Unofficial translation of the Degree Program and Examination Regulations published in Amtliche Mitteilungen der Philipps-Universität Marburg (No. 23/2025) on April 10, 2025. Translated with DeepL on November 13, 2025.

Second amendment dated February 19, 2025

Second amendment dated February 19, 2025 to the degree program and examination regulations for the degree program "Computer Science" leading to the degree "Master of Science (M.Sc.)" at Philipps-Universität Marburg dated January 25, 2023 (Amt.Mit. 51/2023) in the version dated March 13, 2024 (Amt.Mit. 19/2024)

- -

The Departmental Council of the Department of “Mathematics and Computer Science” at Philipps-Universität Marburg in accordance with § 50 (1) of the Hessian Higher Education Act (HessHG) in the version of December 14, 2021 (GVBI, p. 931), last amended by Article 1 of the Act dated October 10, 2024 (GVBI. 2024 No. 56), has adopted the following amendment to the degree program and examination regulations on February 19, 2025:

Article 1

1. § 4 is amended as follows:

§ 4 Admission requirements

(1) The general admission requirement for the Master's degree program is proof of completion of a relevant Bachelor's degree program in the field of Computer Science or proof of a comparable domestic or foreign professionally qualifying university degree. In addition to the Bachelor's degree in the degree program Computer Science, a degree for teaching in grammar schools (First State Examination or Master's degree) with computer science as a subject in the teacher education program entitles the holder to admission. The professionally qualifying university degree must have been passed with an overall grade of 3.2 or 7.3 grade points or better in accordance with § 28.

As part of the completed degree program or another degree program, a total of at least 90 LP must have been completed in the two scientific disciplines of mathematics and computer science. Of these, at least 12 LP must be in mathematics modules and at least 72 LP in computer science modules. In mathematics, competences must have been acquired in the basics of analysis, linear algebra and statistics. In computer science, at least 9 LP must be allocated to competences from the module Theoretical Computer Science and at least the specified number of credit points to competences from least 5 of the following modules: Algorithms and Data Structures (9 LP), Declarative Programming (9 LP), Object-Oriented Programming (9 LP), System Software and Computer Communication (9 LP), Database Systems (9 LP), Software Engineering (6 LP) and Technical Computer Science (9 LP). It is strongly recommended that students acquire the competences from the above modules, which have not already been acquired, on their own responsibility before commencing their studies.
If no degree certificate with an overall grade is available by the application deadline yet, enrollment may be conditional. In the case of an underlying Bachelor's degree program

with a scope of 180 credit points, the prerequisite is that proof of passed module examinations or partial module examinations amounting to at least 80% of the credit points required for the relevant Bachelor's degree is provided. The proof must include an average grade determined on the basis of the graded module examinations and partial module examinations within the scope of the 80% of the credit points required for the Bachelor's degree. Enrollment can only take place subject to the proviso that all course work and examinations for the Bachelor's degree program have been completed before the start of the Master's degree program (deadline March 31 if the Master's degree program starts in the summer semester or deadline September 30 if the Master's degree program starts in the winter semester) and that proof of the degree certificate is submitted by the end of the lecture period of the first semester.

(2) The eligibility assessment committee appointed by the departmental council in accordance with § 3 of Appendix 5 "Special admission requirements" shall decide on the question of the relevance of the previous studies within the meaning of (1).

(3) The question of the comparability of the university degree within the meaning of (1) shall be decided by the eligibility assessment committee appointed by the departmental council in accordance with § 3 of Appendix 5 "Special Admission Requirements". The eligibility assessment committee also decides on the existence of the required credit points in accordance with (1) sentences 4 to 7.

(4) The modules and courses of the degree program are generally offered in English. A German-language offer is possible as an exception if all students of the module or course so wish. The coursework and examinations can be taken in either German or English at the student's discretion. Optional offers and compulsory elective areas may include import modules from Bachelor's degree programs or other departments in German, so that the choice may be limited here.

The special admission requirements are: Proof of either

a) English language proficiency at least at level C1 of the "Common European Framework of Reference for Languages" by means of a language certificate from one of the following internationally recognized language examinations:

Language certificate	Result
International English Language Testing System (IELTS)[1]	7.0, 7.5, 8.0
Test of English as a Foreign Language (TOEFL)	
TOEFL iBT	95 - 120
TOEFL PBT	627 - 677
TOEFL ITP Level 1	627 - 677
Cambridge English Language Assessment[1]	Cambridge First Certificate in English + Grade A (FCE) Certificate of Advanced English + Grade B or C (CAE) Cambridge English: Business Higher (BEC Higher)
Pearson PTE Academic	76 - 84
Test of English for International Communication (TOEIC) [2]	
TOEIC Listening and Reading Test	945 - 990
TOEIC Speaking Test	180 - 200

TOEIC Writing Test	180 - 200
telc	telc C1 certificate
UNIcert	UNIcert III
Cambridge IGCSE [3]	
IGCSE 1st Language	with average C1
IGCSE 2nd Language	with average C1

[1]If the score and CEFR level are given at the same time, the CEFR level is always used.
[2]All 4 modules (possibly completed as a double module) must be provided for.
[3]All 4 individual examinations of the IGCSE 1st Language or the IGCSE 2nd Language must have been taken and passed.

or

b) English language proficiency at least at level B1 of the "Common European Framework of Reference for Languages" and German language proficiency at least equivalent to the "DSH-2" language examination.

(5) In addition to the general admission requirements for the degree program, participation in individual modules or parts of modules may be made dependent on the fulfillment of specific module admission requirements.
In this case, the prerequisites are listed in the module list (Appendix 2) under "Prerequisites for participation".

2. § 6 is amended as follows:

§ 6 Degree program: Structure, content, degree program curriculum and information
(1) The Master's degree program in Computer Science is divided into the study areas Compulsory Elective Modules in Computer Science, Profile Area Modules, Practical and Seminar Modules and Final Module.

