Module descriptions

Module number	**Module name**	**Responsible lecturer**
INF-BAS1	Applied Computer Science	Prof. Dr. Martin Wollschlaeger martin.wollschlaeger@tu-dresden.de
Contents and qualification objectives	The students master the basic principles of engineering information technology in flexible automated systems according to the requirements of man and environment. The content of the module is chosen by the students: Methods for modeling and simulation, analysis and performance evaluation of complex dynamic systems, approaches to solve practical technical decision problems, specifics of networked systems or real-time systems, methods for planning and controlling complex technical systems, methods of design, specification and implementation of networked industrial application systems, methods for testing and troubleshooting in software applications, techniques of task analysis and evaluation methods for the usable design of interactive systems.	
Teaching and learning methods	The module includes 4 SWS (semester weeks) lectures and 4 SWS exercises and the self-study. The language of the lectures and/or exercises can be German or English and will be determined at the beginning of the semester.	
Prerequisites for participation	Knowledge and skills in the basics of statistics, object-oriented programming, the basics of distributed systems, computer networks and software design are required. With the following literature, students can prepare for the module: Christian Ullenboom, Java is also an island: Learning programming with the standard work for Java developers, Rheinwerk Computing; Edition: 12, 2016, ISBN: 978-3836241199. Andrew s. Tanenbaum: Computer Networks. Prentice Hall, Pearson Education Germany. Alan Dix, Janet Finlay, Gregory D. Abowd: Human Computer Interaction, Prentice Hall, Pearson.	
Usability	The module is one of eight compulsory elective basic modules of the Master's programme in Computer Science, of which three are to be selected, one of seven compulsory elective basic modules of the Diploma programme in Computer Science, of which three are to be selected and one of four compulsory elective basic modules of the Diploma programme in Information Systems Engineering, of which one is to be selected. In the aforementioned Diploma programme in Computer Science, it fulfils the prerequisites for the compulsory elective advanced modules *Advanced Applied Computer Science* (INF-VERT1), *Introduction to Basic Research in Computer Science* (INF-PM-FOR) and *Introduction to Applied Research in*	

	Computer Science (INF-PM-ANW).
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. If there are more than 40 registered students, the module examination consists of a written examination with a duration of 90 minutes. If there are 40 or fewer registered students, it consists of an oral examination with a duration of 30 minutes; this will be announced to the registered students as usual at the faculty at the end of the registration period.
Credit points and grades	The module allows for the earning of 12 credit points. The module grade corresponds to the grade of the examination.
Frequency of the module	The module is offered each winter semester.
Workload	The workload is a total of 360 hours.
Duration of the module	The module takes one semester.

Module number	**Module name**	**Responsible lecturer**
INF-BAS2	Artificial Intelligence	N.N.
Contents and qualification objectives	The students understand the theory and master the methods for the independent conception, construction and programming of intelligent systems. Students are able to familiarize themselves with various topics in the field of artificial intelligence in both industry-related and research-oriented contexts and to apply their knowledge to solve problems independently. The content of the module is chosen by the students: Modelling and analysis of visual objects as well as methods of pattern recognition and computer vision, modeling and solution of complex problems with the help of declarative programming languages, ontology languages and other techniques of computational logic, theory of learning and advanced approaches in the field of machine learning and of statistical learning and methods for self-learning systems, techniques for solving planning and configuration problems as well as the combination of planning, decision theory and execution in rational agents and mobile robots, construction and methodology of autonomous robots, basic techniques for autonomous systems in complex systems that act rationally despite possible erroneous data and uncertain knowledge.	
Teaching and learning methods	The module includes lectures, exercises and seminars in the amount of 8 SWS (semester weeks) and the self-study. The courses are to be selected from the INF-BAS2 catalogue to the specified extent, including at least 2 SWS lectures and 2 SWS exercises. Some courses of this module can be offered in English. The catalogue will be announced as usual at the Faculty of Computer Science, at the beginning of each semester, including the language of the courses.	
Prerequisites for participation	Knowledge and skills in the basics of artificial intelligence (search methods, knowledge representation, machine learning) are required. With the following literature, students can prepare for the module: Russell & P. Norvig: Artificial Intelligence - A Modern Approach.	
Usability	In the Master's programme in Computer Science, the module is one of eight elective basic modules, of which three must be chosen and one of seven elective basic modules, of which three must be chosen in the Diploma programme in Computer Science.	

	This module fulfils the prerequisites for the following compulsory elective modules: *Advanced Artificial Intelligence* (INF-VERT2), *Introduction to Basic Research in Computer Science* (INF-PM-FOR) and *Introduction to Applied Research in Computer Science* (INF-PM-ANW) of the aforementioned Diploma programme.
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of an oral examination, with a duration of 30 minutes. At the student's request, the oral examination may be conducted in English.
Credit points and grades	The module allows for the earning of 12 credit points. The module grade corresponds to the grade of the oral examination.
Frequency of the module	The module is offered each semester.
Workload	The workload is a total of 360 hours.
Duration of the module	The module takes two semesters.

