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FACULTY OF MANAGEMENT,
ECONOMICS AND SOCIAL
SCIENCES

UNIVERSITY OF COLOGNE

VICE DEAN OF STUDIES
DEPARTMENT



valid for students of the
Examination
Regulations 2015

(enrolment for winter
semester 2020/21 at
the latest)

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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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.

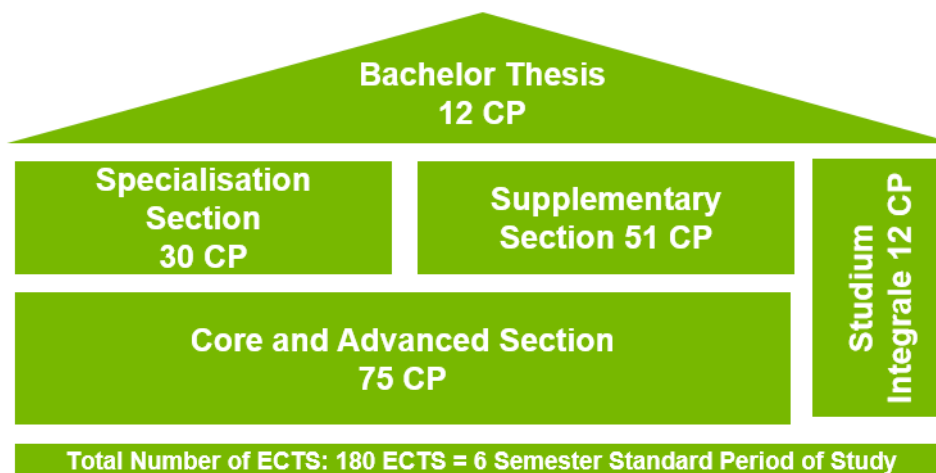
1.2 Requirements

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, ending on 15th January. 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.

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)



* 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 (start winter term)				
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	AM Statistics and Econometrics	Core and Advanced Section	6
3	EC	Supplementary Section Business Administration I	Supplementary Section	9
3	CC	Supplementary Module Information Systems I	Supplementary Section	6
				30
4	EC	Supplementary Section Business Administration II	Supplementary Section	12
4	CC	Supplementary Module Information Systems II	Supplementary Section	6
4	CC	Programming Project	Specialisation Section	9
4	EC	Studium Integrale	Studium Integrale	6
				33
5	CC	Bachelor Seminar	Specialisation Section	6
5	CC	Specialisation Module Information Systems	Specialisation Section	15
5	EC	Supplementary Module Computer Science	Supplementary Section	9
				30
6	EC	Supplementary Module Computer Science	Supplementary Section	9
6	EC	Studium Integrale	Studium Integrale	6
6	CC	Bachelor Thesis	Specialisation Section	12
				27

Note: For the Supplementary Modules in Business Administration, it is possible that the modules include mid-term examinations. Further information regarding mid-terms can be found in section 1.6 Modules with mid-term Examinations.

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 both Supplementary Modules 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