(2) The degree program consists of modules that are assigned to the various study areas in accordance with (1). The following program structure results from the assignment of the modules, the degree to which they are compulsory and the calculated student workload in credit points (LP):

	Compulsory [PF] / Compulsory Elective [WP]	Credit points	Comment
Compulsory Elective Modules in Computer Science		***51-54*** *or* ***63-66***	***
Advanced Algorithmics	WP	T9	
Advanced Data Structures	WP	T9	
Advanced Methods of System Development	WP	P6	
Advanced Programming Concepts	WP	T6	
Advanced Topics in Cryptography	WP	T6	
Algorithm Engineering	WP	P9	
Algorithmic Network Analysis	WP	T6	
Algorithms for Bioinformatics	WP	P6	
Artificial Intelligence	WP	P6	
Big Data Systems	WP	P9	
Compiler Construction	WP	T9	
Computational Complexity Theory	WP	T9	
Computer-assisted Theorem Proving	WP	T9	

Computer Vision I	WP	P 6	
Computer Vision II	WP	P 6	
Content-based Image and Video Analysis	WP	P 6	
Dialog Systems	WP	P 6	
Distributed Systems	WP	P 6	
Ethical Hacking and Practical Cryptanalysis	WP	P 6	
Formal Methods in Software Engineering	WP	T 9	
Geo Databases	WP	P 6	
Image Synthesis	WP	P 9	
Implementation of Database Systems	WP	P 9	
Index and Storage Structures	WP	P 6	
Large Specialization Module Computer Science 1	WP	P 9	
Large Specialization Module Computer Science 2	WP	T 9	
Large Specialization Module Computer Science 3	WP	T 9	
Large Specialization Module Computer Science 4	WP	T 9	
Large Specialization Module Computer Science 5	WP	T 9	
Model-driven Software Development	WP	P 9	
Modern Methods of System Development	WP	P 9	
Multimedia Signal Processing	WP	P 9	
Natural Language Systems	WP	P 6	
Neural Networks	WP	P 6	
Operating Systems	WP	P 6	
Parameterized Algorithms	WP	T 6	
Program Verification and Synthesis	WP	T 9	
Small Specialization Module Computer Science 1	WP	P 6	
Small Specialization Module Computer Science 2	WP	P 6	
Small Specialization Module Computer Science 3	WP	P 6	
Small Specialization Module Computer Science 4	WP	P 6	
Small Specialization Module Computer Science 5	WP	P 6	
Software as a Medical Device	WP	P 6	
Software Evolution	WP	P 6	
Statistical Bioinformatics	WP	P 6	
Virtual Machines	WP	P 6	
Visual Languages	WP	P 6	
Web Technologies	WP	P 6	
Import modules with content or methodological reference to the subject area of computer science,***	WP	P, T 0-66	
Profile Area Modules		***0** or **12***	Optionally possible
Import modules in a profile area from another academic discipline.*	WP	12	

Practical and Seminar Modules		***24-27***	
Further Selected Advanced Topics in Computer Science (Seminar)	WP	3	
Independent Scientific Practice Computer Science	PF	9	
Project Work Computer Science	PF	12	
Selected Advanced Topics in Computer Science (Seminar)	PF	3	
Final Module		***30***	
Master Thesis	PF	30	
Total		***120***	

* Appendix 3 Import module list.
** In the area Compulsory Elective Modules in Computer Science, a maximum of 18 LP may be acquired in advanced modules and at least one module each in Theoretical Computer Science (marked with a "T") and Practical Computer Science ("P") must be completed.
*** The scope of the Compulsory Elective Modules in Computer Science area is reduced from 66 LP to 63, 54 or 51 LP, depending on whether the optional second seminar in the area Practical and Seminar Modules and/or the optional area Profile Area Modules is completed.

(3) In the study area Compulsory Elective Modules in Computer Science, students deepen and expand their knowledge and competences in various disciplines of practical and theoretical computer science. In this way, they broaden their spectrum of computer science and acquire specialized knowledge that introduces them to current research questions and modern applications of computer science.

(5) In the optional study area Profile Area Modules, students acquire knowledge in a further subject in which the thinking and methods of computer science can be applied in an enriching manner. The ability to form analogies between ways of thinking and contents of computer science and those of another subject is acquired. The list of subjects from which modules can be selected, which can be expanded in coordination with other departments, can be found in Appendix 3 or in the most up-to-date form on the website in accordance with (8).

(4) In the study area Practical and Seminar Modules, students deepen their practice-oriented academic skills. The essential competence for computer scientists to carry out a research project in a group setting, usually with the development of extensive software, is practiced. In addition, one or two seminars are used to further develop their profile, whereby students learn to compare and evaluate research findings. In the module Independent Scientific Practice Computer Science, students learn and practice techniques of academic work in computer science. The module also prepares students for the master's thesis and it is recommended that they complete it with the prospective advisor of the master's thesis.

(6) The degree program is more research-oriented.

(7) The exemplary sequence of the modularized degree program is shown in the degree program curriculum (see Appendix 1).

(8) General information and regulations in their current form can be found on the degree program website at

https://www.uni-marburg.de/de/fb12/studium/studiengaenge/m-sc-informatik

In particular, the module handbook and the degree program curriculum can also be viewed there. Furthermore, a list of the current import and export offers of the degree program is published.

(9) The assignment of the individual courses to the modules of the degree program can be found in the course catalog of the Philipps-Universität Marburg, which is available on the university's website.

3. Appendix 2 is amended as follows:

Appendix 2: Module list

Module name *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites for participation***	**Prerequisites for the awarding of LP**
Compulsory Elective Modules in Computer Science						
CS 627 **Advanced Algorithmics** *Höhere Algorithmik*	9	Compulsory elective module	Specialization module on theoretical computer science	The students - can design algorithms for computational problems from a wide variety of application contexts, - can select an adequate algorithmic approach for a concrete computational problem from a range of advanced algorithmic techniques, - can assess the quality of algorithms in various analysis models, - can demonstrate the algorithmic difficulty of computational problems.	None. The competences taught in the modules Algorithms and Data Structures and Efficient Algorithms are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Written exam (*Klausur*) or oral examination (individual examination)
CS 650 **Advanced Data Structures** *Fortgeschrittene Datenstrukturen*	9	Compulsory elective module	Specialization module on theoretical computer science	The students - can evaluate and use known advanced data structures according to their performance characteristics, - can use methods for the design of new data structures, - can apply methods for analyzing data structures, - can use known lower bounds for impossibility results.	None. The competences taught in the modules Algorithms and Data Structures and Efficient Algorithms are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Written exam (*Klausur*) or oral examination (individual examination)
CS 607 **Advanced Methods of System Development** *Fortgeschrittene Methoden der Systementwicklung*	6	Compulsory elective module	Specialization module on practical computer science	The students - can report on research results from current scientific articles in national and international journals and from conferences in the field of system development, - are able to apply scientific working methods when independently recognizing, formulating and solving problems, - are able to speak freely about scientific content, both in front of an audience and in a discussion.	None. The competences taught in the basic modules Object-Oriented Programming and Algorithms and Data Structures are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual

