

2020/21

Please note the year of validity of the module catalogue.

FACULTY OF MANAGEMENT,
ECONOMICS AND SOCIAL
SCIENCES

UNIVERSITY OF COLOGNE

VICE DEAN OF STUDIES
DEPARTMENT



MODULE CATALOGUE

INFORMATION SYSTEMS

BACHELOR OF SCIENCE

IN ACCORDANCE WITH THE EXAMINATION REGULATIONS FOR THE SINGLE MAJOR
BACHELOR PROGRAMME IN INFORMATION SYSTEMS

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Status	Taking effect on 01.10.2020

Lists of abbreviations

AM	Advanced module	PR	Project
AS	Assignment	PRES	Presentation
C	Course	SI	Studium Integrale
CC	Compulsory course	SM	Specialisation module
CM	Core module	SPM	Supplementary module
CH	Contact hours (= time spent in class)	SPW	Semester period per week
ECTS	Credit Points	SSt	Self-study
CS	Case study	TP	Term paper
EC	Elective course	TPF	Time required for preparation and follow-up
OE	Oral Examination	TR	Credit points transferred from another university
PRP	Project report	WL	Workload
PCR	Practical component report	WT	Written Test

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1 Information Systems

Information Systems is an independent, interdisciplinary field, which has its roots in informatics and economics, especially business administration.

The Cologne Institute of Information Systems (CIIS) is responsible for teaching Information Systems at the University of Cologne. In addition, the range of courses is supplemented by teaching assignments and practical contributions. There are extra-curricular workshops on current topics (for example App development, Big Data, Soft-Skills) held at irregular intervals, which are mostly financially supported by companies and are sometimes even hosted by them.

1.1 Content and objectives of the programme

Graduates have competences at level 6 of the German Qualification Framework or the Bachelor level of the German Qualification Framework for Higher Education Qualifications. Their specific formulation as *Intended Learning Outcome* is:

Graduates...

...understand the logical and theoretical principles of informatics, correctness, calculability and complexity of algorithms.

...know the application, structure and function of information technologies and information systems in organisations and their implications, and/or understand data base management systems and integrated information systems.

...recognise different methods for management, know respective advantages and disadvantages, and apply the development process for information systems.

...analyse corporate decisions relative to application and information systems from an information economics perspective.

...reflect their knowledge in practical situations and use it problem solving oriented.

...apply IT, economic, mathematical and statistical theories and methods to selected issues.

...understand a programming language, and can create and apply application programmes with a given authoring tool.

...apply their knowledge in practical situations or apply the presented methods in practice-relevant tasks, and demonstrate awareness of situational environmental factors (e.g. mid- to long-term economic trends, ethical implications of electronic data processing).

...collect, systematise and define literature and data material for scientific papers/questions on a selected topic.

...prepare independently an academic paper/thesis on a selected topic under the advisor's guidance.

...work constructively and cooperatively in teams.

...present and/or discuss academic topics and problems in German or in English.

...justify argumentatively and evaluate independently positions, solutions to problems or processes in German or in English.

...consider during the preparation for solution of problems perspectives of relevant stakeholders.

...organise independently their own work and learning processes.

...evaluate their own action processes by self- and external-reflexion.

The subject of information systems deals with the conception, development and application of information systems in economics, management and increasingly in our private life. The subject unites theoretical knowledge of several disciplines with application-oriented focus towards system solutions for operational challenges. In many contexts of work and living environment, it provides solutions to product and (business) process designing under economic framework conditions, with its innovative capacity. Information systems are indispensable in almost all conceivable economic, political and social contexts like resource management, energy, security, health and care, traffic, environment, production, finance, education, production as well as media. Information systems contribute towards decision-making, coordination, steering and control of value added processes as well as their automation, integration and virtualisation. Information systems can affect product, process and business model innovations. Therefore, a degree course in business informatics opens up a wide operational spectrum for the interface of business management and informatics, especially in planning, development, introduction and operation of information systems. In the labour market, the frequently sought-after dual qualification in the areas of business administration and informatics can be applied in a wide spectrum of various business areas and industries. Here, IT business engineers adopt a translation function between business administration related world of ideas and voice on one hand and of a technically entrenched system world on the other. IT business engineers can accordingly perceive coordinating functions between IT specialists and subject specialists on the application side, whereby consultancy services and project management are paramount. Over and above that, IT business engineers are experts in structuring and modelling information systems and understand how to make a difference in IT non-expert domains, like healthcare. From an industry-related perspective, not only companies related to information technology like IT service providers or consultancies are considered employers, but in connection with corresponding specialisations like employers from the trade, logistics/transport, media, telecommunication or banking and insurance sectors also.

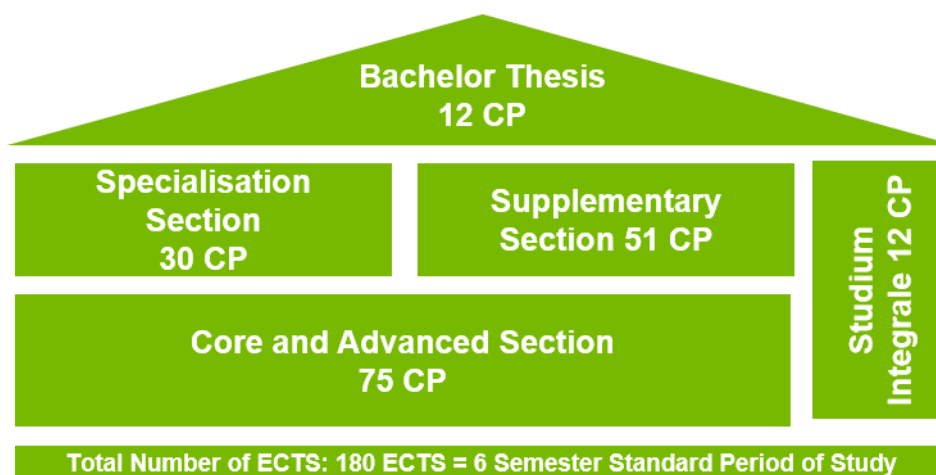
1.2 Requirements

Students must bring along the following professional, methodical and personal strengths and inclinations for a successful bachelor's degree:

- Good mathematical and analytical skills
- Abstract and conceptual thinking
- Good linguistic expressiveness in German and English
- Independent, target and result-oriented work
- Marked interest in economic and information technology issues

1.3 Programme structure and sequence

The degree course comprises overall 180 CP and includes a Core and Advanced Section (75 CP), a Supplementary Section (51 CP), as well as a Specialisation Section (30 CP). The Core and Advanced Section is again divided into a WiSo Core Section, Mathematics, Informatics and Business Informatics Section. It only includes Fundamental, or rather, Compulsory Modules and should be completed first for this specific reason. The Supplementary Section offers students the chance to obtain knowledge in the areas of Business Administration, Business Informatics or Informatics. Moreover, 12 CP from the wider range of Studium Integrale must be completed. Finally, in the Specialisation Section, additional knowledge from Informatics as well as Business Informatics must be deepened and applied. The degree course ends with a bachelor thesis (12 P).



1.4 Study Abroad Option

The WiSo Faculty offers a broad range of study abroad options within an excellent network of prestigious partner universities worldwide. The so-called Study Abroad Programme (STAP) includes ERASMUS exchanges and provides an opportunity for a single-term stay at one of the WiSo Faculty's partner universities. Successful STAP applicants benefit from direct contact and organisational support at the partner university as well as support in the organisation of the semester abroad by the [International Relations Center \(ZIB WiSo\)](#). Additionally, they are exempt from paying tuition fees there. The range of universities available depends on the bachelor course on which the student is enrolled – the possible options are listed in the [WiSo Exchange \(WEX\)](#) (access through the student's UoC account only), along with detailed information on each university.

Every year, in addition to the STAP programme, the WiSo Faculty organises an exclusive short-term study option WiSo@NYC which takes place in New York City.

In addition to these options offered by the Faculty, bachelor students can also apply for a non-WiSo exchange, offered by Dezernat 9 – Internationales (Central International Office of the University of Cologne) within the 'fakultätsübergreifende Partnerschaften' framework. Further possibilities are going abroad as a freemover (i.e. as a student who organises his or her stay abroad individually) or participating in short courses or summer schools offered under separate terms and conditions.

1.4.1 The Faculty's Study Abroad Programme (STAP)

Bachelor students should plan their application for a term abroad at the beginning of their bachelor studies. The main selection round for STAP takes place once a year. It starts on 1st December 2020 and ends on 15th January 2021. It allows for an application either for fall term or spring term of the following academic year. Detailed information on the selection criteria and the best preparation for a STAP application can be found online in the [STAP Bachelor Application Manual](#).

If there are still places available after the main selection round has been completed, another small secondary selection round will be offered between April and June 1st. In this round, students can only apply for the following spring term.

STAP Bachelor – main selection round (fall term and spring term)



* Deadline for handing in FILTERtest results (if taken until 30 November): 15 December. ** Alternative offer: if no offer can be given at one of the five preferred universities and if slots at other universities are available. *** End of main selection round. In case any exchange slots become available after 15 March, these slots will be made available in a secondary selection round.

STAP Bachelor – secondary selection round (for spring term only)

Please note: there is no guarantee that a secondary selection round will take place every year, nor should a wide range of exchange opportunities be expected.



* Deadline for handing in FILTERtest results (if taken until 1 June): 15 June. ** Alternative offer: if no offer can be given at one of the five preferred universities and if slots at other universities are available.

1.4.2 Credit transfer options from studies abroad

The WiSo Faculty has put a lot of emphasis on internationalisation in the design of its bachelor programmes, offering broad credit transfer options for all kinds of study abroad options. Each bachelor course includes at least one "Studies Abroad" module, with a broad range of courses suitable for credit transfer. In addition, a single course-to-course credit transfer can be considered. Moreover, students have the option of crediting courses from the semester abroad as part of their Studium Integrale.

For any questions regarding credit transfer, students can contact the [ZIB WiSo](#) or the [WiSo Credit Transfer Center](#).

1.5 Module study plan sequence

B.Sc. Information Systems				
Term	CC/ EC	Module	Section	CP
1	CC	Core Module Mathematics	Core and Advanced Section	12
1	CC	Core Module Computer Science	Core and Advanced Section	6
1	CC	Core Module Information Systems I	Core and Advanced Section	6
1	CC	Core Module Information Systems II	Core and Advanced Section	6
				30
2	CC	Advanced Module Computer Science I	Core and Advanced Section	9
2	CC	Core Module Fundamentals of Business Administration	Core and Advanced Section	12
2	CC	Advanced Module Information Systems	Core and Advanced Section	9
				30
3	CC	Advanced Module Computer Science II	Core and Advanced Section	9
3	CC	Advanced Module Statistics	Core and Advanced Section	6
3	EC	Supplementary Section Business Administration I	Supplementary Section	9
3	EC	Supplementary Module Information Systems I	Supplementary Section	6
				30
4	EC	Supplementary Module Computer Science	Supplementary Section	9
4	CC	Supplementary Module Information Systems II	Supplementary Section	6
4	CC	Specialisation Module Computer Science	Specialisation Module	9
4	EC	Studium Integrale	Studium Integrale	6
				30
5	CC	Bachelor Seminar	Specialisation Module	6
5	CC	Specialisation Module Information Systems	Specialisation Section	15
5	EC	Supplementary Module Computer Science	Supplementary Section	9
				30
6	EC	Supplementary Section Business Administration II	Supplementary Section	12
6	EC	Studium Integrale	Studium Integrale	6
6	CC	Bachelor Thesis	Specialisation Section	12
				30

1.5.1 Study plans including a semester abroad

a) Adaption

The fifth semester is mostly suitable for studying abroad.

In view of the model study plan sequence and the credit transfer options in the Supplementary Section (12 CP) as well as in the Studium Integrale (12 CP) the two parts of the Studium Integrale as well as the Supplementary Module Business Administration II should be positioned in the fifth semester in the case of an **exemplary** stay abroad. The Specialisation Module Information Systems can be positioned in the sixth semester and the Supplementary Module Computer Science can be moved to the fourth semester. The Bachelor's Seminar is to be planned according to the individual curriculum.

b) General remarks

For questions about studying abroad the ZIB WiSo is at your disposal.

Additionally, it is always possible not to request a semester on leave (*Urlaubssemester*) if you spend a semester abroad such that examinations can be taken upon return to the University of Cologne (if it is individually feasible).

1.6 Modules with mid-term examinations

Some modules have courses that only run for half a term and usually with twice the normal number of classes. For these modules, the term is divided into two roughly equal halves. In the fall, the mid-term usually ends at the beginning of December; in the spring, it is usually in the middle or at the end of May. Often, the examinations for these courses are held mid-term, enabling students to reduce their examination load at the end of term.

The information in the campus management system (KLIPS) regarding the dates of courses and examinations is relevant in this context.

