this Bachelor's program as well as graduates of the Bachelor's programs in Wirtschaftsinformatik (K033/526) and Elektronik und Informationstechnik (K033/289) at JKU are admitted to the Master's program without any restrictions.

(3) Graduates of Computer Science or related programs at Universities, Universities of Applied Sciences, and other national or international post-secondary educational institutions can be admitted to the Master's program in Computer Science if their degree programs are equivalent to the Bachelor's program in Computer Science at JKU. Differences between programs can be compensated by replacing one or more courses from the Complementary Subject (§ 5) with courses specified in the notification of admission.

(4) Graduates of programs that are not equivalent according to § 2 (3) can be granted admission on the condition to complete additional courses with up to 20 ECTS points during their Master's study.

(5) Graduates of a Diploma program with a longer duration than a Bachelor's program can obtain recognition for examinations of the Master's program (see § 78 UG) to the extent by which the Diploma program (excluding the diploma thesis) exceeds the Bachelor's program.

§ 3 Structure and Outline

(1) The Master's program in Computer Science covers 4 semesters and consists of 120 ECTS points, which are distributed among the following subjects:

Subjects	**ECTS**
Major Subject	37,5
Complementary Subject	27,0
Master's Thesis (incl. Master's thesis seminars)	41,0
Master's Examination	2,5
Free Electives	12,0
Total	120,0

(2) For the Free Electives students have to pass courses corresponding to 12 ECTS points, which can be chosen from any recognized national or international post-secondary educational institution. The Free Electives shall provide additional skills beyond Computer Science and can be taken anytime during the Master's study.

(3) Categories of recommended Free Electives courses are:

- Gender Studies (e.g., from the "Institut für Frauen- und Geschlechterforschung" at JKU http://www.jku.at/ifg/content).
- Social Skills (e.g., from the " Zentrum für Soziale und Interkulturelle Kompetenz" at JKU http://www.sozialekompetenz.org).
- Economy and Law (e.g., from the Faculty of Social Sciences and Economy or the Faculty of Law at JKU).

- Foreign languages (e.g., from the “Zentrum für Fachsprachen und Interkulturelle Kommunikation" at JKU http://www.jku.at/zsp/content).
- Further Computer-Science-related courses from the Complementary Subject according to § 5.

(4) The recommended course of study is shown in annex 1.

§ 4 Major Subject

The Major Subject allows students to focus their Master’s study by selecting one of the following areas of specialization. All courses of the selected Major Subject have to be completed successfully.

Code	Name	ECTS
921COEN13	Computational Engineering	37,5
921DASI17	Data Science	37,5
921INSY13	Intelligent Information Systems	37,5
921NESE13	Networks and Security	37,5
921PECO13	Pervasive Computing	37,5
921SOEN13	Software Engineering	37,5

§ 5 Complementary Subject

(1) Students have to complete the following Complementary Subject successfully:

Code	Name	ECTS
921COMS13	Complementary Subject	27

(2) The Complementary Subject allows students to broaden their technical knowledge in areas other than the selected Major Subject. For the Complementary Subject students have to select courses with a total of 27 ECTS points from the following categories:

a) Courses from the Electives described in the study handbook of JKU (http://www.jku.at/studienhandbuch). The Electives consist of General Electives (courses with fixed titles that are offered regularly), Special Topics (courses with changing subtitles that cover contemporary material), and courses in Gender Studies; students are strongly expected to select 3 ECTS points from Gender Studies.

b) Courses (except projects) from the other subjects in § 4 that were not chosen as the Major Subject.

(3) Students must select only such courses from the Electives that have not been completed in a Bachelor’s program at JKU already.

(4) If courses of the Complementary Subject are replaced by compensation courses as a result of the admission process (§ 2 (3)) the amount of ECTS points selectable from the Complementary Subject is reduced by the ECTS points of the compensation courses specified in the notification of admission.

§ 6 Courses

(1) The names and the types of all courses of the Major and Complementary subjects, as well as their ECTS points, their duration in hours per week, their codes, their registration requirements, and their admission procedures (in case of limited availability of places) are described in the study handbook of JKU (http://www.jku.at/studienhandbuch).

(2) The possible types of courses as well as the examination regulations are described in §§ 13 and 14 of the JKU statute (Section "Studienrecht").