Module name *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites for participation***	**Prerequisites for the awarding of LP**
						examination) or written exam (*Klausur*)
CS 609 **Advanced Programming Concepts** *Fortgeschrittene Konzepte der Programmierung*	6	Compulsory elective module	Specialization module on theoretical computer science	The students - can explain basic techniques for the formal description of syntax and semantics of programming languages, - can apply these to formally describe their own small programming languages, - can report on research results from current scientific articles in national and international journals and from conferences in the field of programming language design, - are able to apply scientific working methods when independently recognizing, formulating and solving problems, - are able to speak freely about scientific content, both in front of an audience and in a discussion.	None. The competences taught in the advanced modules on Theoretical Computer Science are recommended.	Coursework: Reaching at least 50 percent of the points from the weekly exercises to be completed and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (Klausur)
CS 556 **Advanced Topics in Cryptography** *Fortgeschrittene Themen der Kryptographie*	6	Compulsory elective module	Specialization module on theoretical computer science	The students - can explain advanced basic principles and more complex methods of cryptography, which are necessary for an evaluation of cryptographic security and its application in the field of IT security, - can explain design and analysis principles for cryptographic methods, - can report on current research issues in the field of cryptography.	None. The competences taught in the modules Introduction to Cryptography and its Applications or IT Security are recommended.	Coursework: Reaching at least 50 percent of the points from the weekly exercises to be completed. Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 628 **Algorithm Engineering** *Algorithm Engineering*	9	Compulsory elective module	Specialization module on practical computer science	The students - can develop efficient algorithms for computationally difficult graph problems, - can estimate runtimes and memory requirements, - are proficient in the use of modern algorithm libraries, - are able to organize project work in a team, document their work adequately and describe their developed algorithms and implementations in short presentations.	None. The competences taught in the modules Object-Oriented Programming, Algorithms and Data Structures and Efficient Algorithms are recommended.	Coursework: Presentation of 4 milestones in program development. Examination: Software development
CS 529 **Algorithmic Network Analysis** *Algorithmische Netzwerkanalyse*	6	Compulsory elective module	Specialization module on theoretical computer science	The students - are able to model different situations using networks and formulate different analysis tasks as concrete calculation problems, - can select or design efficient algorithms for these computational problems or show that such algorithms do not currently exist.	Successful participation in the module Algorithms and Data Structures is required; successful participation in the module Efficient Algorithms is recommended.	Coursework: Reaching at least 50 percent of the points from the weekly exercises and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual

Module name *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites for participation***	**Prerequisites for the awarding of LP**
						examination) or written exam (*Klausur*)
CS 594 **Algorithms for Bioinformatics** *Algorithmen der Bioinformatik*	6	Compulsory elective module	Specialization module on practical computer science	The students - can present and discuss typical questions from bioinformatics and their formalization, - can use and adapt elementary bioinformatics algorithms, - can design and evaluate solutions for new questions and variants of problems, - can apply scientific working methods (recognizing, formulating, solving problems, abstraction), - are able to speak freely about scientific content, both in front of an audience and in a discussion.	None. The competences taught in the modules Algorithms and Data Structures and Efficient Algorithms are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Written exam (*Klausur*) or oral examination (individual examination)
CS 592 **Artificial Intelligence** *Künstliche Intelligenz*	6	Compulsory elective module	Specialization module on practical computer science	The students - can explain the most important AI methods and their application in practice and can apply them, - can create knowledge-based inference systems in predicate logic (Prolog), - can use knowledge representation forms, - can represent problem-solving, search and planning algorithms, - can give an overview of common methods of estimation, such as Bayes, Demster/Shafer, fuzzy inference, - can apply methods of knowledge acquisition from the field of machine learning and knowledge engineering, - can give an insight into non-classical logics, - are able to apply scientific working methods when independently recognizing, formulating and solving problems, - are able to speak freely about scientific content, both in front of an audience and in a discussion.	None. The competences from the basic modules on computer science are recommended.	Coursework: Reaching at least 50 percent of the points from the weekly exercises to be completed and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 673 **Big Data Systems** *Big-Data-Systems*	9	Compulsory elective module	Specialization module on practical computer science	The students - can name challenges in the construction of distributed systems, - can explain reactive, distributed programming (actor programming), - can explain techniques for digital representation and serialization of data (encoding), - can describe procedures for the functioning of networks (communication), - can specify standards for structuring and querying data (Data Models and Query Languages),	None. The competences taught in the module Algorithms and Data Structures and Database Systems are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual

Module name *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites for participation***	**Prerequisites for the awarding of LP**
				- can explain algorithms and data structures for distributed work with data (Storage and Retrieval), - can describe techniques for ensuring reliability and availability (Replication and Partitioning), - can describe techniques for ensuring consistency and consensus, - can understand algorithms for distributed transaction management (Transactions), - can explain frameworks for distributed batch processing of data-intensive tasks (Batch Processing) and for distributed stream processing (Stream Processing), - can explain the functionality of distributed database management systems (Distributed DBMSs), - can explain the basics of distributed query processing (Distributed Query Optimization), - are able to apply this knowledge practically in the programming of data-intensive, distributed algorithms, - are able to apply scientific working methods when independently recognizing, formulating and solving problems, - are able to speak freely about scientific content, both in front of an audience and in a discussion.		examination) or written exam (*Klausur*)
CS 551 **Compiler Construction** *Compilerbau*	9	Compulsory elective module	Specialization module on theoretical computer science	The students - can compare different aspects of programming languages (lexicon, syntax, semantics, pragmatics), - can describe the structure of compilers and compiler phases, - understand tools for compiler generation and can use them, - can explain the basic principles of code generation, denotational semantics and abstract machines, - can program individual parts of a compiler, - are able to apply scientific working methods when independently recognizing, formulating and solving problems, - are able to speak freely about scientific content, both in front of an audience and in a discussion.	None. The competences taught in the module Theoretical Computer Science are recommended.	Coursework: Reaching at least 50 percent of the points from the weekly exercises to be completed and oral presentation of the solution to at least two of the exercises. Examination: Written exam (*Klausur*) or oral examination (individual examination)
CS 576 **Computational Complexity Theory** *Komplexitätstheorie*	9	Compulsory elective module	Specialization module on theoretical computer science	The students - can classify problems with regard to their computational difficulty, - can compare different classes of problems with each other, - can compare the computational power of different machine models, such as randomized and non-deterministic Turing machines.	Successful participation in the module Theoretical Computer Science from the Bachelor's program in Computer Science.	Coursework: Presentation of intermediate results, participation in the block course. Examination: Oral examination (individual examination) or written exam (*Klausur*)