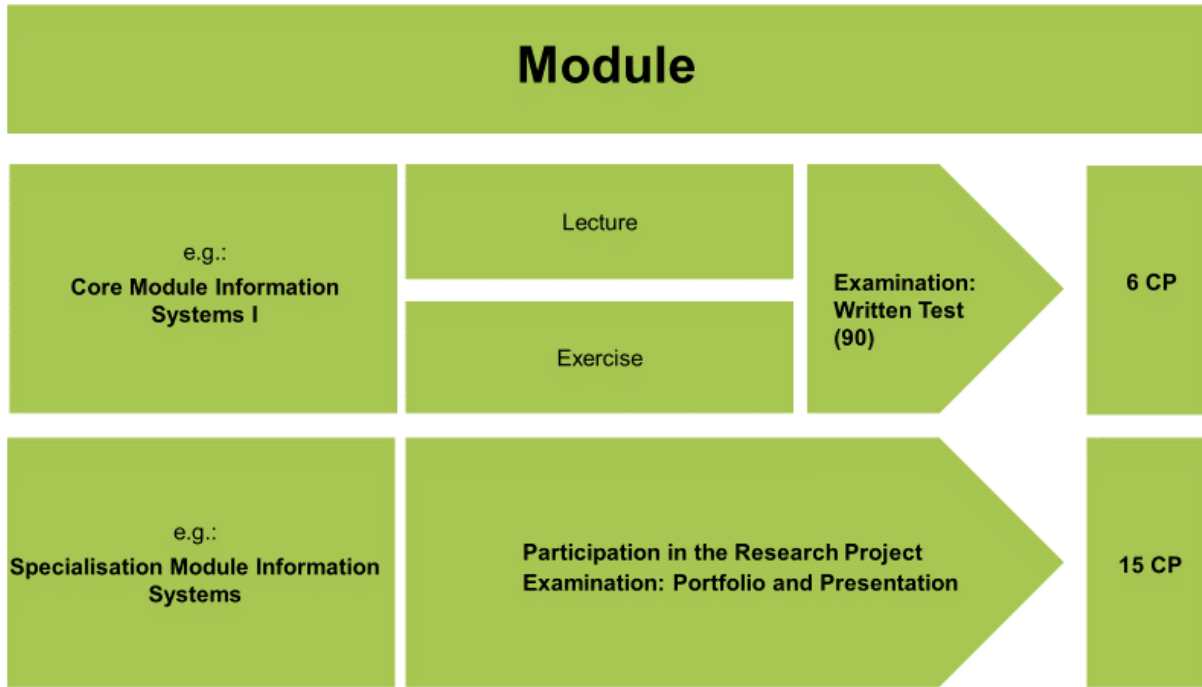
a module examination is calculated based on several components, the mark is calculated based on a weighting given in the module description. For means, only the first decimal place after the decimal point is taken into account; all other decimal places are deleted without rounding.

1.8 Modularity

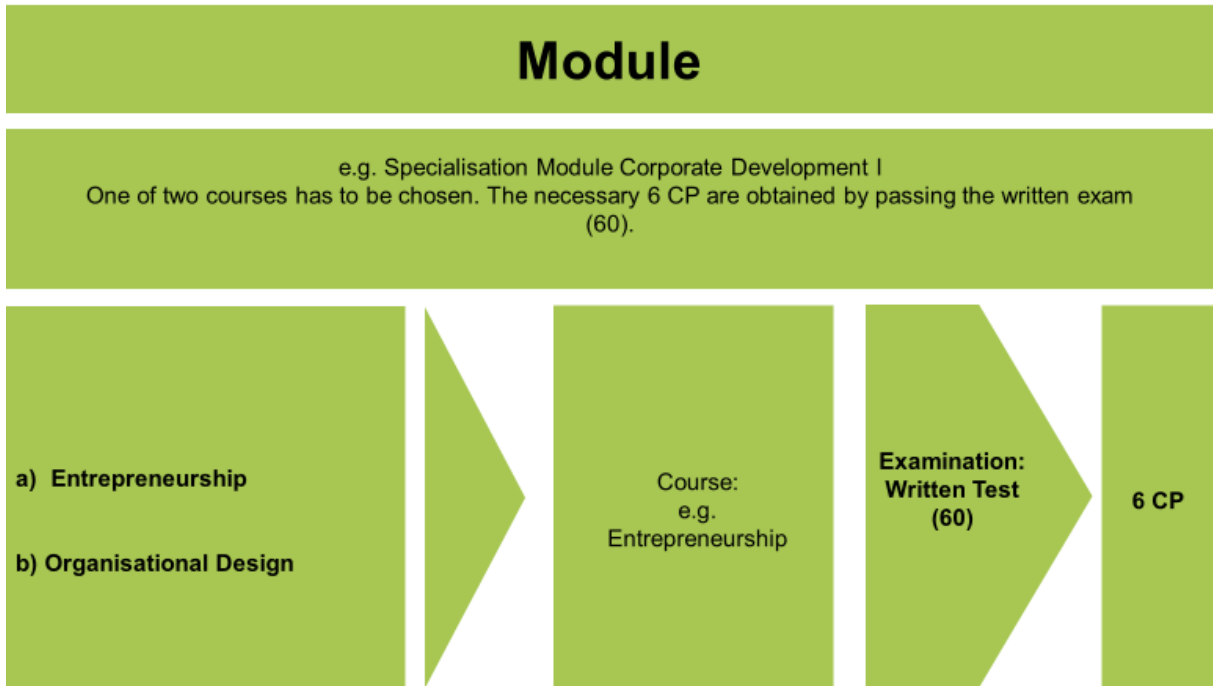
The subject categories on the bachelor programmes are divided into modules, the contents of which are presented in the module descriptions. The bachelor module catalogue can be viewed in the [download section](#) of the WiSo Student Services (“WiSo-Studienberatungszentrum”) website. Students who pass 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 have to choose one course from a selection and take the exam.