1.7 Calculation of the overall mark

The overall mark for the bachelor degree combines the marks for the various sub-categories, Core and Advanced Section, Supplementary Section and Specialisation Section, weighted based on the respective number of credit points attainable and each sub-category's contribution towards the overall mark for the examinations for which marks are given. The marks for the sub-categories are calculated as the mean of the examination results in line with the weighting for each examination in terms of the credit points it contributes to the overall mark for the examinations in the respective category for which marks are given. If the result of

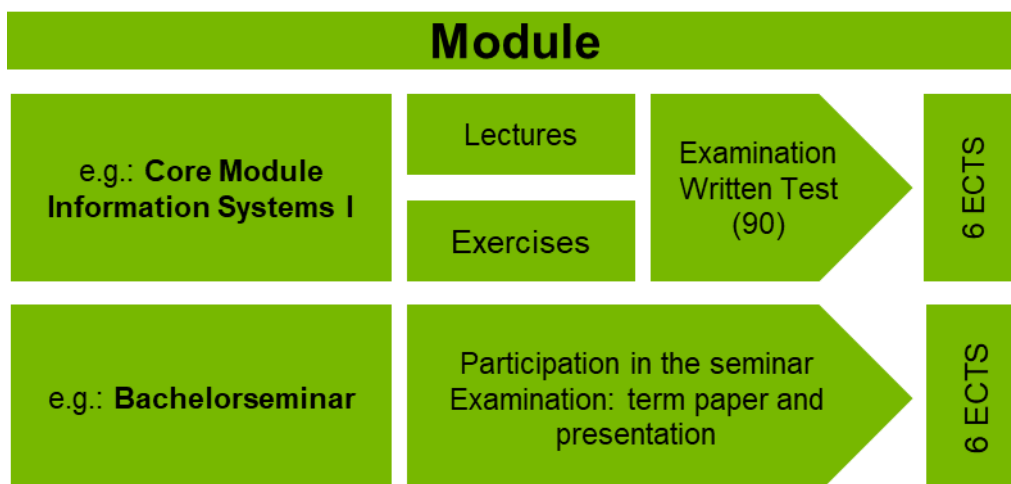
a module examination is calculated based on several components, the mark is calculated based on a weighting given in the module description. For means, only the first decimal place after the decimal point is taken into account; all other decimal places are deleted without rounding.

1.8 Modularity

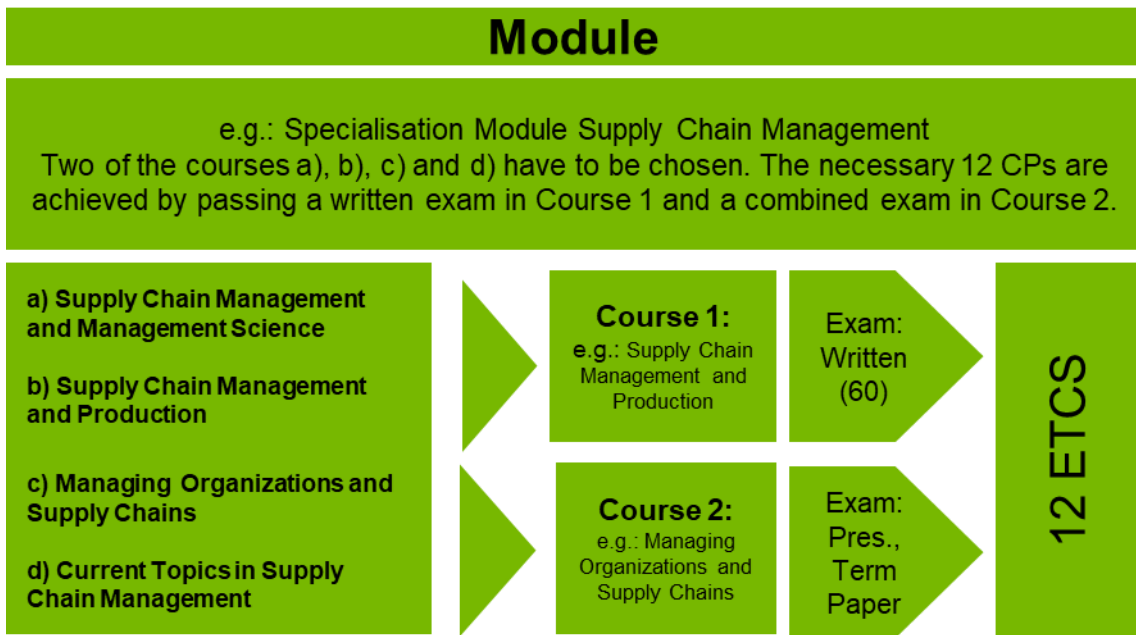
The subject categories on the bachelor programmes are divided into modules, the contents of which are presented in the module descriptions. The bachelor module catalogue can be viewed in the [download section](#) of the WiSo Student Services (“WiSo-Studienberatungszentrum”) website. Students who pass the necessary examinations are awarded credit points as proof of their successful participation in a module. The module examinations are taken at regular intervals during the programme. Each module consists of various parts and can usually be completed in one or two terms. You will find this information in the “Duration” section of the module description. A module can consist of lectures, exercises and/or tutorials on the same subject. There are also modules that only comprise one type of class, e.g. a seminar. In some cases, modules offer students a choice between various courses and they are required to take one or more of them. In these cases, the examination can consist of two components (written test in course 1 and a term paper in course 2) or take the form of one, combined examination (a written test covering the content of courses 1 and 2).

When planning your studies, please remember that not every module is offered every term. To find out whether a module is being offered, refer to the “Module availability” section of the module description.

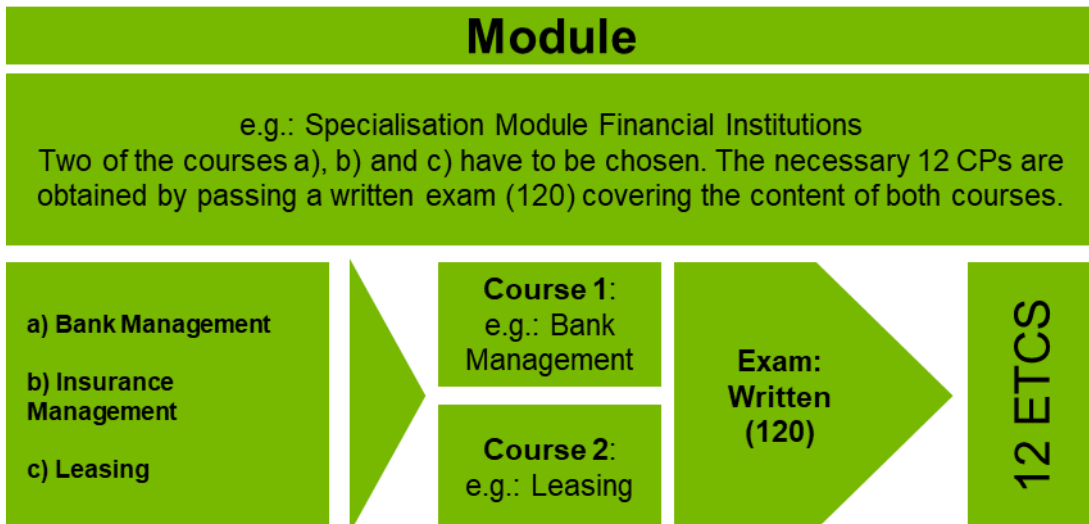
The following examples are to be understood exclusively as illustrations of the individual scenarios; they do not necessarily include modules of the present study programme.



Scenario 1: The module consists of complementary courses on the same subject.



Scenario 2: Students are required to take a combination of courses, each of which ends with its own examination. The CP are awarded once both examinations have been passed.



Scenario 3: Students take a combination of courses and at the end they sit one examination, covering the content of all of the courses, in order to gain their CPs.

1.9 Rules for failed attempts

Students may retake module examinations that they have failed. The number of attempts is limited to three per module.

In addition, additional three resit attempts can be granted to students at any point of the programme. Students who have accumulated at least 140 credit points are granted a further additional attempt. If a student fails an examination in the three additional attempts and the extra attempt for students with 140 points or more, they are deemed to have failed the programme at the final attempt. However, students may only be eligible for additional attempts beyond the initial three attempts if none of the first three examination attempts were failed due to cheating or to an offence. If the candidate fails a module examination three times, he or she will receive a written notification informing him or her of the options available. We recommend all students who fail the initial three attempts to seek advice from WiSo Student Services (“WiSo-Studienberatungszentrum”) before embarking upon an additional attempt.

Where a module examination consists of several components, the candidate must obtain a “bestanden” (pass) mark, or at least an “ausreichend (4,0)” (sufficient) mark, in all of the examination components. All components marked “mangelhaft (5,0)” or “nicht bestanden” (fail) must be retaken.

It is not possible to retake module examinations that have already been passed.

A failed bachelor thesis can be retaken once, with a new topic. Students must register for their second attempt within six months of the result of their first attempt being announced.

1.10 Compulsory attendance of courses

The rules concerning compulsory attendance of courses are laid down in Section 64(2a) of the “Hochschulzukunftsgesetz” (Higher Education Future Development Act). Consequently, the rules concerning compulsory attendance laid down in WiSo Faculty’s examination regulations no longer apply, which means that attendance is not compulsory for lectures or seminars.

Nonetheless, the WiSo Faculty does recommend students to attend courses regularly, particularly seminars. This is also in students’ own interests.

2 Support for students

2.1 Course registration in KLIPS 2.0

KLIPS 2.0 is the central campus management system of the University of Cologne. At the WiSo faculty, KLIPS 2.0 serves as a student organization tool. Students should use it as an online course catalogue, for registration and deregistration of courses and examinations, as well as an overview of the complete study programme and calendar. Information on current dates and deadlines of the WiSo faculty, as well as video tutorials and FAQs about KLIPS can be found on the homepage of WiSo-KLIPS-Support. If you have further questions, feel free to contact WiSo-KLIPS-Support via e-mail (klips-wiso@uni-koeln.de). For account questions, contact the central KLIPS support.

2.2 Exam registration in KLIPS 2.0

Examinations on the various programmes are always managed via KLIPS 2.0. Students must register for them within specified deadlines. Please note that registration for courses without restriction on participation via KLIPS and registration for the corresponding module examinations are two completely separate processes. In the case of courses which are subject to a restriction on participation, an examination registration is generally only possible if a registration for the course has been submitted beforehand. Most examinations in written test form are offered twice per term. Often, this will be to “space out” the dates, i.e. students can choose the date that best fits their examination schedule. In some cases, however, the second examination may be a genuine repetition of the first, depending on the department/institute concerned.

All WiSo Faculty examination candidates are entitled to see their examination papers after they have been marked. For more information, please visit the WiSo Examination Office website.

2.3 Subject-specific and examination advice

General advice for students, especially regarding study options and programme requirements, is available from WiSo Student Services (“**WiSo-Studienberatungszentrum**”) for all programmes at the WiSo Faculty. The WiSo Student Services also offer subject-specific recommendations for students’ study plans for the first semester plus information on how the individual programmes are structured. The WiSo Student Services are also the first place students should turn to if they have any other questions or problems concerning their studies. The centre can be contacted by telephone, in person or by email. The opening hours and contact data can be found on the corresponding webpage.

Subject-specific advice is provided during the designated times by the University’s faculty members and associated teaching staff (“akademische Mitarbeiterinnen und Mitarbeiter”) involved in the teaching on the programme. The designated times are announced by means of notices in the institutes and on the departments’/institutes’ websites.

Legally binding information concerning examinations and examination procedures is provided by the WiSo Faculty Examination Office. It also issues transcripts of records in German and English, ranking certificates and letters of assignment to the appropriate term of the programme. All the necessary information, contact details and opening hours can be found on the corresponding webpage.

2.4 Academic Working

To support the academic writing of term and final papers, the University of Cologne offers various courses to practice the process of academic writing by students. These include:

a) Writing advice/consultation

The Kompetenzzentrum Schreiben, the Professional Center, the Kölner Studierendenwerk and the programme SchreibArt offer advice as well as courses related to the issues that arise when writing an academic paper.

b) Literature research

The university library offers various courses especially for researching literature.

c) Text processing and literature administration

The Regionales Rechenzentrum provides courses regarding text processing and literature administration.

Students can register for the courses of the Professional Center and the SchreibArt programme in the **Studium Integrale** under „Kompetenzen für das Studium“ (competencies for studies).

There are even more offers made by the WiSo-faculty that can be elected in the Studium Integrale. Hence, these courses can be credited for your studies.

2.5 Other sources of information and advice

International students who study at the WiSo Faculty for part of their programme can turn to the International Relations Centre (“Zentrum für Internationale Beziehungen” or “ZIB”) for help with any questions they have. Cologne University students preparing to study abroad can also contact the ZIB for support. The Centre also runs a variety of summer schools, short programmes and Business English courses. The services, courses and people to contact can be found on the corresponding webpage.

The Faculty’s Credit Transfer Centre (“Zentrum für die Anrechnung auswärtiger Leistungen”) is responsible for recognising credits accumulated in other institutions. This applies both to credits students have gained at other higher education institutions in Germany or abroad prior to studying at the WiSo Faculty, and to (advance) transfer of credits that students plan to accumulate abroad or have already accumulated abroad as part of a WiSo Faculty programme. This system eliminates the need to make individual inquiries to departments/institutes and examination offices. Students can find out everything they need to know about the transfer process on the corresponding webpage.