Module name *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites for participation***	**Prerequisites for the awarding of LP**
CS 523 **Computer-assisted Theorem Proving** *Rechnergestützte Beweissysteme*	9	Compulsory elective module	Specialization module on theoretical computer science	The students - master the specification of formal proof tasks as well as methods, calculi and algorithms of computer-aided proof, - can deal with practical proof systems, - can deal with special logics, - can apply scientific working methods (recognizing, formulating, solving problems, training the ability to abstract), - can speak orally in free speech in front of an audience about scientific content and discuss it.	None. The competences taught in the modulesTheoretical Computer Science and Logic are recommended.	Coursework: Reaching at least 50 percent of the points from the weekly exercises to be completed and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 657 **Computer Vision I**	6	Compulsory elective module	Specialization module on practical computer science	The students - can explain basic concepts of computer vision such as object recognition, measurement and motion detection, - understand deep learning and its application to visual data, - know standard implementations of methods in computer vision and can use them, - can develop solutions to computer vision problems, and - are able to apply scientific working methods when independently recognizing, formulating and solving problems.	None. The competences from the basic modules on computer science are recommended.	Coursework: Reaching at least 50 percent of the points from the weekly exercises to be completed and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 658 **Computer Vision II**	6	Compulsory elective module	Specialization module on practical computer science	The students - can explain advanced concepts of computer vision, - can explain in-depth methods of deep learning and its application to visual data, - can implement, analyze and use computer vision methods and concepts, - can develop and optimize solutions to computer vision problems, and - are able to apply scientific working methods when independently recognizing, formulating and solving problems.	None. The competences from the basic modules on computer science are recommended.	Coursework: Reaching at least 50 percent of the points from the weekly exercises and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 516 **Content-based Image and Video Analysis** *Inhaltsbasierte Bild- und Videoanalyse*	6	Compulsory elective module	Specialization module on practical computer science	The students - can explain and apply the necessary methods of content-based analysis of image and video data; this includes methods of image and moving image processing and machine learning, - can design software systems for image recognition and implement them based on deep learning libraries (Caffe, Tensorflow, ...),	None. The competences taught in the basic modules on practical computer science are recommended. In addition, programming	Coursework: Reaching at least 50 percent of the points from the weekly exercises to be completed and oral presentation of the solution to at least two of the exercises.

Module name *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites for participation***	**Prerequisites for the awarding of LP**
				- are able to apply scientific working methods when independently recognizing, formulating and solving problems.	experience in Python and C++ is recommended and basic knowledge of Linux is helpful.	Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 569 **Dialog Systems** *Dialogsysteme*	6	Compulsory elective module	Specialization module on practical computer science	The students - can explain the basic functionality of dialog systems, voice assistants and conversational systems, - can design implementation approaches for such systems, - can implement simple dialog systems, - are able to apply scientific working methods when independently recognizing, formulating and solving problems.	None. The competences taught in the modules Machine Learning, Introduction to Natural Language Processing and Fundamentals of Statistics or Elementary Stochastics are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Written exam (*Klausur*) or oral examination (individual examination)
CS 513 **Distributed Systems** *Verteilte Systeme*	6	Compulsory elective module	Specialization module on practical computer science	The students - can explain how distributed systems work, - can apply algorithms to problems of distributed systems, - are able to apply scientific working methods when independently recognizing, formulating and solving problems, - are able to speak freely about scientific content, both in front of an audience and in a discussion.	None. The competences taught in the modules Object-Oriented Programming, Data Structures and Algorithms, System Software and Computer Communication and Operating Systems are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to to least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 575 **Ethical Hacking and Practical Cryptanalysis** *Ethisches Hacken und praktische Kryptoanalyse*	6	Compulsory elective module	Specialization module on practical computer science	The students - can describe selected techniques for breaking security systems and cryptographic procedures, - can put these into practice (implementation and project work), in particular with regard to server security, network security, computer-aided analysis of cryptographic procedures and security architectures, - can name ethical and legal issues of hacking.	None. The competences taught in Introduction to Cryptography and its Applications or IT Security are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)

Module name *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites for participation***	**Prerequisites for the awarding of LP**
CS 510 **Formal Methods in Software Engineering** *Formale Methoden in der Softwaretechnik*	9	Compulsory elective module	Specialization module on theoretical computer science	students - are able to formalize systems, system properties and software development activities, - can explain how system properties can be automatically analyzed and verified, - can assess the strengths and weaknesses of formal methods in software engineering, - are able to apply scientific working methods when independently recognizing, formulating and solving problems, - are able to speak freely about scientific content, both in front of an audience and in a discussion.	None. The competences taught in the modules Theoretical Computer Science, Logic and Software Engineering are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 573 **Geo Databases** *Geo-Datenbanken*	6	Compulsory elective module	Specialization module on practical computer science	The students - can describe concepts for the extension of object-relational database systems for geo applications, - can explain the principles of basic algorithms and data structures for geo-databases, - can describe data models for geodata, - can use query processing in geo-databases, - can work with geo-information systems and geo-database systems, - are able to apply scientific working methods when independently recognizing, formulating and solving problems, - are able to speak freely about scientific content, both in front of an audience and in a discussion.	None. The competences taught in the module Algorithms and Data Structures are recommended.	Coursework: Reaching at least 50 percent of the points from the weekly exercises to be completed and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 681 **Image Synthesis** *Bildsynthese*	9	Compulsory elective module	Specialization module on practical computer science	The students - can describe and apply methods for creating computer-generated images of high visual quality; this includes topics such as modeling a dynamic virtual scene, free-form curves and surfaces, methods for global illumination, or methods for displaying volume data, - can explain the architecture of current graphics cards and understand the graphics card as an enormously powerful stream processor with many parallel computing units, which can also be used for complex calculations outside of computer graphics, - can apply parallel programming on the graphics card, - are able to apply scientific working methods when independently recognizing, formulating and solving problems, - are able to speak freely about scientific content, both in front of an audience and in a discussion.	None. The competences taught in the modules Object-Oriented Programming and Graphics Programming are recommended.	Coursework: Reaching at least 50 percent of the points from the weekly exercises to be completed and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)