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.

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.

The WiSo student council represents the interests of all students from the WiSo faculty. In addition to advice from fellow students it also provides a variety of useful services for studying at the WiSo faculty. Any information can be found at [**wiso-buero.uni-koeln.de**](http://wiso-buero.uni-koeln.de) or by directly writing an email to [**wiso-buero@uni-koeln.de**](mailto:wiso-buero@uni-koeln.de).

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	CM Information Systems I	6	CC	21
	CM Information Systems II	6	CC	
	AM Information Systems	9	CC	
Management Core	CM Fundamentals of Business Administration	12	CC	12
Mathematics	Core Module Mathematics	12	CC	18
	AM Statistics and Econometrics ¹	6	CC	

¹ The registration for the examination is not possible if the examination for the compulsory module "Advanced Module Statistics" has already been successfully completed.

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	SpM Corporate Development I	6	EC	12
	SpM Corporate Development II	6	EC	
	SpM Finance I	6	EC	
	SpM Finance II	6	EC	
	SpM Marketing I	6	EC	
	SpM Marketing II	6	EC	
	SpM Supply Chain Management I	6	EC	
	SpM Supply Chain Management II	6	EC	
	Supplementary Module Studies Abroad	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	SuM Information Systems I	6	CC	12
	SuM 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
Specialization Section	Programming Project	9	CC	24
	SpM Information Systems	15	CC	
Seminar	Bachelor Seminar Information Systems	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 lecture practice				
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 Wirtschaftsinformatik: Core and Advanced Section				
9	Module Manager Geschäftsführende*r Direktor*in Institut für Informatik				
10	Miscellaneous Programming cannot be learned exclusively by theoretical observation, therefore the 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.				

Advanced Module Computer Science I					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
5722AMIn01	270h	9	German	every 2nd term - summer term	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 lecture practice				
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 Wirtschaftsinformatik: Core and Advanced Section				
9	Module Manager Geschäftsführende*r Direktor*in 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.				

Advanced Module Computer Science II					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
5722AMTI02	270h	9	German	every 2nd term - winter term	1 Term
1	Courses Theoretical Computer Science		Contact Hours 60h	Self-Studies 210h	Course Language
2	Module Content The module entails an introduction to theoretical computer science. It consists of a short introduction in automation theory and the area of formal language. The focus lies in the results from computability theory and complexity theory. Important areas are, for example, the definition of Turing machines, results of diagonal language and regard the Halting problem, the complexity classes P and NP, polynomial reductions and NP-completeness.				
3	Learning Objectives Students will learn how computers are used for modelling in theoretical computer science and which limitations exist for different computing methods. Furthermore, students will learn about the limits of computability and efficient computability, and how to evaluate the complexity of algorithmic problems.				
4	Teaching and Learning Methods lecture practice				
5	Module Entry Requirements Recommendation: CM Mathematics, BM Computer Science, AM Computer Science I				
6	Mode of End-Of-Module Examination Written Test: WT (90 120)				
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.				
8	Other Programmes that Use the Module Bachelor of Science Wirtschaftsinformatik: Core and Advanced Section				
9	Module Manager Geschäftsführende*r Direktor*in 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.				

CM Information Systems I					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
1277BBWIF1	180h	6	German	every 2nd term - winter term	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"> • Information systems as a 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... ... know and understand basic theories in the field of information management. ... apply theories in the field of analysis and structuring concepts in pre-structured contexts (e.g. case studies) in a solution-oriented way. ... use methods in pre-structured contexts in a solution-oriented way in the field of analysis and structuring concepts. ... analyse (current) questions and challenges within the framework of pre-structured contexts. ... communicate continuously and purposefully within teaching and learning groups. ... establish and evaluate independently developed positions. ... develop an understanding of the impact of decisions that take into account environmental, economic, social or ethical criteria. ... question and critically reflect on current social developments.				
4	Teaching and Learning Methods lecture practice				
5	Module Entry Requirements none				
6	Mode of End-Of-Module Examination Written test: WT (90)				
7	Prerequisites for Awarding of Credit Points Passing the module examination				
8	Other Programmes that Use the Module Bachelor of Science Betriebswirtschaftslehre: Supplementary Section Bachelor of Science Wirtschaftsinformatik: Core and Advanced Section				
9	Module Manager Univ.-Prof. Dr. Detlef Schoder				