The WiSo Career Service offers advice and support for students from the WiSo Faculty looking for an internship or profession that is right for them. It also helps them as they plan their career and apply for jobs. In addition, the WiSo Career Service organises seminars, presentations and special events in cooperation with employers and external and internal experts. It also works with other partners in the Faculty and the University to support and guide students as they decide on a career path.

The WiSo IT Service runs regular courses dealing with standard software and field-specific programs.

In case of study-related or personal difficulties, the psychosocial counselling (“Psycho-Soziale Beratung”) of the Kölner Studierendenwerk can be called upon. In addition to psychological and social counselling, it also offers writing and learning counselling and support for pregnant women and students with children.

As a further offer, there is Nightline Cologne, the listening and information telephone of students for students. It is available to all students at Cologne universities and colleges.

3 Module tables and descriptions

3.1 Core and Advanced Section

In accordance with Section 29(1), No. 1 of the Examination Regulations, students must accumulate 75 CPs in the Core and Advanced Section.

Group	Module	CP	CC/EC	Reqd. CP
Computer Science	Core Module Computer Science	6	CC	24
	Advanced Module Computer Science I	9	CC	
	Advanced Module Computer Science II	9	CC	
Information Systems	Core Module Information Systems I	6	CC	21
	Core Module Information Systems II	6	CC	
	Advanced Module Information Systems	9	CC	
WiSo Core	Core Module Fundamentals of Business Administration	12	CC	12
Mathematics	Core Module Mathematics	12	CC	18
	Advanced Module Statistics	6	CC	

3.2 Supplementary Section

In accordance with Section 29(1), No. 2 of the Examination Regulations, students must accumulate 51 CPs in the supplementary section.

Group	Module	CP	CC/EC	Reqd. CP
Management I	Core Module Corporate Development	9	EC	9
	Core Module Finance	9	EC	
	Core Module Marketing	9	EC	
	Core module Supply Chain Management	9	EC	
Management II	Specialisation Module Strategy, Organization and Human Resources	12	EC	12
	Specialisation Module Finance	12	EC	
	Specialisation Module Marketing	12	EC	
	Specialisation module Supply Chain Management	12	EC	
	Supplementary Module Studies Abroad in Management	12	EC	
	Specialisation Module Behavioral Management Science	12	EC	
Computer Science	Supplementary Module Theoretical Computer Science	9	EC	18
	Supplementary Module Practical Computer Science	9	EC	
	Supplementary Module Applied Computer Science	9	EC	
	Supplementary Module Technical Computer Science	9	EC	
	Supplementary Module Mathematics I	9	EC	
	Supplementary Module Mathematics II	9	EC	
	Supplementary Module Mathematics III	9	EC	
Information Systems	Supplementary Module Information Systems I	6	CC	12
	Supplementary Module Information Systems II	6	CC	

3.3 Specialisation Section

In accordance with Section 29(1), No. 3 of the Examination Regulations, students must accumulate 30 CPs in the specialisation section.

Group	Module	CP	CC/EC	Reqd. CP
Specialisation Section	Specialisation Module Computer Science	9	CC	24
	Specialisation Module Information Systems	15	CC	
Seminar	Bachelor Seminar	6	CC	6

3.4 Studium Integrale

All of the Faculty's bachelor programmes include an interdisciplinary component, known as the Studium Integrale, in which students accumulate 12 credit points. The Studium Integrale is a university-wide and interdisciplinary component of the courses of study in which academic and professional competences are imparted. The Studium Integrale has both theoretical and practical content, enabling students to focus on more academic aspects or topics related to their future careers enhancing their employability. It aims to teach and develop skills that go beyond subject-specific knowledge or that are related to basic academic and personal traits: scientific curiosity, systematic and analytical thinking, and ability to deal with complexity, a solution-minded outlook plus other abilities such as teamwork and foreign language skills.

The Studium Integrale courses are run jointly by the faculties and the University's Professional Centre. They enable students to pursue their own interests in more depth, gain an insight into other subjects and departments, attend courses dealing with issues of relevance to society, acquire skills relevant to their future careers and attend language classes. The "Universitas" segment offers formats especially designed for the Studium Integrale, such as lecture series on societal issues with related workshops. In addition, the Studium Integrale offers students assistance with their learning and studying, helping them with such questions as how to write an academic paper or how to conduct literature reviews. Periods of training abroad and work experience can also be credited in the Studium Integrale. The Studium Integrale carries 12 credit points in total and formally counts as a module. There is no restriction on the number of attempts possible for Studium Integrale examinations.

Any credit points attained in the Studium Integrale over and above the 12 credit points specified in the study structure are shown on the transcript of records.

3.5 Bachelor Thesis

The bachelor thesis carries 12 CPs and is written at the end of the programme. Its aim is to illustrate that the candidate is capable of working and reflecting independently on a specific problem related to the subject matter covered on the programme, using the necessary methods and within a specified period. The topic of the bachelor thesis must reflect one of the sub-categories: Core and Advanced Section, Supplementary Section or Specialisation Section.

To be allowed to register for the bachelor thesis component, candidates must have acquired at least 100 credit points. In line with the number of credit points it carries, the workload allotted for the thesis is 360 hours, i.e. 12 weeks. Bachelor theses should not be more than 40 pages long. Candidates who have earned all of the necessary credit points, except for the bachelor thesis, must register within a period of one year to write their bachelor thesis. Further and more detailed information concerning bachelor theses can be found in the examination regulations. Please note that the Cologne Institute for Information Systems (CIIS) offers Bachelor theses in every semester. Each semester you can start working on your bachelor thesis at **one fixed starting time** (in November in winter semesters and in May in summer semesters).

3.6 Module Descriptions

3.6.1 Core and Advanced Section

Core Module Computer Science					
Module code 5722BMIn00	Workload 180h	ECTS credits 6	Module Language German	Module availability every 2nd term - winter term	Duration 1 Term
1	Courses Programming Course		Contact hours 30h	Self-Studies 150h	Course Language German
2	Module content The event starts with a general introduction to development tools and environments as well as the Java programming language. The core of the course is the teaching of basic programming skills in the areas of "data types, instructions and control structures", "classes and objects", "object-oriented design and implementation", "Java language class libraries" and "problem analysis and resolution" as well as the design and development of small programs.				
3	Learning objectives Students... ... are able to create, analyze and apply simple Java programs. ... can analyze given problems and implement them as Java programs. ... can independently explore and use class libraries.				
4	Teaching and learning methods practice lecture				
5	Module entry requirements none				
6	Mode of end-of-module examination Written Test: WT e (90)				
7	Prerequisites for awarding of credit points Passing the written test. If prior notice is given, regular participation in the exercises and successful completion of exercises and/or projects can be used as a prerequisite for admission to the examination and included in the examination performance on a pro rata basis				
8	Other programmes that use the module Bachelor of Science Information Systems: Core and Advanced Section				
9	Module manager Geschäftsführender Direktor, Institut für Informatik				
10	Miscellaneous Programming cannot be learned exclusively by theoretical observation, therefore the				

	<p>participation in the exercises and the independent processing of implementation tasks is indispensable. Registration is required to take part in the final exam. One retest per cycle is offered. A repeated participation in the lecture and the exercises to prepare for a repetition of the final exam is possible. The module will be graded. The exam will be an e-exam.</p>
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Advanced Module Computer Science I					
Module code 5722AMIn01	Workload 270h	ECTS credits 9	Module Language German	Module availability every second semester - summer term	Duration 1 Term
1	Courses Computer Science I		Contact hours 90h	Self-Studies 180h	Course Language German
2	Module content After an introduction to the terminology and definition of computer science and the structure and functionality of computers, the lecture deals with basic contents of algorithms and data structures. The general design and analysis of algorithms are performed using examples from the fields of sorting and search methods as well as elementary graph algorithms. Furthermore, elementary graph algorithms can be treated. The presented elementary data structures include trees, graphs and Union-Find data structures.				
3	Learning objectives Students... ... are able to design and implement basic algorithms and to analyze algorithms with regard to correctness and their runtime behavior depending on the data structures used.				
4	Teaching and learning methods practice lecture				
5	Module entry requirements Recommended: Core Module Computer Science				
6	Mode of end-of-module examination Written test: WT (180)				
7	Prerequisites for awarding of credit points Passing the written test. The examination takes the form of a two-hour exam and may include both a theoretical part and a programming part, which must be passed equally. If prior notice is given, regular participation in the exercises and successful completion of exercises can be used as prerequisites for admission to the examination and can be included in the examination performance on a pro rata basis. Registration is required to take part in the final examination. One retest per cycle is offered. A repeated participation in the lecture and the exercises to prepare for a repetition of the final examination is possible. The module will be graded.				
8	Other programmes that use the module Bachelor of Science Information Systems: Core and Advanced Section				
9	Module manager Geschäftsführender Direktor, Institut für Informatik				
10	Miscellaneous The contents of the lecture cannot be learned exclusively by theoretical observation,				

	therefore participation in the exercises and independent processing of the tasks are indispensable.
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Advanced Module Computer Science II					
Module code 5722AMIn02	Workload 270h	ECTS credits 9	Module Language German	Module availability every 2nd term - winter term	Duration 1 Term
1	Courses Fundamentals of Computer Science II		Contact hours 90h	Self-Studies 180h	Course Language German
2	Module content The first part of the lecture imparts knowledge in the field of coding, Boolean functions, circuits and switching networks as the basis of computer architectures. This is followed by introductions to formal languages and their translation by compilers, operating systems and computer networks. The concluding theoretical part teaches the basics of computability and complexity theory.				
3	Learning objectives Students... ... learn the logical basics of computer calculations and their electronic realization, as well as the theoretical foundations of computability and complexity.				
4	Teaching and learning methods practice lecture				
5	Module entry requirements Recommended: Core Module Computer Science				
6	Mode of end-of-module examination Written test: WT (180)				
7	Prerequisites for awarding of credit points Passing the written test. In addition to a theoretical part, it may also include a programming part, which must be passed separately. If prior notice is given, regular participation in the exercises and successful completion of exercises can be used as prerequisites for admission to the examination and included in the examination performance on a pro rata basis. To take part in the final examination, a registration is required; a retest is offered per cycle. A repeated participation in the lecture and the exercises to prepare for a repetition of the final examination is possible. The module will be graded.				
8	Other programmes that use the module Bachelor of Science Information Systems: Core and Advanced Section				
9	Module manager Geschäftsführender Direktor, Institut für Informatik				
10	Miscellaneous The contents of the lecture cannot be learned exclusively through theoretical observation, therefore participation in the exercises and independent work on the tasks is indispensable.				

Core Module Information Systems I					
Module code 1277BMWi01	Workload 180h	ECTS credits 6	Module Language German	Module availability every 2nd term - winter term	Duration 1 Term
1	Courses Information Systems Management		Contact hours 60h	Self-Studies 120h	Course Language German
2	Module content <ul style="list-style-type: none"> • Business Informatics as science • Strategic role of information systems • Internal and inter-company business process integration • Electronic Commerce and Electronic Business • Computer Supported Collaborative Work • IT-Security • Ethical, social and political aspects • Information assets • Business Process Reengineering • Internet of things 				
3	Learning objectives Students... ... assess the relevance of application and information systems for companies, administration and, increasingly, the immediate private sphere. ... analyse or shape entrepreneurial decisions by means of information-economic considerations. ... classify current technological developments and estimate potentials for the solution of operational tasks. ... apply analysis and structuring concepts to case studies. ... assess concrete company and competition examples from the e-commerce and e-business sector.				
4	Teaching and learning methods practice lecture				
5	Module entry requirements none				
6	Mode of end-of-module examination Written test: WT (90)				
7	Prerequisites for awarding of credit points A pass in the written test.				
8	Other programmes that use the module Bachelor of Science Business Administration: Supplementary Section Bachelor of Science Information Systems: Core and Advanced Section				

<p>9</p>	<p>Module manager Univ.-Prof. Dr. Detlef Schoder</p>
<p>10</p>	<p>Miscellaneous Complementary compulsory reading: Laudon, K.; Laudon, J.; Schoder, D.: Wirtschaftsinformatik –eine Einführung, Pearson Verlag, 2010.</p>

Core Module Information Systems II					
Module code 1277BMWio2	Workload 180h	ECTS credits 6	Module Language German	Module availability every 2nd term - winter term	Duration 1 Term
1	Courses Database Systems		Contact hours 60h	Self-Studies 120h	Course Language German
2	Module content <ul style="list-style-type: none"> • Data organization and development process of database systems • Conceptual data modelling (e.g. Entity Relationship Model) • Relational model and relational algebra • Relational database-design • Relational query languages • Physical data organization • Transactions, Concurrency Control, Recovery, Security, Tuning 				
3	Learning objectives Students... ... classify basic concepts of information and knowledge processing and the role of data models within system development, architecture and functionality of (relational) database systems. ... design and implement (relational) data models. ... understand the concepts data, information, knowledge and intelligence as well as system and model. ... outline the architecture and development process of a database system. ... apply design principles of conceptual data models (e.g. entity relationship diagrams) and relational databases (normalization theory) as well as the associated methodology to the design of data models and databases. ... formulate (simple) queries in industry standard Structured Query Language (SQL) using basic relational query language concepts. ... understand problems with the operation of (multi-user) database systems and apply established concepts and methods to solve them.				
4	Teaching and learning methods lecture				
5	Module entry requirements none				
6	Mode of end-of-module examination Written test: WT (90)				
7	Prerequisites for awarding of credit points A pass in the written test.				
8	Other programmes that use the module Bachelor of Science Business Administration: Supplementary Section Bachelor of Science Information Systems: Core and Advanced Section				

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9	Module manager Univ.-Prof. Dr. Christoph Rosenkranz
10	Miscellaneous Students will be advised of compulsory reading on a term-by-term basis.