Module number	Module name	Responsible lecturer
INF-BAS3	Software and Web Engineering	Prof. Dr. Raimund Dachselt raimund.dachselt@tu-dresden.de
Contents and qualification objectives	The students master the basic principles of the engineering of software, web and multimedia applications and the associated processes. You can design, implement and evaluate simple applications with graphical and web-based interfaces. The content of the module is chosen by the students: Software Technologies, Web & Multimedia Engineering and Usability Engineering.	
Teaching and learning methods	The module includes lectures, exercises and seminars in the amount of 8 SWS (semester weeks) and the self-study. The courses are to be selected from the INF-BAS3 catalogue of the Faculty of Computer Science to the specified extent, including at least 2 SWS lectures and 2 SWS exercises. Some courses of this module can be offered in English. The catalogue will be announced as usual at the faculty, at the beginning of each semester, including the language of the courses.	
Prerequisites for participation	Skills and abilities in the basics of programming (e.g. in Java and JavaScript), software technology (e.g. UML) and markup languages (e.g. XML) are required. The following literature will help students to prepare for the module: Helmut Balzert, Textbook of Software Engineering, 2nd edition. Heidelberg, 2000, ISBN 3-8274-0042-2. Christian Ullenboom, Java is also an island: Learning programming with the standard work for Java developers, Rheinwerk Computing; Edition: 12, 2016, ISBN: 978-3836241199. Balzert, Helmut; Krüger, Sandra. HTML5, XHTML & CSS: Developing websites systematically & barrier-free - [2nd ed. Witten : W3L, 2011. ISBN: 9783937137544. http://katalogbeta.slub-dresden.de/id/0011609301/.	
Usability	The module is one of eight compulsory elective basic modules in the Master's programme in Computer Science, of which three are to be selected, one of seven compulsory elective basic modules in the Diploma programme in Computer Science, of which three are to be selected and one of four compulsory elective basic modules in the Diploma programme in Information Systems Engineering, of	

	which one is to be selected. It fulfils the prerequisites for the compulsory elective compulsory modules *Advanced Software and Web Engineering* (INF-VERT3) in the Master's and Diploma programmes in Computer Science and the prerequisites for the compulsory elective profile modules *Introduction to Basic Research in Computer Science* (INF-PM-FOR) and *Introduction to Applied Research in Computer Science* (INF-PM-ANW) in the Diploma programme in Computer Science.
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of an oral examination with a duration of 30 minutes. At the student's request, the oral examination may be conducted in English.
Credit points and grades	The module allows for the earning of 12 credit points. The module grade corresponds to the grade of the oral examination grade.
Frequency of the module	The module is offered each semester.
Workload	The workload is a total of 360 hours.
Duration of the module	The module takes one semester.

Module number	Module name	Responsible lecturer
INF-BAS4	System Architecture	Prof. Dr. Wolfgang Lehner wolfgang.lehner@tu-dresden.de
Contents and qualification objectives	The students have the technical and methodological competence to analyze, design, validate and operate system architectures not only under functional but also under non-functional aspects such as effort, costs, real time, fault tolerance, security and data protection. The content of the module is chosen by the students: Operating systems, databases, computer networks, fault tolerance, data protection and data security.	
Teaching and learning methods	The module includes lectures, exercises and seminars in the amount of 8 SWS (semester weeks) and the self-study. The courses are to be selected from the INF-BAS4 catalogue of the Faculty of Computer Science, to the specified extent, including at least 2 SWS lectures and 2 SWS exercises. Some courses of this module can be offered in English. The catalogue will be announced as usual at the faculty, at the beginning of each semester, including the language of the courses.	
Prerequisites for participation	Knowledge and skills in the basics of databases, computer networks, operating systems and security at Bachelor level are required. The following literature will help students to prepare for the module: Andrew S. Tanenbaum: Modern operating systems. Andrew S. Tanenbaum: Computer Networks. David Kahn: The Codebreakers: The Comprehensive History of Secret Communication from Ancient Times to the Internet. Theo Härder, Erhard Rahm: Database systems. Concepts and techniques of implementation.	
Usability	The module is one of eight compulsory elective basic modules in the Master's programme in Computer Science, of which three are to be selected, one of seven compulsory elective basic modules in the Diploma programme in Computer Science, of which three are to be selected and one of four compulsory elective basic modules in the Diploma programme in Information Systems Engineering, of which one is to be selected. In the aforementioned Diploma programme in Computer Science, it fulfils the prerequisites for the compulsory elective advanced and profile modules *Advanced*	

	System Architecture (INF-VERT4), *Introduction to Basic Research in Computer Science* (INF-PM-FOR) and *Introduction to Applied Research in Computer Science* (INF-PM-ANW)).
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of an oral examination with a duration of 30 minutes. At the student's request, the oral examination may be conducted in English.
Credit points and grades	The module allows for the earning of 12 credit points. The module grade corresponds to the grade of the oral examination.
Frequency of the module	The module is offered each semester.
Workload	The workload is a total of 360 hours.
Duration of the module	The module takes two semesters.