Module name *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites for participation***	**Prerequisites for the awarding of LP**
CS 672 **Implementation of Database Systems** *Implementierung von Datenbanksystemen*	9	Compulsory elective module	Specialization module on practical computer science	The students - can assess the performance of database systems, - can use techniques to develop efficient data structures and algorithms in database systems, - can assess external data structures in terms of runtime, storage space and throughput, - can deal with index structures in commercial database systems, - have knowledge of query optimization techniques and their availability in commercial systems, - can describe architectures of modern database systems.	None. The competences taught in the modules Algorithms and Data Structures and Database Systems are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 571 **Index and Storage Structures** *Index und Speicherstrukturen*	6	Compulsory elective module	Specialization module on practical computer science	The students - can use techniques to develop external data structures and algorithms, - can evaluate external data structures in terms of runtime, storage space and throughput, - can create data structures within a system-oriented environment, - can deal with index structures in commercial database systems, - are able to apply scientific working methods when independently recognizing, formulating and solving problems, - are able to speak freely about scientific content, both in front of an audience and in a discussion.	None. The competences taught in the module Algorithms and Data Structures are recommended.	Coursework achievement(s): Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 647 **Large Specialization Module Computer Science 1** *Großes Vertiefungsmodul Informatik 1*	9	Compulsory elective module	Specialization module on practical computer science	The students - have extended in-depth knowledge and skills in a selected special field of computer science, - can report on current research results and deal with research literature, - can apply working methods from computer science to the selected special field of computer science (development and application of basic solution strategies and their formal description, training of abstraction skills, system development), - are able to apply scientific working methods when solving problems independently and communicate the solution, - have acquired skills, preferably in the field of practical computer science.	None. The competences taught in the advanced modules (in relation to the respective topic) are recommended.	Coursework: Reaching at least 50 percent of the points from the weekly exercises to be completed and oral presentation of the solution to at least two of the exercises. Examination: Written exam (*Klausur*) or oral examination (individual examination)
CS 525 **Large Specialization Module Computer Science 2**	9	Compulsory elective module	Specialization module on	The students - have extended in-depth knowledge and skills in a selected special field of computer science,	None. The competences taught in the advanced	Coursework: Reaching at least 50 percent of the points from the weekly exercises to be completed

Module name *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites for participation***	**Prerequisites for the awarding of LP**
Großes Vertiefungsmodul Informatik 2			theoretical computer science	- can report on current research results and deal with research literature, - can apply working methods from computer science to the selected special field of computer science (development and application of basic solution strategies and their formal description, training of abstraction skills, system development), - are able to apply scientific working methods to independently solve problems and communicate the solution, - have acquired skills, preferably in the field of theoretical computer science.	modules (in relation to the respective topic) are recommended.	and oral presentation of the solution to at least two of the exercises. Examination: Written exam (*Klausur*) or oral examination (individual examination)
CS 526 **Large Specialization Module Computer Science 3** *Großes Vertiefungsmodul Informatik 3*	9	Compulsory elective module	Specialization module on theo retical computer science	The students - have extended in-depth knowledge and skills in a selected special field of computer science, - can report on current research results and deal with research literature, - can apply working methods from computer science to the selected special field of computer science (development and application of basic solution strategies and their formal description, training of abstraction skills, system development), - are able to apply scientific working methods when solving problems independently and communicate the solution, - have acquired skills, preferably in the field of computer engineering.	None. The competences taught in the advanced modules (in relation to the respective topic) are recommended.	Coursework: Reaching at least 50 percent of the points from the weekly exercises to be completed at and oral presentation of the solution to at least two of the exercises. Examination: Written exam (*Klausur*) or oral examination (individual examination)
CS 623 **Large Specialization Module Computer Science 4** *Großes Vertiefungsmodul Informatik 4*	9	Compulsory elective module	Specialization module on theoretical computer science	The students - have extended in-depth knowledge and skills in a selected special field of computer science, - can report on current research results and deal with research literature, - can apply working methods from computer science to the selected special field of computer science (development and application of basic solution strategies and their formal description, training of abstraction skills, system development), - are able to apply scientific working methods when solving problems independently and communicate the solution, - have acquired skills, preferably in the field of applied computer science.	None. The competencies taught in the advanced modules (in relation to the respective topic) are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Written exam (*Klausur*) or oral examination (individual examination)
CS 624 **Large Specialization Module Computer Science 5**	9	Compulsory elective module	Specialization module on theoretical	The students - have extended in-depth knowledge and skills in a selected special field of computer science, - can report on current research results and deal with research literature,	None. The competences taught in the advanced modules (in relation to	Coursework: Reaching at least 50 percent of the points from the weekly exercises to be completed and oral presentation of the

Module name *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites for participation***	**Prerequisites for the awarding of LP**
Großes Vertiefungsmodul Informatik 5			computer science	- can apply working methods from computer science to the selected special field of computer science (development and application of basic solution strategies and their formal description, training of abstraction skills, system development), - are able to apply scientific working methods when solving problems independently and communicate the solution, - have acquired skills, preferably in the field of artificial intelligence.	the respective topic) are recommended.	solution to at least two of the exercises. Examination: Written exam (*Klausur*) or oral examination (individual examination)
CS 561 **Model-driven Software Development** *Modellgetriebene Softwareentwicklung*	9	Compulsory elective module	Specialization module on practical computer science	The students - can explain the paradigm of model-driven software development, - can model and develop model-driven application software, - can explain core concepts and techniques of model-driven development, - can discuss the possibilities and limitations of model-driven software development, - have a basic understanding of the tools presented in the course and their practical application, - are able to apply scientific working methods when independently recognizing, formulating and solving problems, - are able to speak freely about scientific content, both in front of an audience and in a discussion.	None. The competences taught in the basic modules of Computer Science and the advanced modules Software Engineering and Software Internship are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 507 **Modern Methods of System Development** *Moderne Methoden der Systementwicklung*	9	Compulsory elective module	Specialization module on practical computer science	The students - can report on new research results from current scientific articles in national and international journals and from conferences in the field of software development, - are able to apply scientific working methods when independently recognizing, formulating and solving problems, - are able to speak freely about scientific content, both in front of an audience and in a discussion.	None. The competences taught in the basic modules Object-Oriented Programming and Algorithms and Data Structures are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 682 **Multimedia Signal Processing** *Multimediale Signalverarbeitung*	9	Compulsory elective module	Specialization module on practical computer science	The students - are able to create content for modern communication media, - have in-depth knowledge of methods for the digital capture, processing, storage and transmission of multimedia data, in particular audio and visual media, - can design media and recognize, formulate and solve practical problems.	None.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises.