Advanced Module Information Systems					
Module code 1277Wirt00	Workload 270h	ECTS credits 9	Module Language German	Module availability every second semester - summer term	Duration 1 Term
1	Courses Integrated Information Systems		Contact hours 60h	Self-Studies 210h	Course Language German
2	Module content <ul style="list-style-type: none"> - Integrated information processing - Business Process Management - Business Process Modelling - Enterprise Resource Planning (ERP) and Enterprise-Systems - Supply Chain Management (SCM) and Customer Relationship Management (CRM) - Service-oriented Architectures (SOA) - Enterprise architectures / Enterprise Architecture Management (EAM) - Enterprise Application Integration (EAI) 				
3	Learning objectives Students... ... acquire and explain the basic concepts and technologies for selecting, implementing and operating integrated information systems within and across companies (e.g. ERP, CRM SCM). ... understand and apply the basics of business process management. ... identify the fields of application, potentials as well as the company-wide and overarching significance of integrated information systems. ... understand and explain the relationship between business processes and integrated information systems. ... explain the problems of using integrated information systems. ... assess selection, evaluation and deployment aspects of integrated information systems.				
4	Teaching and learning methods lecture				
5	Module entry requirements Recommended: Core Module Information Systems I, Core Module Information Systems II				
6	Mode of end-of-module examination Written test: WT (90)				
7	Prerequisites for awarding of credit points Passing the written test.				
8	Other programmes that use the module Bachelor of Science Information Systems: Core and Advanced Section				
9	Module manager Univ.-Prof. Dr. Christoph Rosenkranz				

10	Miscellaneous Mandatory texts can be indicated, which must be read before the event. The degree of preparation is checked in the business event. Case studies and exercises can be prepared in group work, which must be presented in the plenum by students. The solutions presented will be analysed and discussed. Mandatory reading will be announced each semester.
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Core Module Fundamentals of Business Administration					
Module code	Workload	ECTS credits	Module Language	Module availability	Duration
1343BMGB00	360h	12	German	every term	1 Term
1	Courses Fundamentals of Business Administration		Contact hours 90h	Self-Studies 270h	Course Language German
2	Module content <ul style="list-style-type: none"> • Inter- and intra-company related models • Management structures and models • Strategy and target systems of companies • Corporate functions and processes and their interrelationships • Analysis / optimization and their instruments for business development • Fundamentals of private law, in particular contract law • Analysis and design of service provision • Establishment of internal and external accounting systems • Main features of the operational cost and performance accounting • Main features of the annual accounts • Main features of operational investment and financing decisions • Inventory and flow quantities in enterprise resource planning systems • Main features of the regulation of business decisions by commercial and tax law 				
3	Learning objectives Students... ... differentiate the perspective on the actions of companies on the basis of different company and market models. ... analyse market and environment conditions for entrepreneurial action and their influence on corporate decisions. ... structure corporate actions according to different process categories and differentiate between management, business and support processes. ... design individual management processes with the help of procedures and instruments (strategy development, coordination design, cultural development). ... make decisions for the design and optimization of business processes (customer attraction, customer loyalty, brand management, service delivery, service innovation) and use them to shape relationships with sales and procurement markets. ... select adequate financial management procedures for various business decisions and apply them in extracts (external accounting, internal controlling, investment and financial accounting). ... assess the success of corporate decisions with the help of key performance indicator systems and draw conclusions from them.				
4	Teaching and learning methods practice lecture				
5	Module entry requirements none				
6	Mode of end-of-module examination Written test: WT (90)				

7	<p>Prerequisites for awarding of credit points Passing the written test.</p>
8	<p>Other programmes that use the module Bachelor of Arts Media Science: Media Management and Economics Bachelor of Arts Regional Studies Latin America - Economics: Economics Regional Studies Latin America, East and Middle Europe Bachelor of Arts Regional Studies Latin America - Social Sciences: Social Sciences Regional Studies Latin America, East and Middle Europe Bachelor of Science Mathematics: Business and Economics Sciences Mathematics Bachelor of Arts Lehramt: Core Section Master of Science Geography: Business Administration Master Geography Bachelor of Science Geography: Business Administration Bachelor Geography Bachelor of Science Health Economics: Core and Advanced Section Bachelor of Science Business Mathematics: Business and Economics Sciences Bachelor Business Mathematics Bachelor of Arts Regional Studies China - Business Administration: Business Administration Regional Studies China Bachelor of Arts Regional Studies China - Economics: Economics Regional Studies China Bachelor of Arts Regional Studies Eastern and Central Europe - Economics: Economics Regional Studies Latin America, East and Middle Europe Bachelor of Arts Regional Studies Eastern and Central Europe - Social Sciences: Social Sciences Regional Studies Latin America, East and Middle Europe Bachelor of Science Information Systems: Core and Advanced Section</p>
9	<p>Module manager Univ.-Prof. Dr. Detlef Buschfeld</p>
10	<p>Miscellaneous Additional tutorials or eTutorials can be offered.</p>

Core Module Mathematics					
Module code 5722BMMa00	Workload 360h	ECTS credits 12	Module Language German	Module availability every 2nd term - winter term	Duration 1 Term
1	Courses Mathematics		Contact hours 120h	Self-Studies 240h	Course Language German
2	Module content Real and complex numbers, introduction to structures and functions, sequences, series, limit values, basics of differential and integral calculus, sets and representations, groups, bodies, vector spaces, linear spaces and linear representations, bases and dimensions.				
3	Learning objectives Students... ... gain knowledge of the basic concepts and methods of mathematics, familiarity with the associated techniques and knowledge of the applications. ... gain a deep insight into the methods of abstract mathematical argumentation independent of the substance. ... can translate facts into the abstract language of mathematics and explain abstract terms. ... can recognize the connections and similarities of the different mathematical areas. ... can independently solve mathematical problems and present the solutions in an understandable way for fellow students.				
4	Teaching and learning methods practice lecture				
5	Module entry requirements none				
6	Mode of end-of-module examination Written test: WT (180)				
7	Prerequisites for awarding of credit points Successful participation in the exercises and passing the written examination.				
8	Other programmes that use the module Bachelor of Science Information Systems: Core and Advanced Section				
9	Module manager Mathematisches Institut				
10	Miscellaneous Mandatory reading is announced every semester.				

Advanced Module Statistics					
Module code	Workload	ECTS credits	Module Language	Module availability	Duration
1314AMSt00	180h	6	German	every term	1 Term
1	Courses Probability Calculus and Deductive Statistics		Contact hours 75h	Self-Studies 105h	Course Language German
2	Module content <ul style="list-style-type: none"> • Random processes and probabilities • Random variables and distributions • Joint distribution and limit theorems • Samples and sample functions • Parameter estimation techniques • Hypothesis tests • Multiple linear regression 				
3	Learning objectives Students... ... apply the fundamental methods used in probability calculation and statistical inference. ... model risks using random variables and special probability distributions. ... calculate probabilities and interpret statements concerning probabilities. ... justify the statistical method chosen. ... conduct and evaluate statistical analyses using a computer. ... interpret and communicate the results of statistical analyses meaning both in their professional and personal environment.				
4	Teaching and learning methods practice lecture				
5	Module entry requirements Recommended: Core Module Statistics, Core Module Mathematics				
6	Mode of end-of-module examination Written test: WT (90)				
7	Prerequisites for awarding of credit points Passing the written test.				
8	Other programmes that use the module Bachelor of Science Economics with Social Sciences: Core and Advanced Section Bachelor of Science Economics: Core and Advanced Section Bachelor of Science Business Administration: Core and Advanced Section Bachelor of Science Information Systems: Core and Advanced Section				
9	Module manager Prof. Dr. Rainer Dyckerhoff Dr. Bastian Gribisch				

10	Miscellaneous Compulsory reading: Mosler, Schmid: Wahrscheinlichkeitsrechnung und schließende Statistik.
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3.6.2 Supplementary Section

Core Module Corporate Development					
Module code	Workload	ECTS credits	Module Language	Module availability	Duration
1253BMCD01	270h	9	German	every term	1 Term
1	Courses Corporate Development		Contact hours 45h	Self-Studies 225h	Course Language German
2	Module content <ul style="list-style-type: none"> • Fundamentals of business management • Strategic and responsible business management • HR selection and development decisions • Incentive schemes • Establishment and development of organisational structures • Theories related to strategic HR decisions and organisational structures 				
3	Learning objectives Students... ... understand strategic business management and the consequences it has in terms of organisation design and HR management. ... recognise what business management entails, its objectives and the processes used. ... analyse various forms of corporate governance in terms of the rights and duties of shareholders, management and employees. ... formulate implications of company-wide strategies and departmental strategies. ... apply strategy formulation tools to selected business case studies. ... shape in a responsible and systematic manner the conditions and structures for HR selection and development decisions. ... critically analyse the way in which incentive schemes work. ... assess the establishment and development of organisational structures. ... identify various dimensions of organisation design (division of labour, coordination, management organisation, division of decision-making powers, process organisation) and apply them. ... critically discuss the conditions under which key organisational forms can be used.				
4	Teaching and learning methods practice lecture				
5	Module entry requirements none				
6	Mode of end-of-module examination Written test: WT (60)				
7	Prerequisites for awarding of credit points Passing the written test.				
8	Other programmes that use the module Bachelor of Arts Media Science: Media Management and Economics Bachelor of Arts Lehramt:				

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	<p>Core Section</p> <p>Bachelor of Science Psychology: Interdisciplinary Integration</p> <p>Bachelor of Science Economics: Supplementary Section</p> <p>Bachelor of Science Business Administration: Core and Advanced Section</p> <p>Bachelor of Science Health Economics: Supplementary Section</p> <p>Bachelor of Arts Regional Studies China - Business Administration: Business Administration Regional Studies China</p> <p>Bachelor of Science Information Systems: Supplementary Section</p>
9	<p>Module manager</p> <p>Univ.-Prof. Dr. Bernd Irlenbusch</p> <p>Univ.-Prof. Dr. Dirk Sliwka</p>
10	<p>Miscellaneous</p>

Core Module Finance					
Module code	Workload	ECTS credits	Module Language	Module availability	Duration
1259BMFi01	270h	9	German	every term	1 Term
1	Courses Finance		Contact hours 60h	Self-Studies 210h	Course Language German
2	Module content a) Fundamentals of capital budgeting <ul style="list-style-type: none"> • Fundamental questions related to terminology and decision theory • Capital budgeting under certainty • Prospects of capital budgeting under uncertainty b) Fundamentals of financing <ul style="list-style-type: none"> • Internal financing • External financing 				
3	Learning objectives Students... ... know fundamental capital-market hypotheses and modelling theories (e.g. Fisher separation, Markowitz diversification, Tobin separation, equilibrium and no-arbitrage hypotheses). ... calculate the capital required for investment projects. ... assess investment decisions using different capital budgeting methods, drawing a distinction between approaches using performance indicators and those using monetary values. ... validate and discuss selected forms of financing. ... examine fundamental valuation issues, focusing on equity and bond financing. ... consider opportunities and risks of investment projects, using different capital budgeting methods, to justify key financial decisions. ... discuss the knowledge and methods learned in class by working independently on application-based exercises and case studies.				
4	Teaching and learning methods practice lecture				
5	Module entry requirements none				
6	Mode of end-of-module examination Written test: WT (60)				
7	Prerequisites for awarding of credit points Passing the written test.				
8	Other programmes that use the module Bachelor of Arts Lehramt: Core Section Bachelor of Science Psychology: Interdisciplinary Integration Bachelor of Science Economics: Supplementary Section				

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	<p>Bachelor of Science Business Administration: Core and Advanced Section</p> <p>Bachelor of Science Health Economics: Supplementary Section</p> <p>Bachelor of Arts Regional Studies China - Business Administration: Business Administration Regional Studies China</p> <p>Bachelor of Science Information Systems: Supplementary Section</p>
9	<p>Module manager Univ.-Prof. Dr. Alexander Kempf Dr. Alexander Pütz Univ.-Prof. Dr. Heinrich R. Schradin</p>
10	<p>Miscellaneous</p>