§ 7 Master's Thesis

(1) Students of the Master's program in Computer Science must write a Master's thesis according to § 81 UG and § 36 of the JKU statute (Section "Studienrecht").

(2) The Master's thesis is a written scientific document corresponding to an effort of 25 ECTS points.

(3) The Master's thesis serves as a proof that graduates are able to perform scientific work autonomously and systematically. The topic of the thesis must be taken from the Major or from the Complementary Subject and must permit completion within 6 months.

(4) The Curricular Committee for Computer Science may specify guidelines for the formal structure of a Master's thesis.

(5) In addition to the Master's thesis, students must pass two Master's thesis seminars with 8 ECTS points each.

§ 8 Examination Regulations

(1) The regulations for subject examinations and course examinations are described in the study handbook of JKU.

(2) The Master's program in Computer Science is concluded by a Master's examination.

(3) The Master's examination consists of two parts: The first part is the successful completion of the Major and Complementary Subjects according to §§ 4 and 5.

(4) The second part of the Master's examination is a comprehensive oral exam (worth 2.5 ECTS points) conducted by an examination committee. Prior to being admitted to the Master's examination, students must complete the first part of the Master's examination, the Master's thesis, the Master's thesis seminars, and the Free Electives.

(5) The second part of the Master's examination starts with a presentation and defense of the Master's thesis, followed by an oral exam that covers the contents of the Major and Complementary Subjects. If courses of the Complementary Subject are replaced by compensation courses as a result of the admission process (§ 2 (3)), the examination topics of the Complementary Subject include the contents of the compensation courses.

(6) The examination committee consists of three members and is formed by the Vice Rector of Academic Affairs. The candidate may submit a proposal for the committee members. In general, the advisor of the Master's thesis is a member of the examination committee. The head of the committee suggests the assessment of the presentation and the defense of the thesis. The other two examiners suggest the assessment of the examinations in the Major and Complementary Subjects, respectively.

§ 9 Academic Degree

(1) Graduates of the Master's program in Computer Science are awarded the academic degree „Diplom-Ingenieurin/Diplom-Ingenieur“, abbreviated „Dipl.-Ing.“, „Dipl.-Ing. (JKU)“, „DI" or „DI (JKU)“.

(2) The certificate about the academic degree is issued in German and in English translation.

§ 10 Legal Validity

(1) This Curriculum comes into effect on October 1, 2013.

(2) § 1 para. 1 and 6, the renaming of the existing paragraphs 6, 7, 8 and 9 in § 1, § 2 para. 2, § 4 and the repeal of § 11 as published in the official newsletter of the Johannes Kepler University Linz on May 24th, 2017, 28th piece, item 200 will take effect on October 1st, 2017.

Annex 1: Global map of study subjects - Master's Programme in Computer Science (2013)

<table>
<tr><th colspan="2">1st Semester (WS)</th><th colspan="2">2nd Semester (SS)</th><th colspan="2">3rd Semester (WS)</th><th colspan="2">4th Semester (SS)</th></tr>
<tr><th>Study subject</th><th>ECTS</th><th>Study subject</th><th>ECTS</th><th>Study subject</th><th>ECTS</th><th>Study subject</th><th>ECTS</th></tr>
<tr><td rowspan="2">Major Subject</td><td rowspan="2">13,5</td><td rowspan="2">Major Subject</td><td rowspan="2">13,5</td><td>Master's Thesis</td><td>8,5</td><td rowspan="2">Master's Thesis</td><td rowspan="2">16,5</td></tr>
<tr><td rowspan="2">Major Subject
(Seminar and Project)</td><td rowspan="2">10,5</td></tr>
<tr><td rowspan="2">Complementary Subject</td><td rowspan="2">13,5</td><td rowspan="2">Complementary Subject</td><td rowspan="2">13,5</td><td>Master's Examination</td><td>2,5</td></tr>
<tr><td>Master's Thesis Seminar</td><td>8</td><td>Master's Thesis Seminar</td><td>8</td></tr>
<tr><td>Free Electives</td><td>3</td><td>Free Electives</td><td>3</td><td>Free Electives</td><td>3</td><td>Free Electives</td><td>3</td></tr>
<tr><td></td><td>30</td><td></td><td>30</td><td></td><td>30</td><td></td><td>30</td></tr>
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