Module name *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites for participation***	**Prerequisites for the awarding of LP**
						Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 619 **Natural Language Systems** *Sprachsysteme*	6	Compulsory elective module	Specialization module on practical computer science	The students - can name basic functions and components of language systems and can compare them in the context of different application scenarios, - can describe architectures for language systems, - can develop simple language systems independently, - can analyze the possible implications of the use of language systems.	None. The competences taught in the modules Artificial Intelligence, Machine Learning or Introduction to Natural Language Processing are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 593 **Neural Networks** *Neuronale Netze*	6	Compulsory elective module	Specialization module on practical computer science	The students - can explain aspects of the theory of neural networks, describe different architectures and discuss the possibilities and limitations of artificial neural networks, - can explain concepts of supervised learning and deep learning, - are able to design a data-driven solution for artificial neural networks based on a specific problem using given program libraries, - are able to apply scientific working methods when independently recognizing, formulating and solving problems, - are able to speak freely about scientific content, both in front of an audience and in a discussion.	None. The competences taught in the modules Machine Learning and Fundamentals of Statistics are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 512 **Operating Systems** *Betriebssysteme*	6	Compulsory elective module	Specialization module on practical computer science	The students - can explain how operating systems work, - can program operating system modules independently, - are able to apply scientific working methods when independently recognizing, formulating and solving problems, - are able to speak freely about scientific content, both in front of an audience and in a discussion.	None. The competences taught in the modules Object-Oriented Programming, Algorithms and Data Structures, and System Software and Computer Communication are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)

Module name *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites for participation***	**Prerequisites for the awarding of LP**
CS 531 **Parameterized Algorithms** *Parametrisierte Algorithmen*	6	Compulsory elective module	Specialization module on theoretical computer science	The students - can identify adequate parameterizations for difficult computational problems, - can develop efficient fixed-parameter algorithms and analyze their runtime, - can design data reduction rules and analyze their effectiveness and - can prove the algorithmic difficulty of parameterized computational problems.	Successful participation in the module "Algorithms and Data Structures" is required; successful participation in the module "Efficient Algorithms" is recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 524 **Program Verification and Synthesis** *Programmverifikation und -synthese*	9	Compulsory elective module	Specialization module on theo-retic computer science	The students - can use and apply current research tools, - can explore new areas of application independently, - can develop theoretical backgrounds, - can deal with higher level logic, - can explain concepts of verification and synthesis of software, - can discuss the application and limits of decision procedures, - can explain the theory and application of the lambda calculus.	None. The competences taught in the modules Logic, Object-Oriented Programming, Algorithms and Data Structures as well as basic knowledge of functional programming (e.g. in Scala, Haskell or Python) are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 549 **Small Specialization Module Computer Science 1** *Kleines Vertiefungsmodul Informatik 1*	6	Compulsory elective module	Specialization module on practical computer science	The students - have in-depth knowledge and skills in a selected specialized area of computer science, - are able to report on current research results and deal with research literature, - can apply working methods from computer science to the selected special field of computer science (development and application of basic solution strategies and their formal description, training of abstraction skills, system development), - are able to apply scientific working methods when solving problems independently and communicate the solution, - have acquired skills, preferably in the field of practical computer science.	None. The competences taught in the advanced modules (in relation to the respective topic) are recommended.	Coursework: Reaching at least 50 percent of the points from the weekly exercises to be completed and oral presentation of the solution to at least two of the exercises. Examination: Written exam (*Klausur*) or oral examination (individual examination)
CS 590 **Small Specialization Module Computer Science 2**	6	Compulsory elective module	Specialization module on practical	The students - have in-depth knowledge and skills in a selected specialist area of computer science,	None. The competences taught in the advanced	Coursework: Reaching at least 50 percent of the points from the weekly exercises to be completed at

Module name *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites for participation***	**Prerequisites for the awarding of LP**
Kleines Vertiefungsmodul Informatik 2			computer science	- can report on current research results and deal with research literature, - can apply working methods from computer science to the selected special field of computer science (development and application of basic solution strategies and their formal description, training of abstraction skills, system development), - are able to apply scientific working methods when solving problems independently and communicate the solution, - have acquired skills, preferably in the field of theoretical computer science.	modules (in relation to the respective topic) are recommended.	and oral presentation of the solution to at least two of the exercises. Examination: Written exam (*Klausur*) or oral examination (individual examination)
CS 644 **Small Specialization Module Computer Science 3** *Kleines Vertiefungsmodul Informatik 3*	6	Compulsory elective module	Specialization module on practical computer science	The students - have in-depth knowledge and skills in a selected special field of computer science, - can report on current research results and deal with research literature, - can apply working methods from computer science to the selected special field of computer science (development and application of basic solution strategies and their formal description, training of abstraction skills, system development), - are able to apply scientific working methods when solving problems independently and communicate the solution, - have acquired skills, preferably in the field of computer engineering.	None. The competences taught in the advanced modules (in relation to the respective topic) are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Written exam (*Klausur*) or oral examination (individual examination)
CS 646 **Small Specialization Module Computer Science 4** *Kleines Vertiefungsmodul Informatik 4*	6	Compulsory elective module	Specialization module on practical computer science	The students - have in-depth knowledge and skills in a selected specialized area of computer science, - are able to report on current research results and deal with research literature, - can apply working methods from computer science to the selected special field of computer science (development and application of basic solution strategies and their formal description, training of abstraction skills, system development), - are able to apply scientific working methods when solving problems independently and communicate the solution, - have acquired skills, preferably in the field of applied computer science.	None. The competences taught in the advanced modules (in relation to the respective topic) are recommended.	Coursework: Reaching at least 50 percent of the points from the weekly exercises to be completed and oral presentation of the solution to at least two of the exercises. Examination: Written exam (*Klausur*) or oral examination (individual examination)
CS 645 **Small Specialization Module Computer Science 5**	6	Compulsory elective module	Specialization module on practical	The students - have in-depth knowledge and skills in a selected specialized area of computer science, - are able to report on current research results and deal with research literature,	None. The competences taught in the advanced modules (in relation to	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral

Module name *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites for participation***	**Prerequisites for the awarding of LP**
Kleines Vertiefungsmodul Informatik 5			computer science	- can apply working methods from computer science to the selected special field of computer science (development and application of basic solution strategies and their formal description, training of abstraction skills, system development), - are able to apply scientific working methods to independently solve problems and communicate the solution, - have acquired skills, preferably in the field of artificial intelligence.	the respective topic) are recommended.	presentation of the solution to at least two of the exercises. Examination: Written exam (*Klausur*) or oral examination (individual examination)
CS 558 **Software as a Medical Device** *Software als Medizinprodukt*	6	Compulsory elective module	Specialization module on practical computer science	The students - can describe and apply concepts of software development for medicine, - can identify cross-connections to computer science, - can apply the thinking and working methods of regulatory authorities to specific issues, including technically motivated problems, - have an intuition for the development of software as a medical device and can translate this into precise terms and formal justifications, - are able to speak freely about scientific content, both in front of an audience and in a discussion.	None. Basic knowledge of software engineering is recommended	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*).
CS 563 **Software Evolution** *Softwareevolution*	6	Compulsory elective module	Specialization module on practical computer science	The students - can systematically familiarize themselves with a given software project, - can work out a coherent evolution plan, - can carry out smaller evolution tasks, - are able to speak freely about scientific content, both in front of an audience and in a discussion, - can work on a project in a team.	None. The competences taught in the basic modules of Computer Science and the advanced modules Software Engineering and Software Internship are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 543 **Statistical Bioinformatics** *Statistische Bioinformatik*	6	Compulsory elective module	Specialization module on practical computer science	The students - can explain the most important methods from statistical bioinformatics that are required for calculations in the natural sciences, - are able to select, carry out and implement suitable methods for specific case studies.	None. The competences taught in the modules Introduction to Bioinformatics and Fundamentals of Statistics are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises.