Core Module Marketing					
Module code	Workload	ECTS credits	Module Language	Module availability	Duration
1266BMMa00	270h	9	German	every term	1 Term
1	Courses Introduction to Marketing		Contact hours 60h	Self-Studies 210h	Course Language German
2	Module content The module covers concepts and methods with which to analyse key marketing tasks and develop sound recommendations on how to manage them. To this end, it looks at how consumers respond to marketing activities and why (consumer behaviour), how information about markets and market partners can be generated to provide important background data for decision-making (market research), how to strategically develop markets (marketing strategy) and how marketing tools (brand/product policy, pricing policy, communication policy, distribution policy) can be used.				
3	Learning objectives Students... ... recognise the importance of marketing plays for a business. ... describe marketing analyses in relation to the marketing environment, customer behaviour and market research and apply them in an exemplary manner. ... describe planning methods both for strategic and operational marketing and apply them in an exemplary manner. ... assess the advantages of different marketing strategies and activities. ... classify the marketing mix instruments and explain theoretical concepts and methods that help in making optimal marketing decisions.				
4	Teaching and learning methods practice lecture				
5	Module entry requirements none				
6	Mode of end-of-module examination Written test: WT (60)				
7	Prerequisites for awarding of credit points Passing the written test.				
8	Other programmes that use the module Bachelor of Arts Lehramt: Core Section Bachelor of Science Psychology: Interdisciplinary Integration Bachelor of Science Economics: Supplementary Section Bachelor of Science Business Administration: Core and Advanced Section Bachelor of Science Health Economics: Supplementary Section Bachelor of Arts Regional Studies China - Business Administration: Business Administration Regional Studies China				

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	Bachelor of Science Information Systems: Supplementary Section
9	Module manager Univ.-Prof. Dr. Werner Reinartz Univ.-Prof. Dr. Franziska Völckner
10	Miscellaneous

Core module Supply Chain Management					
Module code	Workload	ECTS credits	Module Language	Module availability	Duration
1271BMSC01	270h	9	German	every term	1 Term
1	Courses Supply Chain Management		Contact hours 45h	Self-Studies 225h	Course Language German
2	Module content <ul style="list-style-type: none"> • Fundamental production and logistics issues • Demand forecasting • Production system infrastructure (e.g. location planning, process design) • Logistics processes (incl. inventory management) • Linear programming • Production planning • Production management systems (push, pull, lean management) • Supply chain management 				
3	Learning objectives Students... ... understand the basic principles of production and service process management. ... develop and solve analytical models, taking into account any interdependencies between decisions. ... quantify and model key interdependencies for the purposes of optimisation calculations. ... apply the methods presented to practical exercises. ... know case examples for applying modern methods of Supply Chain Management.				
4	Teaching and learning methods practice lecture				
5	Module entry requirements none				
6	Mode of end-of-module examination Written test: WT (60)				
7	Prerequisites for awarding of credit points Passing the written test.				
8	Other programmes that use the module Bachelor of Arts Lehramt: Core Section Bachelor of Science Psychology: Interdisciplinary Integration Bachelor of Science Economics: Supplementary Section Bachelor of Science Business Administration: Core and Advanced Section Bachelor of Science Health Economics: Supplementary Section Bachelor of Arts Regional Studies China - Business Administration: Business Administration Regional Studies China				

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	Bachelor of Science Information Systems: Supplementary Section
9	Module manager Univ.-Prof. Dr. Horst Tempelmeier Univ.-Prof. Dr. Ulrich W. Thonemann
10	Miscellaneous

Specialisation Module Strategy, Organization and Human Resources					
Module code	Workload	ECTS credits	Module Language	Module availability	Duration
1253SMSO00	360h	12	German and English	every second semester - summer term	1 Term
1	Courses a) Human Resource Management b) Organizational Design c) Entrepreneurship* d) International Strategic Management*		Contact hours a) 60h b) 60h c) 60h d) 30h	Self-Studies a) 120h b) 120h c) 120h d) 150h	Course Language a) German b) German c) English d) English
2	Module content <ul style="list-style-type: none"> • Market-entry, product, market and value-adding strategies • Theories concerning international management • Basic concepts of behavioural decision theory • Contingency theory of organisation • Shaping organisational change • HR instruments • HR selection • HR development • Co-determination and corporate governance • Equal opportunity and diversity • Compliance management • Corporate responsibility 				
3	Learning objectives Students... ... gain in-depth insights into strategic business management and the design of organisational structures and HR instruments. ... identify factors that influence organisational design at the job and organisation level and derive and assess various possible courses of action on that basis. ... assess companies' internationalisation decisions with regard to their market-entry, product, market and value-adding strategies. ... understand how organisations secure their future by adjusting to a complex and ever-changing environment. ... assess, using organizational design parameters, which organisational structures are beneficial under which conditions. ... recognise key challenges, identify design possibilities and develop methods for implementing organisational change processes. ... formulate strategic and operational HR plans. ... systematically analyse HR instruments. ... apply the knowledge gained to create practical designs for HR instruments, working in small groups. ... understand basic HR-related aspects of labour law. ... develop an awareness of equal opportunity and diversity in the world of work.				

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4	<p>Teaching and learning methods practice lecture</p>
5	<p>Module entry requirements Recommended: Core Module Corporate Development, Core Module Corporate and Business Ethics, Core- und Advanced Module Statistics</p>
6	<p>Mode of end-of-module examination Written test: WT (120)</p>
7	<p>Prerequisites for awarding of credit points A pass in the written test. Students must take two courses. The written test will be based on the content of two courses.</p>
8	<p>Other programmes that use the module Bachelor of Science Economics: Specialization Section Bachelor of Science Business Administration: Specialization Section Bachelor of Science Information Systems: Supplementary Section</p>
9	<p>Module manager Univ.-Prof. Dr. Mark Ebers Univ.-Prof. Dr. Bernd Irlenbusch Univ.-Prof. Dr. Dirk Sliwka</p>
10	<p>Miscellaneous *Please consult KLIPS 2.0 to ascertain whether this course will be taking place and what it will be covering.</p>

Specialisation Module Finance						
Module code 1259SMFi01		Workload 360h	ECTS credits 12	Module Language German and English	Module availability every term	Duration 2 Terms
1	Courses a) Investment Management b) Insurance Management c) Bank Management d) Corporate Finance e) Corporate Governance f) Leasing		Contact hours a) 60h b) 60h c) 60h d) 60h e) 60h f) 60h	Self-Studies a) 120h b) 120h c) 120h d) 120h e) 120h f) 120h	Course Language a) German b) English c) German d) English e) German f) German	
2	<p>Module content</p> <p>a) Investment Management</p> <ul style="list-style-type: none"> • Portfolio theory • Risk management • Investment strategies <p>b) Corporate Finance</p> <ul style="list-style-type: none"> • Financial management • Financing strategies • Company valuation • Cost of capital <p>c) Corporate Governance</p> <ul style="list-style-type: none"> • Principal-agent theory of Corporate Governance, issues of asymmetrical information and agency-costs • Internal and external mechanism of Corporate Governance (e.g. management compensation, board of directors, asset-side investors and company acquisitions) • Corporate Governance-systems and regulation • Analytical and empirical methods to assess i) the value and success of corporations, ii) the costs of insufficient corporate governance, and iii) decisions made by regulators • Analysis and interpretation of empirical studies and methods in the field of Corporate Governance <p>d) Insurance Management</p> <ul style="list-style-type: none"> • Primary insurance and re-insurance markets • Underwriting risks • Institutional parameters • Insurance companies' capital requirements <p>e) Bank Management</p> <ul style="list-style-type: none"> • Banking market • Bank accounting • Bank regulation • Bank cost accounting • Risk/return control 					

	<p>f) Leasing</p> <ul style="list-style-type: none"> • German leasing market • Leasing agreements • Leasing instalments • Capital costs of leasing • Impacts on balance sheets and taxation • An institutional-economic analysis of leasing
3	<p>Learning objectives Students...</p> <p>... analyse financial markets, its participants and products. (a, b, c)</p> <p>... evaluate the success of investment strategies. (a, b, c)</p> <p>... design methods with which to manage portfolio risks. (a, b, c)</p> <p>... analyse the economic role of corporate governance. (a, b, c)</p> <p>... know the insurance and financial services market, the structure of the service providers and the products offered. (d, e, f)</p> <p>... identify the regulatory parameters. (d, e, f)</p> <p>... calculate the product prices. (d, e, f)</p> <p>... apply the basic principles of risk/return control to business decisions. (d, e, f)</p>
4	<p>Teaching and learning methods</p> <p>practice</p> <p>lecture</p>
5	<p>Module entry requirements</p> <p>Recommended: core module Finance, core module Accounting. It is also useful to have attended the supplementary module in Financial Management</p>
6	<p>Mode of end-of-module examination</p> <p>Written test: WT (120)</p>
7	<p>Prerequisites for awarding of credit points</p> <p>A pass in the written test. Students must take two courses. The written test will be based on the content of two courses.</p>
8	<p>Other programmes that use the module</p> <p>Bachelor of Science Economics: Specialization Section</p> <p>Bachelor of Science Business Administration: Specialization Section</p> <p>Bachelor of Science Information Systems: Supplementary Section</p>
9	<p>Module manager</p> <p>Univ.-Prof. Dr. Thomas Hartmann-Wendels</p> <p>Univ.-Prof. Dr. Dieter Hess</p> <p>Univ.-Prof. Dr. Alexander Kempf</p> <p>Jun.-Prof. Dr. Peter Limbach</p> <p>Dr. Alexander Pütz</p> <p>Univ.-Prof. Dr. Heinrich R. Schradin</p>
10	<p>Miscellaneous</p>

Specialisation Module Marketing					
Module code	Workload	ECTS credits	Module Language	Module availability	Duration
1266SMark0	360h	12	English	every term	2 Terms
1	Courses a) Methods of Marketing Mix Management (Winter & Summer Term) b) Concepts of Marketing Mix Management (Winter & Summer Term)		Contact hours a) 60h b) 60h	Self-Studies a) 120h b) 120h	Course Language a) English b) English
2	Module content <ul style="list-style-type: none"> • Marketing mix decisions (e.g. brand policy, new product development, pricing and communication policy) • Design of market research projects • Sample selection and data collection methods • Measurement and questionnaire design • Uni- und bivariate analyses • Using multivariate techniques for marketing mix decisions 				
3	Learning objectives Students... ... identify and systematise decision-making problems related to the marketing mix. ... classify and assess the advantages of different marketing strategies. ... analyse, discuss and interpret market research methods and approaches. ... design and conduct market research projects and to verify presumed interdependencies.				
4	Teaching and learning methods practice lecture				
5	Module entry requirements Recommended: Core module Marketing				
6	Mode of end-of-module examination Written test: WT (120)				
7	Prerequisites for awarding of credit points A pass in the written test. Students must take both courses; the written test is based on the content of both courses.				
8	Other programmes that use the module Bachelor of Science Economics: Specialization Section Bachelor of Science Business Administration: Specialization Section Bachelor of Science Information Systems: Supplementary Section				
9	Module manager Univ.-Prof. Dr. Marc Fischer				
10	Miscellaneous The written test is held every term.				

Specialisation module Supply Chain Management					
Module code	Workload	ECTS credits	Module Language	Module availability	Duration
1271SMSC01	360h	12	German and English	every term	1 Term
1	Courses a) Supply Chain Management and Management Science (Winter Term) b) Supply Chain Management: Strategy and Innovation (Winter Term) c) Supply Chain Management and Production - Basics (Summer Term) d) Supply Chain Management and Production - Application (Summer Term)		Contact hours a) 60h b) 60h c) 60h d) 60h	Self-Studies a) 120h b) 120h c) 120h d) 120h	Course Language a) English b) German c) German d) English
2	Module content <ul style="list-style-type: none"> • Supply chain planning and control • Analysis and structuring of in-company and cross-company supply chains • Configuration of supply chain networks 				
3	Learning objectives Students... ... understand the fundamentals of supply chain management. ... discuss relationships and interdependencies between decision-making problems in the context of supply chain management. ... identify and use modern theories and methods for analysing and assessing existing situations. ... develop solutions for specific problems. ... apply modern solutions in exercises reflecting real life. ... apply their gained knowledge with case studies.				
4	Teaching and learning methods practice lecture				
5	Module entry requirements Recommended: Core module Supply Chain Management				
6	Mode of end-of-module examination Written test: WT (120)				
7	Prerequisites for awarding of credit points Passing the written test. Students must take two courses. The written exam is based on the content of two courses. A combination of courses of summer and winter term is not possible.				
8	Other programmes that use the module Bachelor of Science Economics: Specialization Section Bachelor of Science Business Administration: Specialization Section				

MODULE CATALOGUE – INFORMATION SYSTEMS - BACHELOR OF SCIENCE

	Bachelor of Science Information Systems: Supplementary Section
9	Module manager AD Dr. Johannes Antweiler Univ.-Prof. Dr. Fabian Sting Univ.-Prof. Dr. Ulrich W. Thonemann
10	Miscellaneous Course b) contains of “Part 1: Strategy: Innovation and Planning” as well as “Part 2: Implementation: Projects and processes”. Course c) and d) subdivides into “Part 1: Basics” as well as “Part 2: Applications”. The written test for course a) and b) takes place in winter term, the written test for courses c) and d) takes place in summer term.