Module number	**Module name**	**Responsible lecturer**
INF-BAS5	Computer Engineering	Prof. Dr. Wolfgang Nagel wolfgang.nagel@tu-dresden.de
Contents and qualification objectives	Students know system architectures and modeling paradigms of VLSI systems, are able to verify descriptions of hardware systems by simulation and convert them into real circuits using typical tools. You know different implementation concepts for embedded systems and can describe them with formal means. They understand how the systems are embedded in their environment and how they are connected to it. You understand the interweaving of hardware and software in embedded systems and can derive design decisions from this. You know different approaches to formulate parallel programs. You understand how these formulations are mapped to different parallel computers and can estimate or evaluate the effects of program alternatives and architectural decisions. The contents of the module are design, modeling, programming, simulation and realization of technical systems in the fields of VLSI systems, embedded systems and parallel processing.	
Teaching and learning methods	The module includes lectures, exercises, practical courses and seminars in the amount of 8 SWS (semester weeks) and the self-study. The courses are to be selected from the INF-BAS5 catalogue of the Faculty of Computer Science, to the specified extent, including at least 2 SWS lectures, 2 SWS exercises and 2 SWS internships. Some courses of this module can be offered in English. The catalogue will be announced as usual at the faculty, at the beginning of each semester, including the language of the courses.	
Prerequisites for participation	Knowledge and skills in the basics of digital circuits, computer organization and computer architecture are required. The following literature will help students to prepare for the module: Lipp & Becker: Basics of digital technology. David Patterson (author), John LeRoy Hennessy: Computer organization and computer design: The hardware/software interface. Hennessy & Patterson: Computer Architecture. A Quantitative approach.	

Usability	The module is one of eight compulsory elective basic modules in the Master's programme in Computer Science, of which three are to be selected, one of seven compulsory elective basic modules in the Diploma programme in Computer Science, of which three are to be selected and one of four compulsory elective basic modules in the Diploma programme in Information Systems Engineering, of which one is to be selected. In the aforementioned Diploma programme in Computer Science, it fulfils the prerequisites for the compulsory elective advanced and profile modules *Advanced Computer Engineering* (INF-VERT5), *Introduction to Basic Research in Computer Science* (INF-PM-FOR) and *Introduction to Applied Research in Computer Science* (INF-PM-ANW).
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of an oral examination with a duration of 30 minutes. A collection of minutes must be prepared as a preliminary examination performance.
Credit points and grades	The module allows for the earning of 12 credit points. The module grade corresponds to the grade of the oral examination.
Frequency of the module	The module is offered in the winter semester.
Workload	The workload is a total of 360 hours.
Duration of the module	The module takes one semester.

Module number	Module name	Responsible lecturer
INF-BAS6	Theoretical Computer Science	Prof. Dr. Franz Baader franz.baader@tu-dresden.de
Contents and qualification objectives	Students have the methodological competence to formally model and verify complex systems through abstraction with the help of automata and logic. The content of the module is chosen by the students: Automata theory (automatons on finite and infinite structures, variants thereof such as alternating, weighted and probabilistic automata), logic (temporal and modal logic, predicate logic of first and higher levels, equality logic, description logic, model theory, deduction, verification, model checking), modeling (modeling languages and their semantics, functional and quantitative system analysis) and complexity theory.	
Teaching and learning methods	The module includes lectures, exercises and seminars in the amount of 8 SWS (semester weeks) and the self-study. The courses are to be selected from the INF-BAS6 catalogue of the Faculty of Computer Science, to the specified extent, including at least 2 SWS lectures and 2 SWS exercises. Some courses of this module can be offered in English. The catalogue will be announced as usual at the faculty, at the beginning of each semester, including the language of the courses.	
Prerequisites for participation	Knowledge and skills in the basics of formal languages and methods, logic, automatics, computability and complexity theory at Bachelor level are required. The following literature will help students to prepare for the module: U. Schöning: Theoretical Computer Science in a nutshell. U. Schöning: Logic for computer scientists. I. Wegener: Theoretical Computer Science.	
Usability	The module is one of eight compulsory elective basic modules in the Master's programme in Computer Science, of which three are to be selected and one of seven compulsory elective basic modules in the Diploma programme in Computer Science, of which three are to be selected. In the aforementioned Diploma programme, it fulfils the prerequisites for the compulsory elective advanced and profile modules *Advanced Theoretical Computer Science* (INF-VERT6), *Introduction to Basic Research in Computer*	

	Science (INF-PM-FOR) and *Introduction to Applied Research in Computer Science* (INF-PM-ANW).
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of an oral examination with a duration of 30 minutes. At the student's request, the oral examination may be conducted in English.
Credit points and grades	The module allows for the earning of 12 credit points. The module grade corresponds to the grade of the oral examination.
Frequency of the module	The module is offered each semester.
Workload	The workload is a total of 360 hours.
Duration of the module	The module takes two semesters.

Module number	Module name	Responsible lecturer
INF-BAS7	Graphic Data Processing	Prof. Dr. Stefan Gumhold stefan.gumhold@tu-dresden.de
Contents and qualification objectives	The students have an overview of the basic principles of graphic data processing and are familiar with the structure and functionality of corresponding software and hardware systems. Graphical data processing is divided into the areas of image processing, image analysis, geometry processing and image synthesis. Students can design, implement and analyze simple applications in a procedural programming language based on standard libraries. The content of the module is chosen by the students: Image processing, pattern recognition, computer graphics, interactive applications, virtual and extended reality, visualization and computer games.	
Teaching and learning methods	The module includes lectures, exercises, internships and seminars in the amount of 8 SWS (semester weeks) and the self-study. The courses are to be selected from the INF-BAS7 catalogue of the Faculty of Computer Science to the specified extent, including at least 2 SWS lectures and 2 SWS exercises. Some courses of this module can be offered in English. The catalogue will be announced as usual at the faculty, at the beginning of each semester, including the language of the courses.	
Prerequisites for participation	Skills and abilities in the basics of programming (e.g. in C and C++), algorithms and data structures, linear algebra, analysis are required. The following literature will help students to prepare for the module: D. Hachenberger: Mathematics for computer scientists (Pearson), ISBN: 978-3827373205. T. Ottmann, P. Widmayer: Algorithms and Data Structures, ISBN: 978-3-8274-2803-5. B. Stroustrup: Introduction to programming with C++, ISBN: 978-3-8632-6586-1.	
Usability	The module is one of eight compulsory elective basic modules in the Master's programme in Computer Science, of which three are to be selected and one of seven compulsory elective basic modules in the Diploma programme in Computer Science, of which three are to be selected. It is also one of 11 compulsory	