Module name *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites for participation***	**Prerequisites for the awarding of LP**
						Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 530 **Virtual Machines** *Virtuelle Maschinen*	6	Compulsory elective module	Specialization module on practical computer science	The students - can describe and explain the basic concepts of process- and system-based virtual machines, - can describe the structure of virtual machines, - can develop components of process-based VMs (such as schedulers, garbage collection, just-in-time compilers), - can explain the methods of system-based VMs (hypervisor, hardware emulation, hardware virtualization, paravirtualization), - can explain optimizations in virtual machines, - can present examples of modern research work in the field of VM technology, - can compare implementation approaches for programming language concepts (code transformation vs. VM support).	None. The competences taught in the basic modules of computer science and the advanced modules of software engineering and software internship are recommended.	Coursework: Reaching at least 50 percent of the points from the weekly exercises to be completed and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 562 **Visual Languages** *Visuelle Sprachen*	6	Compulsory elective module	Specialization module on practical computer science	The students - can explain the differences between textual and visual languages, - can describe methods for defining visual languages, - can use basic design tools for visual languages, - can familiarize themselves with an unknown visual language and evaluate it using a small test application, - are able to apply scientific working methods when independently recognizing, formulating and solving problems, - are able to speak freely about scientific content, both in front of an audience and in a discussion.	None. The competences taught in the basic modules of Computer Science and the advanced modules Software Engineering and Software Internship are recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)
CS 533 **Web Technologies** *Webtechnologien*	6	Compulsory elective module	Specialization module on practical computer science	The students - can explain which web technologies exist and how to use them, - are able to demonstrate the possible applications and the power of these technologies, - can describe the interaction and dependencies between the technologies, - can apply scientific working methods (recognizing, formulating, solving problems, training the ability to abstract), - have practiced oral communication skills in the exercises by practicing free speech in front of an audience and in discussions.	None. Basic knowledge of programming and software technology is recommended.	Coursework: Reaching at least 50 percent of the points from the exercises to be completed each week and oral presentation of the solution to at least two of the exercises. Examination: Oral examination (individual examination) or written exam (*Klausur*)

Module name *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites for participation***	**Prerequisites for the awarding of LP**
Practical and Seminar Modules						
CS 567 **Further Selected Advanced Topics in Computer Science ("Seminar")** *Weitere ausgewählte fortgeschrittene Themen der Informatik („Seminar“)*	3	Compulsory elective module	Profile module	The students - are able to work independently on a special topic in computer science, - are able to further develop and expand corresponding skills already acquired in the module Selected Advanced Topics in Computer Science ("Seminar"), - are able to prepare and divide up contexts in computer science and supplement them with explanatory content, - can deal with and search for scientific literature, - can give a structured presentation tailored to the skills of the audience, - can handle presentation media, - can discuss computer science content in a structured way in a group.	None. Previous knowledge is recommended, depending on the subject focus of the seminar, but generally knowledge from the basic modules of computer science and mathematics.	Two partial examinations: Seminar presentation (weighting: 1 LP) Written elaboration (weighting: 2 LP)
CS 698 **Independent Scientific Practice Computer Science** *Selbstständiges wissenschaftliches Arbeiten Informatik*	9	Compulsory module	Profile module	The students, - are able to independently review and expand their knowledge in a scientific field of computer science on the basis of recommended literature and to familiarize themselves with the current state of research, - can carry out literature searches using subject-specific methods, - are able to use systems that support scientific work in the field of the master's thesis.	None. The competences taught in the advanced and specialization modules are recommended.	Examination: Written elaboration ***Ungraded module***
CS 697 **Project Work Computer Science** *Projektarbeit Informatik*	12	Compulsory module	Practical module	The students - can work on a comprehensive computer science task in a team of several students . This includes developing, adapting, extending and developing problem-relevant methods, - can learn, plan and work independently, - are practiced in project management and monitoring methods, e.g.: target descriptions, planning, milestones, record keeping, deadlines, delegation, controlling, - have team-related social skills: Cooperation, team development, leadership, motivation, well-structured team of employees, working under deadline pressure, - are proficient in methods of documentation and presentation of IT projects for users and third parties in the form of program documentation, project reports and, if applicable, publications.	None.	Examination: Software creation (the term software includes all created artifacts, in particular the program code, planning documents, user and developer manuals and presentation material). ***Ungraded module***
CS 610 **Selected Advanced Topics in Computer Science ("Seminar")**	3	Compulsory module	Profile module	The students - are able to work independently on a special topic in computer science,	None. Previous knowledge is recommended,	Two partial examinations: Seminar presentation (weighting: 1 LP) Written elaboration

Module name *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites for participation***	**Prerequisites for the awarding of LP**
Ausgewählte fortgeschrittene Themen der Informatik („Seminar“)				- are able to prepare and divide up contexts in computer science and supplement them with explanatory content, - can deal with and search for scientific literature, - can give a structured presentation tailored to the skills of the audience, - can handle presentation media, - can discuss computer science content in a structured way in a group.	depending on the subject focus of the seminar, but generally knowledge from the basic modules of computer science and mathematics.	(weighting: 2 LP)
Final Module						
CS 699 **Master Thesis** *Masterarbeit*	30	Compulsory module	Final module	Students are able to work on a comprehensive task from the field of computer science using scientific methods under supervision and to present a thesis and the results contained therein appropriately in writing and orally.	At least 66 LP must have been acquired.	Two partial examinations: Master's thesis (weighting: 27 LP) and disputation (weighting: 3 LP).

* Module references in the column "Prerequisites for participation” were translated from German automatically. For originial module names, please refer to the original Degree Program and Examination Regulations published in Amtliche Mitteilungen der Philipps-Universität Marburg (No. 23/2025) on April 10, 2025.

4. Appendix 3 is amended as follows:

Appendix 3: Import module list

The following modules can be chosen at the time of the resolution on these degree program and examination regulations. In accordance with § 14 Para. 1 General Regulations, the details of the degree program and examination regulations in which the modules are offered apply to these modules (particularly with regard to qualification objectives, prerequisites, credit points and examination modalities). The possible combinations of modules may be determined by the teaching unit offering them.