Supplementary Module Studies Abroad						
Module code 1014SAMB02		Workload 360h	ECTS credits 12	Module Language	Module availability every term	Duration 1 Term
1	Courses			Contact hours	Self-Studies	Course Language
2	Module content depending on course selection					
3	Learning objectives Students... ... describe approaches in business informatics, business administration and economics from an international perspective. ... explain international questions of business informatics, business administration and economics. ... discuss and compare different theories and approaches of business informatics, business administration and economics. ... develop new intellectual perspectives on their own educational background. ... be better equipped to effectively manage the dynamic global dimensions of their future careers.					
4	Teaching and learning methods depending on course choice					
5	Module entry requirements					
6	Mode of end-of-module examination TR - depending on course selection					
7	Prerequisites for awarding of credit points					
8	Other programmes that use the module Bachelor of Science Information Systems: Supplementary Section					
9	Module manager					
10	Miscellaneous Language: can be held in English or in any language offered at the host university. This module can be studied at a foreign university. In this case, there is a standardised course crediting procedure. Information about course crediting (deadlines and procedures) is available from the Credit Transfer Center (WiSo-Anrechnungszentrum : https://www.anrechnungswiso.uni-koeln.de/ .) This module can also be studied as part of a Summer School organised by the WiSo-Faculty. In this case, the previous exam registration has to be done according to the regulations of the WiSo-Faculty.					

Specialisation Module Behavioral Management Science					
Module code 1271SMBMSc	Workload 360h	ECTS credits 12	Module Language English	Module availability every second semester - summer term	Duration 1 Term
1	Courses a) Behavioral Management Science – Lecture (Summer Term) b) Behavioral Management Science – Seminar (Summer Term)		Contact hours a) 30h b) 30h	Self-Studies a) 150h b) 150h	Course Language a) English b) English
2	Module content <ul style="list-style-type: none"> • Rational, limited rational, and irrational behavior • Cognitive distortions and heuristics of individuals • Social preferences (e.g. altruism, fairness) • Robust management systems • Design and programming of experiments 				
3	Learning objectives Students... ... analyze the limits of rational decision models. ... evaluate the validity of Management Science Models by using experimental data. ... examine which problems occur by cognitive distortion. ... evaluate the consequences of social preferences. ... create scientific experiments discretely. ... transfer acquired knowledge to practical managerial problems.				
4	Teaching and learning methods lecture seminar				
5	Module entry requirements Recommended: Fundamental knowledge in statistics and mathematics				
6	Mode of end-of-module examination Combined examination: PRES, TP Written test: WT (60)				
7	Prerequisites for awarding of credit points 1.) A pass in the written test for course a) 2.) A pass in the combined examination for course b)				
8	Other programmes that use the module Bachelor of Science Economics: Specialization Section Bachelor of Science Business Administration: Specialization Section Bachelor of Science Information Systems: Supplementary Section				

MODULE CATALOGUE – INFORMATION SYSTEMS - BACHELOR OF SCIENCE

9	Module manager Univ.-Prof. Dr. Dirk Sliwka
10	Miscellaneous

Supplementary Module Theoretical Computer Science						
Module code 5722EMTI01		Workload 270h	ECTS credits 9	Module Language German	Module availability every second semester - summer term	Duration 1 Term
1	Courses a) Logic for Computer Scientists b) Graph Theory c) Introduction to Theoretical Computer Science			Contact hours a) 90h b) 90h c) 90h	Self-Studies a) 180h b) 180h c) 180h	Course Language a) German b) German c) German
2	<p>Module content</p> <p>a) Logics for Computer Scientists: Syntax and semantics of the statement and predicate logic of the 1st level are covered. For the resolution calculus, which is of elementary importance for automatic proof, its completeness and correctness are proven. It also deals with horn logic and its key role in logic programming. In addition, complexity and decisionability issues as well as alternative axiomatization approaches are dealt with. Finally, non-classical logics are presented, such as multivalent, fuzzy, temporal or modal logics, which are important for the modelling of many problems.</p> <p>b) Graph Theory: - Directional and non-directional graphs - Context, circles and cuts - Planarity and duality - Euler's graphs - Shortest paths, flows, matching: duality theorems and algorithms - Node and edge staining, chromatic polynomial - Perfect Graphs - Extreme and random graphs, relationship with Ramsey numbers - Properties of almost all graphs, tree width and partial k-trees</p> <p>c) Introduction to Theoretical Computer Science: The lecture conveys the theoretical foundations of computer science in the areas of formal languages, computability and complexity. The basic knowledge of computability and decidability theory, as well as complexity theory, conveyed in "Fundamentals of Computer Science II", will be further deepened in this course. Furthermore, a selection of randomized, approximative and online algorithms will be introduced and analyzed.</p>					
3	<p>Learning objectives</p> <p>Students...</p> <p>... Concepts and methods used in computer science are fundamentally influenced by logic. The concept of calculation, the exact distinction between syntax and semantics have enabled entire areas of computer science, such as programming languages, translator construction, specification, verification, expert systems and many others. In addition, the language of logic is the most important linguistic tool for clarifying complex problems.</p> <p>... learn techniques and ways of thinking of this for the computer science fundamental area ((a) Logic for Computer Scientists).</p> <p>... learn basic techniques and ways of thinking to solve discrete problems with graph-theoretical models ((b) Graphentheorie).</p>					

	<p>... learn the theoretical foundations of computer science in the areas of formal languages, computability and complexity.</p> <p>... are introduced to a selection of randomized, approximate and online algorithms and analyze them ((c) Introduction to Theoretical Computer Science).</p> <p>... deepen their specialist knowledge in the respective field and also acquire general skills for the classification, recognition, formulation and solution of problems through conceptual, analytical and logical thinking.</p> <p>... deepen the lecture material in the exercises and acquire communication and presentation skills there.</p>
4	<p>Teaching and learning methods</p> <p>practice</p> <p>lecture</p>
5	<p>Module entry requirements</p> <p>Recommended: Core Module Computer Science, Advanced Module Computer Science I, Advanced Module Computer Science II, Specialisation Module Computer Science</p>
6	<p>Mode of end-of-module examination</p> <p>Written test: WT (180)</p>
7	<p>Prerequisites for awarding of credit points</p> <p>Passing the written test. One of three courses must be taken and the final module examination refers to the content of this one course. The module is passed and credit points are awarded if the 180-minute final exam is passed or the 30-45-minute oral final exam is passed. Depending on the number of participants, the exam or oral examination may be required. If prior notice is given, regular participation in the exercises and successful completion of exercises may be taken into account as a prerequisite for admission to the examination and included in the examination performance on a pro rata basis.</p>
8	<p>Other programmes that use the module</p> <p>Bachelor of Science Information Systems: Supplementary Section</p>
9	<p>Module manager</p> <p>Geschäftsführender Direktor, Institut für Informatik</p>
10	<p>Miscellaneous</p> <p>Registration is required to take part in the final examination. One retest per cycle is offered. A repeated participation in the lecture and the exercises to prepare for a repetition of the final exam is possible. The module will be graded. The contents of the course cannot be learned exclusively through theoretical observation, therefore participation in the exercises and independent working on exercises is indispensable. For further information, please refer to the current website of the event.</p>

Supplementary Module Practical Computer Science					
Module code	Workload	ECTS credits	Module Language	Module availability	Duration
5722EMPI00	270h	9	German	every term	1 Term
1	Courses a) Efficient Algorithms b) Algorithms for linear and discrete optimization c) Parallel Algorithms		Contact hours a) 90h b) 90h c) 90h	Self-Studies a) 180h b) 180h c) 180h	Course Language a) German b) German c) German
2	<p>Module content</p> <p>a) Efficient Algorithms: We treat algorithms for combinatorial optimization problems that can be solved with efficient algorithms. After a short introduction to duality theory, the following topics will be covered: minimum spanning trees, shortest paths, maximum flows, flows with minimum costs, cardinality matching in bipartite and general graphs.</p> <p>b) Algorithms for linear and discrete optimization: After the introduction of the basic tools of linear programming and complexity theory, the lecture deals in particular with algorithms of linear (mixed) integer and combinatorial optimization. The focus is on the exact solution of mixed-integer decision and optimization problems by Branch-and-Bound, Branch-and-Cut, and Branch-and-Cut-and-Price algorithms. Furthermore, polynomial approximation algorithms for NP difficult problems are discussed. In the course of the lecture a selection of prominent combinatorial decision/optimization problems will be discussed: Fulfillability Problem, Traveler Problem, Linear Order Problem, Maximum Cut Problem, Node Cover Problem, Graph Coloration Problem, Clique Problem, Stable Set Problem, Backpack Problem, Crate Pack Problem, Machine Deployment Problem. In many cases, the discussion of the algorithms is motivated and supplemented by application examples in industry, business and the natural sciences.</p> <p>(c) Parallel algorithms: The lecture covers a selection of the following topics: The Parallel Random Access Machine (PRAM) and the Shared Memory Model Basic design techniques for PRAM algorithms Complexity classes NC, P, P complete Parallel solution of numerical problems from linear algebra Transformation of semisystolic algorithms into systolic communication in network-connected systems: Network topologies, network embeddings, routing methods, PRAM simulation on grid-connected systems, efficient load balancing, Two card tricks and your solution with the help of SE networks</p>				
3	<p>Learning objectives</p> <p>Students...</p> <p>... receive basic knowledge of the conception and implementation of efficient algorithms and combinatorial structures on the basis of prominent problems for which polynomial solution methods are known ((a) Efficient Algorithms).</p> <p>... acquire the algorithmic basics for the mathematical methods of Operations Research to solve NP-complete or NP-heavy combinatorial optimization and decision problems ((b) Algorithms for linear and discrete optimization).</p> <p>... learn ways of thinking and techniques for the efficient use of parallel computer architectures.</p> <p>... are able to design and implement powerful algorithms. are able to analyze algorithms with regard to correctness and their runtime behavior in dependence on data structures ((c) Parallel Algorithms).</p>				

	<p>... deepen their specialist knowledge in the respective field and also acquire further general skills for the classification, recognition, formulation and solution of problems through conceptual, analytical and logical thinking.</p> <p>... expand the lecture material in the exercises and acquire communication and presentation skills.</p>
4	<p>Teaching and learning methods</p> <p>practice lecture</p>
5	<p>Module entry requirements</p> <p>Recommended: Core Module Computer Science, Advanced Module Computer Science I, Advanced Module Computer Science II, Specialisation Module Computer Science</p>
6	<p>Mode of end-of-module examination</p> <p>Written test: WT (180)</p>
7	<p>Prerequisites for awarding of credit points</p> <p>Passing the written test. One of three courses must be taken and the final module examination refers to the content of this one course. The module is passed and credit points are awarded if the 180-minute final exam is passed or the 30-45-minute oral final exam is passed. Depending on the number of participants, the exam or oral examination may be required. If prior notice is given, regular participation in the exercises and successful completion of exercises may be taken into account as a prerequisite for admission to the examination and included in the examination performance on a pro rata basis.</p>
8	<p>Other programmes that use the module</p> <p>Bachelor of Science Information Systems: Supplementary Section</p>
9	<p>Module manager</p> <p>Institut für Informatik</p>
10	<p>Miscellaneous</p> <p>Registration is required to take part in the final examination. One retest per cycle is offered. A repeated participation in the lecture and the exercises to prepare for a repetition of the final exam is possible. The module will be graded. The contents of the course cannot be learned exclusively through theoretical observation, therefore participation in the exercises and independent working on exercises is indispensable. For further information, please refer to the current website of the event.</p>

Supplementary Module Applied Computer Science					
Module code	Workload	ECTS credits	Module Language	Module availability	Duration
5722EMAI00	270h	9	German	every third term	1 Term
1	Courses a) Modeling and Simulation b) Automatic Drawing of Graphs		Contact hours a) 90h b) 90h	Self-Studies a) 180h b) 180h	Course Language a) German b) German
2	<p>Module content</p> <p>a) Modelling and Simulation:</p> <ul style="list-style-type: none"> - Life cycle of a simulation application - Fundamentals of statistical methods - Generation of random numbers - Analysis and modelling methods - Simulation methods - Verification and Validation - Evaluation of results and scenario analysis - Application examples from modeling and simulation - Special aspects of modelling and simulation <p>b) Automatic drawing of graphs:</p> <p>Automatic drawing of graphs is a young and lively field of research. Here, algorithms are designed that generate aesthetically "beautiful" drawings of slide-grams (such as flowcharts, PERT diagrams, ER diagrams, event process chains, UML diagrams or networks). There are many different drawing methods, each of which optimizes different criteria. Example criteria for an aesthetically "beautiful" drawing are "few crossings", "few bends" or "as large an angle as possible".</p> <p>In this lecture we will cover algorithms for drawing general (un-directed and directed) graphs as well as drawing methods for special graphs such as trees, directed acyclic graphs or planar graphs. In many cases, the discussion of the algorithms is motivated and complemented by application examples in industry, business and the natural sciences as well as the associated software.</p>				
3	<p>Learning objectives</p> <p>Students...</p> <ul style="list-style-type: none"> ... are able to analyse real systems using stochastic methods, to create models from the analysis results and to implement these using suitable simulation methods and can validate the validity of the simulation application thus created and draw conclusions about the real system by creating and analysing scenarios (a) Modelling and simulation). ... acquire knowledge on how to visualize different classes of graphs based on their different properties and learn basic techniques for designing and implementing suitable algorithms (b) Automatic drawing of graphs). ... deepen their specialist knowledge in the respective field and also acquire further general skills for the classification, recognition, formulation and solution of problems through conceptual, analytical and logical thinking. ... expand the lecture material in the exercises and acquire communication and presentation skills. 				