	elective advanced modules in the Master's programme in Media Informatics, of which a total of 60 credit points must be chosen. In the aforementioned diploma programme, it fulfils the prerequisites for the compulsory elective advanced modules Advanced *Graphic Data Processing (INF-VERT7), Introduction to Basic Research in Computer Science (INF-PM-FOR)* and *Introduction to Applied Research in Computer Science (INF-PM-ANW).*
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of an oral examination with a duration of 30 minutes. At the student's request, the oral examination may be conducted in English.
Credit points and grades	The module allows for the earning of 12 credit points. The module grade corresponds to the oral examination grade.
Frequency of the module	The module is offered each semester.
Workload	The workload is a total of 360 hours.
Duration of the module	The module takes two semesters.

Module number	Module name	Responsible lecturer
INF-BAS8	Non-IT Applications	Academic dean studiendekan@inf.tu-dresden.de
Contents and qualification objectives	The students have grasped the basics of a non-computer science minor subject to such an extent that they can plan the use of typical computer science methods, estimate the corresponding challenges and successfully implement them. They are able to comprehend problems in the field of application and are able to work out solutions using computer science approaches. They are also particularly qualified to work in interdisciplinary projects and teams. The contents of the module are as chosen by the students: Acoustics, Business Administration, Biomedical Engineering, Photogrammetry and Psychology.	
Teaching and learning methods	The module includes lectures, exercises, internships, practical courses and seminars in the amount of at least 6 SWS. The courses are to be selected from the INF-BAS8 catalogue of the Faculty of Computer Science to the specified extent. The catalogue including the examination performances and weightings as well as the required preliminary examination performances will be announced as usual at the faculty, at the beginning of each semester.	
Prerequisites for participation	none	
Usability	This module is one of eight compulsory elective basic modules in the Master's programme in Computer Science, of which three are to be selected. Additionally, it is one of five compulsory elective advanced modules in the Master's programme in Media Informatics, of which modules to the amount of 12 credit points are to be selected.	
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of the examination performances according to the INF-BAS8 catalogue Some preliminary examination performances are required as specified in the INF-BAS8 catalogue.	

Credit points and grades	The module allows for the earning of 12 credit points. The module grade results from the average of the grades of the examination performances, weighted according the INF-BAS8 catalogue.
Frequency of the module	This module is offered each semester.
Workload	The workload is a total of 360 hours.
Duration of the module	The module takes two semesters.

Module number	**Module name**	**Responsible lecturer**
INF- VERT1	Advanced Applied Computer Science	Prof. Dr. Martin Wollschlaeger martin.wollschlaeger@tu-dresden.de
Contents and qualification objectives	Students know advanced engineering methods for flexible automated systems over their entire life cycle. They can transfer engineering methods to novel application systems, apply them in an integrated way and develop components of such systems independently. The content of the module can be chosen by the students: Design and synchronization of multimodal user interfaces using visual, speech-based and haptic interaction techniques, assistive technologies, simulative performance evaluation of complex dynamic systems, industrial simulation projects including common statistical methods and modelling approaches, planning and control approaches from production and logistics, Resource scheduling problems, design of networked software systems including wireless networks and sensor-actuator networks and methods for modelling, specification, description, engineering and management of industrial communication systems, information models and systems for complex networked production systems.	
Teaching and learning methods	The module includes courses in the amount of 10 SWS (semester weeks) and the self-study. At least 4 SWS lectures and 2 SWS exercises are to be selected from the INF-VERT1 catalogue of the Faculty of Computer Science. 4 SWS lectures, exercises, seminars and internships listed in the catalogue can be freely selected. Some courses in this module may be offered in English. The catalogue will be announced as usual at the Faculty of Computer Science, at the beginning of each semester, including the language of the course.	
Prerequisites for participation	The Diploma programme in Computer Science requires the competences to be acquired in the module *Applied Computer Science* (INF-BAS1).	
Usability	The module is one of seven compulsory elective advanced modules in the Master's programme in Computer Science, of which one is to be selected, and one of seven compulsory elective advanced modules in the Diploma programme in Computer Science, of which one is to be selected. It is also one of four compulsory elective advanced modules in the Diploma	

	programme in Information Systems Engineering, of which one must be selected.
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of an oral examination performance, with a duration of 40 minutes. At the student's request, the oral examination may be conducted in English.
Credit points and grades	The module allows for the earning of 15 credit points. The module grade corresponds to the grade of the oral examination.
Frequency of the module	The module is offered each semester.
Workload	The workload is a total of 450 hours.
Duration of the module	The module takes two semesters.