The examination committee may change or supplement the catalog of selectable study programs, in particular if the range of degree programs offered by the offering departments at Philipps-Universität Marburg changes. Such changes will be published by the examination committee on the respective degree program website. In individual cases or in general, taking advantage of the degree programs listed below may be subject to prior academic advising or binding registration. In the event of capacity restrictions, the corresponding regulations of the degree program and examination regulations apply. Otherwise, no guarantee is given that the courses listed below will actually be offered and can be attended.

Upon justified request by the student, it is permissible to approve additional import modules beyond the regular offer in individual cases; this requires the consent of the department or institution offering the module.

The current import offer is published as an export offer on the degree program website of the department offering the module.

Students should take advantage of the relevant information and advisory services offered by the department offering the module before taking up the course.

Any participation requirements or recommendations as well as combination regulations must be observed. If the module provider has specified combination regulations and created export packages, only a limited range of modules is actually available, depending on the scope of your own import window.

The import module list in its current form can be found on the degree program website at https://www.uni-marburg.de/de/fb12/studium/studiengaenge/m-sc-informatik.

5. Appendix 5 is amended as follows:

Appendix 5: Special admission requirements and eligibility assessment process

§ 1 Special admission requirements

(1) Admission to the master's degree program "Computer Science" can only be granted to persons who meet the general admission requirements set out in § 4 of the degree program and examination regulations. .

(2) In addition, applicants must have demonstrated their personal aptitude for the subject as part of an eligibility assessment process to be carried out in accordance with the following requirements.

§ 2 Application for participation in the eligibility assessment process

The application must be submitted on the form provided by the University. The application must be accompanied by the following documents:

1. Proof of a completed relevant Bachelor's degree or at least an equivalent domestic or foreign university degree or proof of the preliminary overall grade from the credits completed up to that point in accordance with § 4 (1) of the degree program and examination regulations.
2. If an academic final thesis amounting to at least 10 credit points has already been completed in the relevant Bachelor's degree program or at least an equivalent degree program in Germany or abroad in accordance with § 4 (1) of the degree program and examination regulations, proof of this thesis and its scope must be enclosed. If such a thesis has not yet been completed, but is either mandatory in the examination regulations of the relevant Bachelor's degree program or an optional thesis has been bindingly registered, proof of this and the scope of the thesis must be provided in a suitable manner.
3. Proof of the competences specified in § 4 (1) sentences 4 to 7 of the degree program and examination regulations.
4. Proof of knowledge of German and/or English in accordance with § 4 (4) of the degree program and examination regulations.
5. Completely and truthfully filled out form, which was created using the web application provided on the degree program website and which contains information on the modules completed so far and their scope as well as, if applicable, on the completion of a thesis and any language certificates acquired.

§ 3 Eligibility assessment committee

(1) The eligibility assessment process to determine personal aptitude for the subject is the responsibility of the eligibility assessment committee appointed by the departmental council.

(2) The committee shall be composed of at least two professors.

(3) The eligibility assessment committee shall report to the departmental council of the department on its experiences after completion of the procedure and make proposals for the further development of the process.

§ 4 Eligibility assessment process

(1) Anyone who has submitted an application in accordance with § 2 shall take part in the eligibility assessment process. Applications that are not complete, in due form or

on time will not take part in the eligibility assessment process. Anyone who provides incomplete information in the form in accordance with § 2 no. 5 with regard to the credits received shall not be entitled to have any additional credits considered. Anyone who claims credits that have not been completed or who provides false and misleading information in the form in accordance with § 2 no. 5 is not entitled to admission.

(2) Aptitude is determined on the basis of the following criteria:

a) Overall grade in accordance with § 2 no. 1: Points are awarded for the overall grade in the following manner:
   Grade points 15.0 to 12.7 (decimal grade 0.7 to 1.4) = 55 points
   Grade points 12.6 to 10.0 (decimal grade 1.5 to 2.3) = 45 points
   Grade points 9.9 to 7.3 (decimal grade 2.4 to 3.2) = 35 points.
   The information is based on the grading scale according to § 28 General Regulations of Philipps-Universität Marburg.

b) Completion of an academic thesis as part of the relevant Bachelor's degree program or at least equivalent domestic or foreign university degree program in accordance with § 4 (1) of the degree program and examination regulations:
   - Proof that an academic thesis worth at least 10 credit points is compulsory in the qualifying Bachelor's degree program or that a corresponding optional thesis has already been completed or has been bindingly registered (10 points).

c) Proof of knowledge according to § 4 (1) sentence 7 of the degree program and examination regulations:
   - The eligibility assessment committee determines that skills have been acquired to at least the specified extent from 7 of the 7 modules in accordance with § 4 (1) sentence 7 of the degree program and examination regulations (35 points).
   - The eligibility assessment committee determines that competences have been acquired to at least the specified extent from 6 of the 7 modules in accordance with § 4 (1) sentence 7 of the degree program and examination regulations (20 points).

(3) A prerequisite for admission to the degree program is an assessment of the degree of aptitude of at least 65 out of a possible 100 points.

(4) A report must be made of the main criteria that led to the result of the assessment in § 4 (2).

§ 5 Completion of the process

(1) Applicants who are admitted shall receive a written letter of admission from the university. This will specify a deadline by which the applicant must enroll. If enrollment is not completed by the deadline, the letter of admission shall become invalid.

(2) Applicants who are not admitted shall receive a letter of rejection. Rejected applicants may reapply for participation in the eligibility assessment process, provided that further relevant credits have been received since the last application.

Article 2

With the exception of the changes in § 4 and Appendix 5: Special admission requirements and eligibility assessment process, the second amendment applies from

winter semester 2025/2026 to all students studying in the degree program "Computer Science" leading to the degree "Master of Science (M.Sc.)" at Philipps-Universität Marburg from 25 January 2023.

Completed and ongoing module examination procedures are not affected; modules that were started before the winter semester 2025/2026 must be completed in accordance with the regulations of January 25, 2023, as amended.

The changes in § 4 and Appendix 5: Special admission requirements and eligibility assessment process apply to all students who have started their studies in the Master's degree program "Computer Science" with the degree "Master of Science (M.Sc.)" from winter semester 2025/26.

The amendment comes into force on the day after its publication in the Amtliche Mitteilungen der Philipps-Universität Marburg.

Marburg, April 08, 2025

signed.

Prof. Dr. István Heckenberger
Deputy Dean of the Department of
Mathematics and Computer Science
Philipps-Universität Marburg