4	<p>Teaching and learning methods</p> <p>practice lecture</p>
5	<p>Module entry requirements</p> <p>Recommended: Core Module Computer Science, Advanced Module Computer Science I, Advanced Module Computer Science II, Specialisation Module Computer Science</p>
6	<p>Mode of end-of-module examination</p> <p>Written test: WT (180)</p>
7	<p>Prerequisites for awarding of credit points</p> <p>Passing the written test. One of three courses must be taken and the final module examination refers to the content of this one course. The module is passed and credit points are awarded if the 180-minute final exam is passed or the 30-45-minute oral final exam is passed. Depending on the number of participants, the exam or oral examination may be required. If prior notice is given, regular participation in the exercises and successful completion of exercises may be taken into account as a prerequisite for admission to the examination and included in the examination performance on a pro rata basis.</p>
8	<p>Other programmes that use the module</p> <p>Bachelor of Science Information Systems: Supplementary Section</p>
9	<p>Module manager</p> <p>Geschäftsführender Direktor, Institut für Informatik</p>
10	<p>Miscellaneous</p> <p>Registration is required to take part in the final examination. One retest per cycle is offered. A repeated participation in the lecture and the exercises to prepare for a repetition of the final exam is possible. The module will be graded. The contents of the course cannot be learned exclusively through theoretical observation, therefore participation in the exercises and independent working on exercises is indispensable. For further information, please refer to the current website of the event.</p>

Supplementary Module Technical Computer Science					
Module code 5722EMTI00	Workload 270h	ECTS credits 9	Module Language German	Module availability every 2nd term - winter term	Duration 2 Terms
1	Courses Computer Graphics and Visualization Algorithms		Contact hours 90h	Self-Studies 180h	Course Language German
2	Module content The first lecture of the two-semester course deals with (3D) computer graphics and human-machine communication. The lecture looks at aspects of human perception and introduces graphical output devices and color systems. Based on raster-based 2D graphics, interaction techniques and graphical user interfaces are explained. 3D computer graphics are used to introduce objects, projections, masking, lighting, and scene graphs. The second lecture introduces the term visualization, which is divided into information visualization and visualization of scientific data. Based on the visualization pipeline and scientific data types, the filtering and reconstruction of data is dealt with, the mapping of data to visual representations is introduced as a central concept and carried out using concrete algorithms. Information visualization for the representation of not locally distributed data is treated in detail. Volume rendering as an alternative method for the representation of three-dimensional data and virtual reality are also considered. The exercises include tasks for computer graphics, the creation of graphical user interfaces, as well as 2D and 3D programming, e.g. with applets and OpenGL.				
3	Learning objectives Students... ... acquire knowledge of 2D and 3D computer graphics, user interface technology, data visualization and the ability to handle complex visualization tasks conceptually and in terms of content. ... deepen their specialist knowledge in the respective field and also acquire further general skills for the classification, recognition, formulation and solution of problems through conceptual, analytical and logical thinking. ... expand the lecture material in exercises and also acquire communication and presentation skills there.				
4	Teaching and learning methods practice lecture				
5	Module entry requirements Recommended: Core Module Computer Science, Advanced Module Computer Science I, Advanced Module Computer Science II, Specialisation Module Computer Science				
6	Mode of end-of-module examination Written test: WT (180)				
7	Prerequisites for awarding of credit points Passing the written test. One of three courses must be taken and the final module examination refers to the content of this one course. The module is passed and credit points are awarded if the 180-minute final exam is passed or the 30-45-minute oral final exam is passed. Depending on the number of participants, the exam or oral examination				

	<p>may be required. If prior notice is given, regular participation in the exercises and successful completion of exercises may be taken into account as a prerequisite for admission to the examination and included in the examination performance on a pro rata basis.</p>
8	<p>Other programmes that use the module Bachelor of Science Information Systems: Supplementary Section</p>
9	<p>Module manager Geschäftsführender Direktor, Institut für Informatik</p>
10	<p>Miscellaneous Registration is required to take part in the final examination. One retest per cycle is offered. A repeated participation in the lecture and the exercises to prepare for a repetition of the final exam is possible. The module will be graded. The contents of the course cannot be learned exclusively through theoretical observation, therefore participation in the exercises and independent working on exercises is indispensable. For further information, please refer to the current website of the event.</p>

Supplementary Module Mathematics I					
Module code 5722EMMa01	Workload 270h	ECTS credits 9	Module Language German	Module availability every 2nd term - winter term	Duration 1 Term
1	Courses Introduction to Stochastics		Contact hours 90h	Self-Studies 180h	Course Language German
2	Module content <ul style="list-style-type: none"> 1. Probability Calculus <ul style="list-style-type: none"> - Probability spaces, urns models - Random variables, distributions, moments, inequalities - Conditional probabilities, independence - Independent random variables, common distribution - Transformed from distributions, analytical tools - Limit value records - Random numbers, simulation 2. Statistics <ul style="list-style-type: none"> - Statistical decision problems - Special statistics and their distributions - Estimation of parameters - Testing hypotheses - Confidence ranges - Regression and Correlation - Vistas 				
3	Learning objectives <p>Students...</p> <ul style="list-style-type: none"> ... receive an introduction to probabilistic thinking. ... gain knowledge of the basic concepts and methods of mathematical stochastics needed to understand and solve application problems based on stochastic models. ... create models that describe stochastic phenomena. ... perform simple statistical tests. ... master concepts, techniques and methods of estimation and test theory and are able to apply them. 				
4	Teaching and learning methods <ul style="list-style-type: none"> practice lecture 				
5	Module entry requirements <p>Recommended: Core Module Mathematics</p>				
6	Mode of end-of-module examination <p>Written test: WT (180)</p>				
7	Prerequisites for awarding of credit points <p>Passing the written test.</p>				

<p>8</p>	<p>Other programmes that use the module Bachelor of Science Information Systems: Supplementary Section</p>
<p>9</p>	<p>Module manager Mathematisches Institut</p>
<p>10</p>	<p>Miscellaneous Parallel to the lecture there are exercises in which written homework is done, which can be completed successfully averaged over the semester. At the end of the lecture there is a written exam, the content of which is the material from the lecture and exercises.</p>

Supplementary Module Mathematics II					
Module code 5722EMMa02	Workload 270h	ECTS credits 9	Module Language German	Module availability every second semester - summer term	Duration 1 Term
1	Courses Introduction to the Mathematics of Operations Research		Contact hours 90h	Self-Studies 180h	Course Language German
2	Module content 1. Introduction: resilient matchings 2. Shortest ways 3. Minimum clamping beams 4. Polyhedral theory 5. The simplex method 6. The ellipsoid method 7. Matrix games and LP duality 8. Matchings in bipartite graphs 9. Network flows 10. Integer optimization and completely unimodular matrices 11. Integer optimization and fully dual integer systems				
3	Learning objectives Students... ... gain knowledge of the basic concepts and methods of mathematical operations research needed to understand and solve problems in the field of business mathematics. ... gain the ability to apply mathematical concepts and methods in the development and application of algorithms.				
4	Teaching and learning methods practice lecture				
5	Module entry requirements Recommended: Core Module Mathematics				
6	Mode of end-of-module examination Written test: WT (180)				
7	Prerequisites for awarding of credit points Passing the written test.				
8	Other programmes that use the module Bachelor of Science Information Systems: Supplementary Section				
9	Module manager Mathematisches Institut				
10	Miscellaneous Parallel to the lecture there are exercises in which written homework is done, which can be				

	completed successfully averaged over the semester. At the end of the lecture there will be an exam, the content of which is the material from the lecture and exercises.
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Supplementary Module Mathematics III						
Module code 5722EMMa03		Workload 270h	ECTS credits 9	Module Language German	Module availability every second semester - summer term	Duration 1 Term
1	Courses Numerical Mathematics I			Contact hours 90h	Self-Studies 180h	Course Language German
2	Module content Interpolation with Polynomials and (B-)Splines; Numerical Integration; if necessary, compensation and eigenvalue problems; Numerics of ordinary differential equations, such as one-step and multistep procedures, boundary value tasks.					
3	Learning objectives Students... ... gain knowledge of the basic concepts and methods of numerical mathematics as well as of scientific computing on the computer, which are required for understanding and solving problems in the field of applied mathematics and business mathematics. Basis for advanced modules in numerics.					
4	Teaching and learning methods practice lecture					
5	Module entry requirements Recommended: Core Module Mathematics					
6	Mode of end-of-module examination Written test: WT (180)					
7	Prerequisites for awarding of credit points Passing the written test.					
8	Other programmes that use the module Bachelor of Science Information Systems: Supplementary Section					
9	Module manager Mathematisches Institut					
10	Miscellaneous Parallel to the lecture there are exercises in which written homework is done, which can be completed successfully averaged over the semester. At the end of the lecture there is a written exam, the content of which is the material from the lecture and exercises.					

Supplementary Module Information Systems I					
Module code	Workload	ECTS credits	Module Language	Module availability	Duration
1277EMWi01	180h	6	German	every 2nd term - winter term	1 Term
1	Courses a) Systems Analysis and Design b) Information Security and IT Forensics		Contact hours a) 60h b) 60h	Self-Studies a) 120h b) 120h	Course Language a) German b) German
2	Module content a) Systems Analysis and Design <ul style="list-style-type: none"> • Requirements analysis and survey • System modelling • Project planning • Prototyping • Unified Modeling Language (UML) • Human-Computer interaction b) Information Security and IT-Forensics <ul style="list-style-type: none"> • Terms, protection goals, threat classes • Historical case studies and conclusions for future situations • Presentation of concrete attack techniques and threats • Design of secure systems (consideration in the development process , Frame-works, ISO/IEC 27001, risk analysis) • Recognized frameworks (BSI Basic Protection, ISO 27001, Business Continuity Management, ...) • Security models • Fundamentals of cryptographic procedures • Authentication procedures and identity management • Mobile Security • Incident response und IT-Forensics • Legal framework 				
3	Learning objectives Students... ... a) Systems Analysis and Design ...understand the needs and benefits of system analysis and design. ...modelling organisational and information systems by means of different notations. ...plan a project taking into account the costs and the course over time. ...use different methods to collect requirements. ...understand object-oriented System-Analysis and Design. ...modelling with the industrial standard UML. ...design of input and output, as well as the human-computer interaction of information systems. b) Information Security and IT-Forensics ...know concepts, models and procedures of information security (security) and IT forensics as well as the dimension preventative<->reactive. ...know typical threats, attack and attacker types and appropriate countermeasures.				

	<p>...analyse and evaluate protection requirements of information systems. ...can use security engineering to systematically define requirements and implement them throughout the entire life cycle of an information system. ...understand basic legal framework conditions and know proven patterns of action for IT incident management and forensic readiness.</p>
4	<p>Teaching and learning methods practice lecture</p>
5	<p>Module entry requirements none</p>
6	<p>Mode of end-of-module examination Written test: PO</p>
7	<p>Prerequisites for awarding of credit points Passing the written test.</p>
8	<p>Other programmes that use the module Bachelor of Science Information Systems: Supplementary Section</p>
9	<p>Module manager Univ.-Prof. Dr. Jan Recker</p>
10	<p>Miscellaneous a) Systems Analysis and Design: In some sessions case studies and exercises are prepared in group work and presented and discussed in the plenum by the students. Mandatory reading will be announced during the respective semester. b) Information Security and IT-Forensics: The course is usually offered by a lecturer. Please note the course dates given in KLIPS. Within the scope of the exercise, practical work with IT security gaps within a laboratory environment (hacking and subsequent security) will take place. Previous knowledge of Linux is useful, but not necessary.</p>

Supplementary Module Information Systems II						
Module code 1277EMWi02		Workload 180h	ECTS credits 6	Module Language German and English	Module availability every second semester - summer term	Duration 1 Term
1	Courses a) Information Systems Development b) Introduction to Data Science and Machine			Contact hours a) 30h b) 60h	Self-Studies a) 150h b) 120h	Course Language a) English b) German
2	<p>Module content</p> <p>a) Information Systems Development</p> <ul style="list-style-type: none"> • Processes and important challenges in the development of IS • Alternatives for the realization of IS ("Make or Buy", Outsourcing, Software as a Service, etc.) • Procedure models for the development of IS (waterfall model, evolutionary development, agile software development) • Concept and forms of project management for IS development • Project control and evaluation methods • Communication and leadership • Time, team and project management <p>b) Introduction to Data Science and Machine Learning</p> <ul style="list-style-type: none"> • The value of data from a business perspective • Data quality and data cleansing • Design of a data analysis process • Explanation vs. Prognosis • Data visualization • Use of data to support entrepreneurial activity • Introduction to machine learning • Programming language: Python 					
3	<p>Learning objectives</p> <p>Students...</p> <p>... a) Information Systems Development</p> <p>... recognize the challenges of developing information systems (IS).</p> <p>... can evaluate, select and apply different procedural models for the development of IS on the basis of their advantages and disadvantages.</p> <p>... understand traditional and new, agile, IS development process models.</p> <p>... are able to assess, select and apply the different organisational forms of project management for the development of IS according to their respective strengths and weaknesses.</p> <p>... are aware of the dangers of time pressure in IS development projects and are able to take appropriate countermeasures.</p> <p>... are able to develop solutions in small groups and present them in plenary sessions.</p> <p>...</p> <p>... b) Introduction to Data Science and Machine Learning</p> <p>... understand the importance of data analysis and machine learning in the business</p>					