Module number	**Module name**	**Responsible lecturer**
INF- VERT2	Advanced Artificial Intelligence	N.N.
Contents and qualification objectives	The students are able to specify intelligent systems by means of formal methods, procedures and algorithms, they can prove properties of intelligent systems by means of formal methods, procedures and algorithms and they can introduce the used formal methods, procedures and algorithms into further applications. The contents of the module are as chosen by the students: Knowledge representation and inference, computational logic, pattern recognition and computer vision as well as bioinformatics.	
Teaching and learning methods	The module includes courses in the amount of in total 10 SWS (semester weeks) and the self-study. At least 4 SWS lectures and 2 SWS exercises are to be selected from the INF-VERT2 catalogue of the Faculty of Computer Science. 4 SWS lectures, exercises, seminars and internships listed in the catalogue are to be freely selected. Some courses in this module may be offered in English. The catalogue will be announced as usual at the Faculty of Computer Science, at the beginning of each semester, including the language of the courses.	
Prerequisites for participation	In the Diploma programme in Computer Science the competences acquired in the module *Artificial Intelligence* (INF-BAS2) are required. Literature: Russel S. and Norvig, P.: Artificial Intelligence: A Modern Approach, Prentice Hall, 2009.	
Usability	In the Master's programme in Computer Science, the module is one of seven compulsory elective advanced modules of which one must be chosen, and one of seven compulsory elective advanced modules of which one must be chosen in the Diploma programme in Computer Science.	
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of an oral examination performance with a duration of 40 minutes. At the student's request, the oral examination may be conducted in English.	
Credit points and grades	The module allows for the earning of 15 credit points. The module grade corresponds to the grade of the oral examination.	

Frequency of the module	The module is offered each semester.
Workload	The workload is a total of 450 hours.
Duration of the module	The module takes two semesters.

Module number	**Module name**	**Responsible lecturer**
INF-VERT3	Advanced Software and Web Engineering	Prof. Dr. Raimund Dachselt raimund.dachselt@tu-dresden.de
Contents and qualification objectives	The students know advanced development methods and tools for the engineering of software, web, and Multimedia applications and the associated processes. With the help of modern frameworks, they can design and implement complex distributed applications with multimedia interfaces and evaluate their usability. The content of the module can be chosen by the students: Software technologies, web & multimedia engineering and usability engineering.	
Teaching and learning methods	The module includes courses in the amount of 10 SWS (semester weeks) and the self-study. At least 4 SWS lectures and 2 SWS exercises are to be chosen from the INF-VERT3 catalogue of the Faculty of Computer Science. 4 SWS lectures, exercises, seminars and internships listed in the catalogue can be freely chosen. Some courses of this module can be offered in English. The catalogue will be announced as usual at the faculty, at the beginning of each semester, including the language of the courses.	
Prerequisites for participation	In the Master's and Diploma programme in Computer Science, the competences to be acquired in the module *Software and Web Engineering* (INF-BAS3) are required.	
Usability	The module is one of seven compulsory elective advanced modules in the Master's programme in Computer Science, of which one is to be chosen, and one of seven comulsory elective advanced modules in the Diploma programme in Computer Science, of which one is to be chosen. It is also one of four compulsory elective advanced modules in the Diploma programme in Information Systems Engineering, of which one must be chosen.	
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of an oral examination performance with a duration of 40 minutes. At the student's request, the oral examination may be conducted in English.	

Credit points and grades	The module allows for the earning of 15 credit points. The module grade corresponds to the grade of the oral examination.
Frequency of the module	The module is offered each semester.
Workload	The workload is a total of 450 hours.
Duration of the module	The module takes two semesters.

Module number	**Module name**	**Responsible lecturer**
INF- VERT4	Advanced System Architecture	Prof. Dr. Wolfgang Lehner wolfgang.lehner@tu-dresden.de
Contents and qualification objectives	Students can independently develop new concepts and solutions for the analysis, design, validation and operation of complex system architectures. They consider both functional and non-functional aspects such as effort, costs, real time, fault tolerance, security and data protection. Furthermore, they are able to consider new research-oriented problems in this area under possible economic and social effects. The contents of the module can be chosen by the students: Operating systems, databases, computer networks, fault tolerance, data protection and data security.	
Teaching and learning methods	The module includes courses in the amount of 10 SWS (semester weeks) and the self-study. At least 4 SWS lectures and 2 SWS exercises are to be chosen from the INF-VERT4 catalogue of the Faculty of Computer Science. 4 SWS lectures, exercises, seminars and internships listed in the catalogue can be freely chosen. Some courses of this module can be offered in English. The catalogue will be announced as usual at the faculty, at the beginning of each semester, including the language of the courses.	
Prerequisites for participation	The Diploma programme in Computer Science requires the competences to be acquired in the module *System Architecture* (INF-BAS4), in particular basic knowledge of databases (relational databases, Entity Relationship Model, XML data model), computer networks (transmission methods, network technologies, Internet protocol mechanisms), operating systems (memory and process management, quantitative methods, process communication) and security (multilateral security, protection targets, attack models, security mechanisms).	
Usability	The module is one of seven compulsory elective advanced modules in the Master's programme in Computer Science, of which one is to be chosen, and one of seven compulsory elective advanced modules in the Diploma programme in Computer Science, of which one is to be selected. It is also one of four compulsory elective advanced modules in the Diploma programme in Information Systems Engineering, of which one must be chosen.	

Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of an oral examination performance with a duration of 40 minutes. At the student's request, the oral examination may be conducted in English.
Credit points and grades	The module allows for the earning of 15 credit points. The module grade corresponds to the grade of the oral examination.
Frequency of the module	The module is offered each semester.
Workload	The workload is a total of 450 hours.
Duration of the module	The module takes two semesters.

Module number	**Module name**	**Responsible lecturer**
INF- VERT5	Advanced Computer Engineering	Prof. Dr. Wolfgang Nagel wolfgang.nagel@tu-dresden.de
Contents and qualification objectives	The students are able to develop new approaches for design, realization, use and evaluation of computer architectures and hardware implementations of technical systems by recombination and extension of known concepts. The contents of the module are as chosen by the students: Performance evaluation of computer systems; hardware and software techniques for parallel processing, design and testing of VLSI circuits, programmable circuits, computer arithmetic, hardware and software architecture of embedded systems; methods for hardware synthesis and efficient methods for code generation.	
Teaching and learning methods	The module includes courses in the amount of 10 SWS (semester weeks) and the self-study. At least 4 SWS lectures and 2 SWS exercises are to be chosen from the INF-VERT5 catalogue of the Faculty of Computer Science. 4 SWS lectures, exercises, seminars and internships listed in the catalogue can be freely chosen. Some courses of this module can be offered in English. The catalogue will be announced as usual at the faculty, at the beginning of each semester, including the language of the courses.	
Prerequisites for participation	The competences to be acquired in the module *Computer Engineering (INF-BAS5)* are required for the Diploma programme in Computer Science.	
Usability	The module is one of seven compulsory elective advanced modules in the Master's program in Computer Science, of which one is to be chosen, and one of seven compulsory elective advanced modules in the Diploma programme in Computer Science, of which one is to be chosen. It is also one of four compulsory elective advanced modules in the Diploma programme in Information Systems Engineering, of which one must be chosen.	
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of an oral examination performance with a duration of 40 minutes.	

Credit points and grades	The module allows for the earning of 15 credit points. The module grade corresponds to the grade of the oral examination.
Frequency of the module	The module is offered each semester.
Workload	The workload is a total of 450 hours.
Duration of the module	The module takes two semesters.

Module number	**Module name**	**Responsible lecturer**
INF- VERT6	Advanced Theoretical Computer Science	Prof. Dr. Franz Baader franz.baader@tu-dresden.de
Contents and qualification objectives	The students possess the methodical competence to create cross-references, dependencies and equivalences between different formal models for complex systems and are therefore able to open up new fields of application for formal descriptions. The contents of the module can be chosen by the students: Automata theory (automata on finite and infinite structures, variants thereof such as alternating, weighted and probabilistic automata), logics (temporal and modal logics, predicate logic of first and higher levels, equality logic, description logic, model theory, deduction, verification, model checking), modelling (modelling languages and their semantics, functional and quantitative system analysis) and complexity theory.	
Teaching and learning methods	The module includes courses in the amount of 10 SWS (semester weeks) and the self-study. At least 4 SWS lectures and 2 SWS exercises are to be chosen from the INF-VERT6 catalogue of the Faculty of Computer Science. 4 SWS lectures, exercises, seminars and internships listed in the catalogue can be freely chosen. Some courses of this module can be offered in English. The catalogue will be announced as usual at the faculty, at the beginning of each semester, including the language of the courses.	
Prerequisites for participation	The competences to be acquired in the module *Computer Engineering (INF-BAS),* especially knowledge and skills in the area of Formal Languages and Methods, Logic, Automata Theory, Computability, and Complexity Theory are required for the Diploma programme in Computer Science. With the following literature students can prepare for the module: U. Schöning: Theoretische Informatik – kurz gefasst. U. Schöning: Logik für Informatiker. I. Wegener: Theoretische Informatik.	
Usability	The module is one of seven compulsory elective advanced modules in the Master's programme in Computer Science, of which one must be chosen, and one of seven compulsory elective	

	advanced modules in the Diploma programme in Computer Science, of which one must be chosen.
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of an oral examination performance with a duration of 40 minutes. At the student's request, the oral examination may be conducted in English.
Credit points and grades	The module allows for the earning of 15 credit points. The module grade corresponds to the grade of the oral examination.
Frequency of the module	The module is offered each semester.
Workload	The workload is a total of 450 hours.
Duration of the module	The module takes two semesters.

