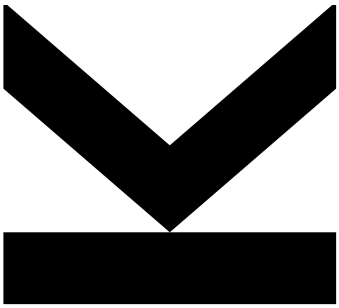
UK 066/921

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



(in English)

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§ 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 provides students with a 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 fosters 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 is shaping our lives by enabling new technologies well beyond the traditional engineering of technical and physical systems. The specialization in Computational Engineering provides students with a solid command of discrete methods of modeling and computation in informatics and mathematics, and enables them to apply these methods to innovative engineering disciplines from computer systems to system verification and machine learning. 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) Data Science is an interdisciplinary field at the interface of computer science and statistics. Rapidly growing amounts of data require completely new solutions, for example in language and speech processing (e.g., machine translation) or image recognition (e.g., in self-driving cars). The specialization in Data Science empowers students to solve hard real-world problems in a data-driven manner. It provides them with profound skills in data analysis technologies such as machine learning, pattern recognition, probabilistic models, data mining, and data visualization, accompanied with a solid 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 generated in almost all domains require intelligent strategies for their analysis and processing. The specialization in Intelligent Information Systems provides students with concepts, methods, and tools for the analysis, semantic modeling, processing, retrieval, extraction, and integration of information. Students acquire profound skills in (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, cooperative situation awareness, and assistive technologies. Comprehensive skills in these fields enable graduates to work both in research and development.

Networks and Security

(8) The protection of IT systems against internal and external attacks is a strategically important task for planning and operating IT infrastructures. The specialization in Networks and Security qualifies students for the systematic planning, configuration and monitoring of (networked) IT systems. Graduates acquire solid capabilities in the design, implementation, and administration of security strategies, the administration of systems, networks, and security policies, the application of cryptography as well as the understanding and implementation of legal requirements in the security domain. The profound technical education in this area allows for a career both in research and development.

Pervasive Computing

(9) The design of miniaturized 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 educates students in a combination of technologies (e.g., sensors, actuators, wireless communication), paradigms (e.g., context-aware and adaptive systems, autonomous and self-organizing systems) and methods (e.g., for interaction, coordination, computational perception, reasoning and learning, virtual reality, reliability, security and user friendliness). It provides 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 great need for well-trained software engineers. The specialization in Software Engineering enables students to plan and manage large software projects, to apply cutting-edge software development techniques, to understand and apply advanced formal concepts in software development, and to apply state-of-the art processes and tools in software engineering. 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 and is taught in English.

(2) The Master's program in Computer Science is based on the Bachelor's program in Computer Science (UK 033/521) at JKU. Graduates of this Bachelor's program are admitted to the Master's program without any restrictions.

(3) Graduates of Computer Science or related programs at recognized national or international post-secondary educational institutions of at least the same higher education level can be admitted to the Master's program in Computer Science if their degree programs are close to the Bachelor's program in Computer Science at JKU. This is the case, if 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 Computer Science or related programs at recognized national or international post-secondary educational institutions of at least the same higher education level that are not close enough according to § 2 (3) can be granted admission on the condition to complete supplementary examinations with up to 20 ECTS points to be taken by the end of the second semester of their Master's study.

§ 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)
- Social Skills
- Economy and Law
- Foreign languages (e.g., from the "Zentrum für Fachsprachen und Interkulturelle Kommunikation" at JKU)
- Further Computer-Science-related courses from the Complementary Subject according to § 5

(4) The recommended study plan is listed in annex 1. This recommendation is based on the requirements of a full-time degree program. However, taking program restrictions into account, the program can also be completed by those who have a flexible work schedule or family care

responsibilities: Some courses are also offered remotely and although attendance is usually not mandatory, attendance is recommended. In other courses, attendance is usually mandatory; however, attempts are made to offer multiple courses at alternative times and/or remotely. In regard to exams, there is no guarantee that they can be held remotely or during off-peak hours. Depending on the extent of work flexibility and/or family care responsibilities, a longer period of studies is to be expected.

§ 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 (studienhandbuch.jku.at). 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 (studienhandbuch.jku.at).

(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.

(3) § 2 para. 2 , § 5 para. 2 lit. a and § 6 para. 1 as published in the official newsletter of the Johannes Kepler University Linz on May 16th, 2018, 20th piece, item 192 will take effect on October 1st, 2018.

(4) § 2 para. 1 as published in the official newsletter of the Johannes Kepler University Linz on June 24th, 2019, 33rd piece, item 458 will take effect on October 1st, 2019.

(5) § 1, § 2 para. 2 and § 3 para. 4 as published in the official newsletter of the Johannes Kepler University Linz on June 10th, 2021, 29th piece, item 395 will take effect on October 1st, 2021.

(6) § 2 para. 3 and 4 as published in the official newsletter of the Johannes Kepler University Linz on May 17th, 2022, 24th piece, item 352, and the repeal of § 2 para. 5 will take effect on October 1st, 2022.

(7) § 3 para. 3 and § 11 as published in the official newsletter of the Johannes Kepler University Linz on May 6th, 2025, 22nd piece, item 248, will take effect on October 1st, 2025.

§ 11 Transitional Provisions

Credits earned for elective courses that were part of an earlier version of this curriculum can be counted towards the corresponding subject.

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>
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