	<p>context.</p> <p>... learn how to handle raw data (data cleansing, handling missing data, etc.).</p> <p>... understand the difference between causality and correlation.</p> <p>... develop methods for data visualization.</p> <p>... learn to structure a data analysis process.</p> <p>... understand essential principles and important algorithms of machine learning.</p> <p>... learn to work independently on a data science project.</p>
4	<p>Teaching and learning methods</p> <p>practice</p> <p>lecture</p>
5	<p>Module entry requirements</p> <p>none</p>
6	<p>Mode of end-of-module examination</p> <p>Portfolio: PO</p>
7	<p>Prerequisites for awarding of credit points</p> <p>Passing the written test.</p>
8	<p>Other programmes that use the module</p> <p>Bachelor of Science Information Systems: Supplementary Section</p>
9	<p>Module manager</p> <p>Geschäftsführender Direktor, Kölner Institut für Wirtschaftsinformatik</p>
10	<p>Miscellaneous</p> <p>Mandatory reading will be announced in the respective semester of the course. b) Python is used in the course.</p>

3.6.3 Specialisation Section

Specialisation Module Computer Science					
Module code 5722SMIn00	Workload 270h	ECTS credits 9	Module Language German	Module availability every second semester - summer term	Duration 1 Term
1	Courses Programming Internship		Contact hours 30h	Self-Studies 240h	Course Language German
2	Module content - Software development in teamwork - Conceptual software design, division of the task into subtasks, interface definition between program components - Implementation of the components and integration to an executable program - Software testing and troubleshooting - Preparation of a complete documentation and a project report				
3	Learning objectives Students... ... are able to analyse a given problem in self-organised and self-responsible group work, to break it down into subtasks, to design a software solution, to implement it in Java and to present the results. ... acquire social skills in the areas of teamwork, organisation and communication.				
4	Teaching and learning methods project				
5	Module entry requirements Recommended: Core Module Computer Science, Advanced Module Computer Science I, Advanced Module Computer Science II, Specialisation Module Computer Science				
6	Mode of end-of-module examination Written test: WT (60) Portfolio: PO				
7	Prerequisites for awarding of credit points passing the combined test. If prior notice is given, regular participation in the exercises and successful completion of exercises can be used as admission requirements for the examination.				
8	Other programmes that use the module Bachelor of Science Information Systems: Specialization Section				
9	Module manager Geschäftsführender Direktor, Institut für Informatik				
10	Miscellaneous During the first weeks, the tasks to be processed are presented by the internship				

	<p>supervisor. In this phase, the group divisions also take place. Subsequently, specifications and modularization of the individual tasks and interface definitions are carried out. The supervisor supervises this phase in an advisory or corrective way. The individual groups meet at least once a week to discuss the status quo. At the end of the semester, the complete programme is presented in the presence of the supervisor. The examination consists of the Java software, the documentation, the proof of authorship and the presentations at the milestone presentations as well as the final acceptance of the project. In addition, a 15 to 45-minute examination can take place. A graded certificate of achievement is issued.</p>
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Specialisation Module Information Systems					
Module code	Workload	ECTS credits	Module Language	Module availability	Duration
1277SMWi00	450h	15	German	every term	1 Term
1	Courses Capstone Project Information Systems		Contact hours 90h	Self-Studies 405h	Course Language German
2	Module content <ul style="list-style-type: none"> • Independent and autonomous development of an IS in a team • Project and team management • Requirements analysis • Draft • Implementation 				
3	Learning objectives Students... ... independently develop information systems (IS) in the form of application software. ... apply different development methods and techniques (sequential, iterative, agile) for the efficient and effective development of a software-based IS. ... work and organize themselves independently in independent teams. ... solve internal team conflicts and goal divergences independently. ... communicate continuously and purposefully within the team and with other stakeholders (e.g. customers). ... reflect on the possibilities and problems of project management, including project planning and implementation.				
4	Teaching and learning methods Research project				
5	Module entry requirements Recommended: Core Modules Information Systems I + II, Advanced Module Information Systems, Specialisation Module Information Systems				
6	Mode of end-of-module examination Combined examination: PO, PR				
7	Prerequisites for awarding of credit points Passing the written test.				
8	Other programmes that use the module Bachelor of Science Information Systems: Specialization Section				
9	Module manager Univ.-Prof. Dr. Christoph Rosenkranz				
10	Miscellaneous The preliminary course at the beginning of the event may end with a test. Basic knowledge of programming, databases, architectures, data structures, algorithms and project management is required. The students work self-organized in larger teams. On fixed dates the teams have to present fixed milestones (e.g. requirement specification, requirement specification, sprint meeting, backlogs, intermediate presentation, final presentation, finished product incl. program code). The work results are compared and, if necessary,				

	<p>corrected so that all teams are able to complete their development assignment. If necessary, the students receive training in the tools and methods to be used as part of a preliminary course.</p>
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Bachelor Seminar					
Module code	Workload	ECTS credits	Module Language	Module availability	Duration
1277SMBa00	180h	6	German and English	every term	1 Term
1	Courses a) Bachelorseminar Information Systems for Sustainable Society (Prof. Ketter) b) Bachelorseminar Information Systems Development (Prof. Recker) c) Bachelorseminar Integrated Information Systems (Prof. Rosenkranz) d) Bachelorseminar Information Management (Prof. Schoder)		Contact hours a) 30h b) 30h c) 30h d) 30h	Self-Studies a) 150h b) 150h c) 150h d) 150h	Course Language a) German and English b) German and English c) German and English d) German and English
2	<p>Module content</p> <ul style="list-style-type: none"> - Project planning in the context of scientific work - Structure and argumentation in scientific works: problem, objective, terminology system, outline - Dealing with scientific literature: literature research, literature administration, literature evaluation, referencing and citation in scientific work - Scientific writing - Formal requirements - Writing, presenting and defending one's own scientific work <p>Seminar work topics are taken from the following areas, among others:</p> <ul style="list-style-type: none"> a) Business Intelligence, Analytics, Machine Learning and Learning Agents research in the domains of Energy Markets, Smart Sustainable Mobility, Energy Storage and Transactive Energy & Blockchain b) Conceptual Modeling, Business Process Management, Information Systems Development, Systems Analysis and Design, Digital Innovation, Digital Entrepreneurship, Green IS, Environmental Sustainability c) IT Outsourcing, IT Strategy, Information Systems Development & IT Project Management, Global Software Development, Agile Development, Business Process Management, Enterprise Systems d) Media Mass Customization, Electronic Commerce, Social Media & Social Network Analysis, Openness, Management von information spheres und IT-platforms, Decision Support Systems, artificial intelligence 				
3	<p>Learning objectives</p> <p>Students...</p> <ul style="list-style-type: none"> ... independently deal with a current topic of business informatics. ... collect, research, select, analyse and synthesise scientific literature relevant to the topic from electronic and non-electronic scientific literature resources. ... work their way into the chosen topic independently. ... use specialist or task-specific software if necessary. ... write a written homework on the chosen topic. ... apply scientific standards for referencing and citing foreign works and thoughts in their own work. ... present the results of the housework in an individual or group presentation. ... supplement the presentations of other participants, if necessary, in the course of 				

	<p>lectures. ... defend their own work and critically discuss the presentations of the other students during the seminar. ... are engaged in a scientific discourse.</p>
4	<p>Teaching and learning methods seminar</p>
5	<p>Module entry requirements none</p>
6	<p>Mode of end-of-module examination Combined examination: PRES, TP</p>
7	<p>Prerequisites for awarding of credit points Passing the combined test.</p>
8	<p>Other programmes that use the module Bachelor of Science Information Systems: Specialization Section</p>
9	<p>Module manager Geschäftsführender Direktor, Kölner Institut für Wirtschaftsinformatik</p>
10	<p>Miscellaneous In the first step, the Bachelor's seminar module is taken by students via KLIPS. This allocation takes place in the 1st allocation phase through the submission of prioritised allocation requests. When enrolling via KLIPS, priority enrolment requests must be submitted for the Bachelor's seminars offered by the various examiners. As a rule, there will be no booking in the 2nd occupancy phase or in the allocation of remaining places. Subsequently, each student is allocated a place in a Bachelor's seminar, taking into account the available capacities. After the allocation to the Bachelor seminars, the students give preferences for concrete seminar work topics. This is usually done at the beginning of the semester via a survey in ILIAS. Part of the Bachelor's seminar is the participation in the block course "Scientific Work", which is offered at the beginning of the semester. Further information on the allocation procedure and the block course can be found in the course descriptions in KLIPS or on the website of the Cologne Institute for Information Systems. The seminar paper can be written in German or English. It is strongly recommended to complete the Bachelor's seminar before the Bachelor's thesis, as the Bachelor's seminar teaches basic competences for scientific work and especially for writing a scientific paper.</p>

3.6.4 Bachelor Thesis

Thesis Bachelor Information Systems					
Module code	Workload	ECTS credits	Module Language	Module availability	Duration
1277BaWi00	360h	12	German	every term	1 Term
1	Courses a) Bachelor Thesis with Prof. Dr. Ketter b) Bachelor Thesis with Prof. Recker c) Bachelor Thesis with Prof. Dr. Rosenkranz d) Bachelor Thesis with Prof. Dr. Schoder		Contact hours a) 0h b) 0h c) 0h d) 0h	Self-Studies a) 360h b) 360h c) 360h d) 360h	Course Language a) German and English b) German and English c) German and English d) German and English
2	Module content Preparation of a scientific thesis. Bachelor thesis topics are taken from the following areas, among others: a) Business Intelligence, Analytics, Machine Learning and Learning Agents research in the domains of Energy Markets, Smart Sustainable Mobility, Energy Storage and Transactive Energy & Blockchain b) Conceptual Modeling, Business Process Management, Information Systems Development, Systems Analysis and Design, Digital Innovation, Digital Entrepreneurship, Green IS, Environmental Sustainability c) IT Outsourcing, IT Strategy, Information Systems Development & IT Project Management, Global Software Development, Agile Development, Business Process Management, Enterprise Systems d) Media Mass Customization, Electronic Commerce, Social Media & Social Network Analysis, Openness, Management von information spheres und IT-platforms, Decision Support Systems, artificial intelligence				
3	Learning objectives Students... ... know the current state of the theoretical and methodical discussions of the subject. ... identify specifically defined scientific questions and problems. ... work on these specific questions independently and in exchange with teachers and students on the basis of the relevant literature. ... know theoretical and methodical (qualitative and/or quantitative) approaches to scientific work. ... create an investigation design and implement it independently. ... organise and design a scientific work process for a clearly defined task. ... develop scientifically and socially relevant conclusions.				
4	Teaching and learning methods Bachelorthesis				
5	Module entry requirements 100 CP successfully passed; Recommended: Bachelor Seminar				
6	Mode of end-of-module examination Written test 12 weeks				

7	<p>Prerequisites for awarding of credit points Passing the written test.</p>
8	<p>Other programmes that use the module Bachelor of Science Information Systems: Bachelorthesis</p>
9	<p>Module manager Geschäftsführender Direktor, Kölner Institut für Wirtschaftsinformatik</p>
10	<p>Miscellaneous Bachelor theses at the Cologne Institute for Information Systems are awarded in a central award procedure. In the first step, the Bachelor's thesis module is assigned to students via KLIPS. This allocation takes place in the 1st allocation phase through the submission of prioritised allocation requests. In the case of KLIPS, prioritized requests for the Bachelor thesis modules offered by the various examiners must be submitted. As a rule, there will be no enrolment in the 2nd phase or in the allocation of remaining places. Subsequently, each student is allocated a place for a Bachelor's thesis, taking into account the available capacities. After the allocation to the examiners, the students give preferences for concrete Bachelor thesis topics. This is usually done about three weeks before the respective start date via a survey in ILIAS. Further information on the award procedure can be found in the course descriptions in KLIPS or on the website of the Cologne Institute for Information Systems. The Bachelor thesis can be written in German or English. It is strongly recommended that you complete the Bachelor's seminar before writing your Bachelor's thesis, as the Bachelor's seminar teaches basic skills for scientific work and especially for writing a scientific paper. Please note that the Cologne Institute for Information Systems (CIIS) offers Bachelor theses in every semester. Each semester you can start working on your bachelor thesis at a fixed starting time (in November in winter semesters and in May in summer semesters).</p>