Module number	Module name	Responsible lecturer
INF- VERT7	Advanced Graphic Data Processing	Prof. Dr. Stefan Gumhold stefan.gumhold@tu-dresden.de
Contents and qualification objectives	Students have in-depth knowledge in selected areas of graphical data processing and understand current research literature. They can independently implement and further develop state-of-the-art methods and integrate the results into existing or self-developed libraries and describe them in structured written form. The contents of the module are as chosen by the students: Image processing, pattern recognition, computer graphics, interactive applications, virtual and augmented reality, visualization and computer games.	
Teaching and learning methods	The module includes courses in the amount of 10 SWS (semester weeks) and the self-study. At least 4 SWS lectures and 2 SWS exercises are to be chosen from the INF-VERT7 catalogue of the Faculty of Computer Science. 4 SWS lectures, exercises, seminars and internships listed in the catalogue can be freely chosen. Some courses of this module can be offered in English. The catalogue will be announced as usual at the faculty, at the beginning of each semester, including the language of the courses.	
Prerequisites for participation	The Diploma programme in Computer Science requires the competences to be acquired in the module *Graphical Data Processing* (INF-BAS7), in particular knowledge of the principles of graphic data processing as well as the structure and functionality of corresponding software and hardware systems. Literature references for the independent acquisition of the stated prerequisites can be found on the following website: http://www-smt.inf.tu-dresden.	
Usability	The module is one of seven compulsory elective advanced modules in the Master's programme in Computer Science, of which one must be chosen, and one of seven compulsory elective advanced modules in the Diploma programme in Computer Science, of which one must be chosen.	
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of an oral examination performance with a duration of 40 minutes. At the student's request, the oral examination may be conducted in English.	

Credit points and grades	The module allows for 15 credit points. The module grade corresponds to the grade of the oral examination.
Frequency of the modules	The module is offered each semester.
Workload	The workload is a total of 450 hours.
Duration of the module	The module takes two semesters.

Module number	**Module name**	**Responsible lecturer**
INF- PM-FOR	Introduction to Basic Research in Computer Science	Academic dean studiendekan@inf.tu-dresden.de
Contents and qualification objectives	The students have the necessary knowledge and skills for a research-oriented specialization. They are familiar with the most important developments in the international research community in a special field of computer science and know how to research their own desired research topic.	
Teaching and learning methods	The module includes lectures in the amount of 2 SWS exercises or seminars in the amount of 2 SWS and the self-study. The courses are to be selected to the specified extent, from the INF-PM-FOR catalogue of the Faculty of Computer Science. Some courses of this module can be offered in English. The catalogue will be announced as usual at the faculty at the beginning of the semester, including the language of the courses.	
Prerequisites for participation	The Diploma programme in Computer Science requires the competences acquired in at least two modules of the modules *Applied Computer Science* (INF-BAS1), *Artificial Intelligence* (INF-BAS2), *Software and Web Engineering* (INF-BAS3), *System Architecture* (INF-BAS4), *Computer Engineering* (INF-BAS5), *Theoretical Computer Science* (INF-BAS6) and *Graphic Data Processing* (INF-BAS7).	
Usability	The module is one of four compulsory elective profile modules of the Master's and Diploma programmes in Computer Science, of which two must be chosen. The module must be chosen along with the module *Introductory Project to Basic Research in Computer Science* (INF-PM-FPG). It fulifils the prerequisites for the module *Introductory Project to Basic Research in Computer Science* (INF-PM-FPG).	
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of an un-graded oral examination, with the duration of 15 minutes.	
Credit points and grades	The module allows for the earning of 9 credit points. The module is only graded "passed" or "failed".	

Frequency of the module	The module is offered each semester.
Workload	The workload is a total of 270 hours.
Duration of the module	The module takes one semester.

Module number	**Module name**	**Responsible lecturer**
INF-PM-FPG	Introductory Project to Basic Research in Computer Science	Academic dean studiendekan@inf.tu-dresden.de
Contents and qualification objectives	After completing this module, students are familiar with scientific working methods and can evaluate and, if necessary, correct their own theses or assumptions by means of suitable investigations and experiments. They can present the findings and explain them argumentatively.	
Teaching and learning methods	The module includes project work in the amount of 8 SWS (semester weeks) and the self-study. The courses are to be selected to the specified extent, from the INF-PM-FPG catalogue of the Faculty of Computer Science. Some courses of this module can be offered in English language. The catalogue will be announced as usual at the faculty at the beginning of the semester, including the language of the courses.	
Prerequisites for participation	The competences acquired in the module *Profile Basic Research in Computer Science* (INF-PM-FOR) are required.	
Usability	The module is one of four compulsory elective profile modules of the Master's and Diploma programmes in Computer Science, of which two have to be chosen. The module must be chosen along with the module *Profile Basic Research in Computer Science* (INF-PM-FOR).	
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of a colloquium, with a duration of 60 minutes.	
Credit points and grades	The module allows for the earning of 12 credit points. The module grade corresponds to the grade of the colloquium.	
Frequency of the module	The module is offered each semester.	
Workload	The workload is a total of 360 hours.	

Duration of the module	The module takes one semester.

Module number	**Module name**	**Responsible lecturer**
INF-PM-ANW	Introduction to Applied Research in Computer Science	Academic dean studiendekan@inf.tu-dresden.de
Contents and qualification objectives	The students have the necessary knowledge and know specialized methods to be able to design and implement systems in an area of applications of computer science. They understand how to map realistic problems to fundamental theoretical models, how to develop solutions and how to transfer these to the concrete application case. They know specialized tools and methods in the application area of their chosen specialization and can use them specifically to solve problems.	
Teaching and learning methods	The module includes lectures in the amount of 2 SWS, exercises or seminars in the amount of 2 SWS and the self-study. The courses are to be selected to the specified extent, from the INF-PM-ANW catalogue of the Faculty of Computer Science. Some courses of this module can be offered in English. The catalogue will be announced as usual at the faculuty at the beginning of the semester, including the language of the courses.	
Prerequisites for participation	The Diploma programme in Computer Science requires the competences acquired in at least two modules of the modules *Applied Computer Science* (INF-BAS1), *Artificial Intelligence* (INF-BAS2), *Software and Web Engineering* (INF-BAS3), *System Architecture* (INF-BAS4), *Computer Engineering* (INF-BAS5), *Theoretical Computer Science* (INF-BAS6) and *Graphic Data Processing* (INF-BAS7).	
Usability	The module is one of four compulsory elective profile modules of the Master's and Diploma programmes in Computer Science, of which two must be chosen. The module must be chosen along with the module *Introductory Project to Applied Research in Computer Science* (INF-PM-FPA). The module fulfils the prerequisites for the module *Introductory Project to Applied Research in Computer Science* (INF-PM-FPA).	
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of an un-graded oral examination performance, with the duration of 15 minutes.	

Credit points and grades	The module allows for the earning of 9 credit points. The module is only graded "passed" or "failed".
Frequency of the module	The module is offered each semester.
Workload	The workload is a total of 270 hours.
Duration of the module	The module takes one semester.

Module number	**Module name**	**Responsible lecturer**
INF-PM-FPA	Introductory Project to Applied Research in Computer Science	Academic dean studiendekan@inf.tu-dresden.de
Contents and qualification objectives	Students can design and implement application systems in a field of application of computer science using specialized methods and tools. They can independently assess the quality and implications of the designed application systems and, if necessary, improve them. They know how to structure and document the solution process. They can present the knowledge gained and explain it argumentatively.	
Teaching and learning methods	The module includes project work in the amount of 8 SWS and the self-study. The courses are to be selected to the specified extent, from the INF-PM-FPA catalogue of the Faculty of Computer Science. Some courses of this module can be offered in English. The catalogue will be announced as usual at the faculty at the beginning of each semester, including the language of the courses.	
Prerequisites for participation	The competences acquired in the module *Introduction to Applied Research in Computer Science* (INF-PM-ANW) are required.	
Usability	The module is one of four compulsory elective profile modules of the Master's and Diploma programmes in Computer Science, of which two must be chosen. The module must be chosen along with the module *Introduction to Applied Research in Computer Science* (INF-PM-ANW).	
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of a colloquium, with a duration of 60 minutes.	
Credit points and grades	The module allows for the earning of 12 credit points. The module grade corresponds to the grade of the colloquium.	
Frequency of the module	The module is offered each semester.	
Workload	The workload is a total of 360 hours.	

Duration of the module	The module takes one semester.

Module number	**Module name**	**Responsible lecturer**
INF- MA-PR	Research and Development in Computer Science	Academic dean studiendekan@inf.tu-dresden.de
Contents and qualification objectives	After completing the module, the students possess extensive practical and application-oriented skills. They know how to efficiently develop and document solutions. They can include relevant research results in their work, but also possess the necessary fundamental specialist knowledge to develop and apply their own approaches. They can present their solutions and explain them argumentatively.	
Teaching and learning methods	The module includes practical courses in the amount of 8 SWS and the self-study. The courses are to be selected to the specified extent, from the INF-MA-PR catalogue of the Faculty of Computer Science. The catalogue including the examination performance and the weightings will be announced as usual at the faculty at the beginning of the semester.	
Prerequisites for participation	none	
Usability	The module is a compulsory module in the Master's programme in Computer Science.	
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of two colloquia.	
Credit points and grades	The module allows for the earning of 12 credit points. The module grade results from the average of the grades of the examination performances, weighted according to the INF-MA-PR catalogue.	
Frequency of the module	The module is offered each semester.	
Workload	The workload is a total of 300 hours.	
Duration of the module	The module takes two semesters.	

Module number	**Module name**	**Responsible lecturer**
INF- AQUA	General Skills in Computer Science	Academic dean studiendekan@inf.tu-dresden.de
Contents and qualification objectives	The students have general qualifications which extend and deepen their competences. In particular, they have the necessary linguistic skills to represent and document their own research and practical work accordingly. This also includes the ability to extract the essential content from scientific texts and to prepare it in the form of a lecture. They are able to cooperate with researchers and users from other linguistic and cultural backgrounds and to develop joint solutions. They also have the ability to familiarize themselves with topics beyond computer science and to understand connections outside their subject area.	
Teaching and learning methods	The module includes lectures, exercises, internships, project work, excursions, tutorials and language courses in the amount of 4 SWS as well as a seminar in the amount of 2 SWS. Some courses of this module can be offered in English. The courses must be selected to the specified extent, from the INF-AQUA catalogue of the Faculty of Computer Science. This catalogue including the examination performance, the weightings and the language of the courses, will be announced as usual at the faculty at the beginning of the semester. The choice of a course is inadmissible if it has already been chosen in the Bachelor's programmes in Computer Science or Media Informatics.	
Prerequisites for participation	There are no participation requirements for the module.	
Usability	The module is a compulsory module in the Master's programmes in Computer Science and Media Informatics.	
Requirements for the awarding of credit points	The credit points are awarded if the module examination is passed. The module examination consists of the examination performances specified in the INF-AQUA catalogue.	
Credit points and grades	The module allows for the earning of 6 credit points. The module grade results from the weighted average of the examination grades according to the INF-AQUA catalogue.	

Frequency of the module	The module is offered each semester.
Workload	The workload is a total of 180 working hours.
Duration of the module	The module takes one semester.