10	Miscellaneous Mandatory accompanying reading: Laudon, K.; Laudon, J.; Schoder, D.: Wirtschaftsinformatik – eine Einführung, Pearson Verlag, 2015.
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CM Information Systems II					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
1277BBWIF2	180h	6	German	every 2nd term - winter term	1 Term
1	Courses Database Systems		Contact Hours 60h	Self-Studies 120h	Course Language German
2	Module Content <ul style="list-style-type: none"> • Relational model and relational algebra • Relational query languages (SQL) • Conceptual data modelling (e.g., Entity Relationship Model) • Relational database design • Normalization (1.-3. normal form, BCNF) • Development process of database systems • Data organization, data management, data protection and privacy 				
3	Learning Objectives Students... ... know and understand basic theories in the field of relational databases and data management. ... apply theories in the field of relational databases and data management in pre-structured contexts (e.g. case studies) in a solution-oriented way. ... use methods in the field of relational databases and data management in pre-structured contexts in a solution-oriented way. ... develop an understanding of the impact of decisions that take into account environmental, economic, social or ethical criteria.				
4	Teaching and Learning Methods lecture tutorial				
5	Module Entry Requirements none				
6	Mode of End-Of-Module Examination Written test: WT (90)				
7	Prerequisites for Awarding of Credit Points Passing the module examination				
8	Other Programmes that Use the Module Bachelor of Science Betriebswirtschaftslehre: Supplementary Section Bachelor of Science Wirtschaftsinformatik: Core and Advanced Section				
9	Module Manager Univ.-Prof. Dr. Christoph Rosenkranz				
10	Miscellaneous Mandatory reading is announced every semester. The written test may be in the form of an e-examination. Tutorials will be offered instead of practices.				

AM Information Systems					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
1277BAWIF1	270h	9	German	every 2nd term - summer term	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 • Intra-organizational application systems (Enterprise Resource Planning (ERP) and Enterprise Systems) • Inter-organisational application systems (Supply Chain Management (SCM) and Customer Relationship Management (CRM)) • Service-oriented architectures (SOA), Cloud Computing and Micro-Services • Enterprise Application Integration (EAI) 				
3	Learning Objectives Students... ... know and understand basic theories in the field of integrated information systems and business process management. ... apply theories in the field of integrated information systems and business process management in pre-structured contexts (e.g. case studies) in a solution-oriented way. ... know and understand common methods in the field of integrated information systems and business process management. ... use methods in the field of integrated information systems and business process management in pre-structured contexts in a solution-oriented way. ... develop an understanding of the impact of decisions that take into account environmental, economic, social and/or ethical criteria.				
4	Teaching and Learning Methods lecture tutorial				
5	Module Entry Requirements Recommendation: CM Information Systems I, CM Information Systems II				
6	Mode of End-Of-Module Examination Written test: WT (90)				
7	Prerequisites for Awarding of Credit Points Passing the module examination				
8	Other Programmes that Use the Module Bachelor of Science Wirtschaftsinformatik: 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 lecture. The degree of preparation is checked in the lectures and exercises. 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				

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	and discussed. Mandatory reading will be announced each semester. The exam may take the form of an e-examination. Tutorials will be offered instead of practices.
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CM Fundamentals of Business Administration					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
1230BBGDB1	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"> • Management structures and models • Strategy and target systems of companies • Corporate functions and processes and their interrelationships • Analysis and design of service provision, in particular the deployment of personnel • Main features of the operational cost and performance accounting • Main features of the annual accounts • Main features of operational investment and financing decisions 				
3	Learning Objectives Students... ... analyse market and environment conditions for entrepreneurial action and their influence on corporate decisions. ... reflect and justify basic positions and basic standards (competition, freedom, social justice) of companies in a social market economy. ... 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 (values, strategy and corporate goals, coordination and motivation, information and control system). ... 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 lecture tutorial				
5	Module Entry Requirements none				
6	Mode of End-Of-Module Examination Written test: WT (90)				
7	Prerequisites for Awarding of Credit Points Passing the module examination				
8	Other Programmes that Use the Module Bachelor of Arts Regionalstudien Ost- und Mitteleuropa - Sozialwissenschaften: Social Sciences Regional Studies Latin America, East and Middle Europe Bachelor of Arts Regionalstudien Ost- und Mitteleuropa - Volkswirtschaftslehre: Economics Regional Studies Latin America, East and Middle Europe Bachelor of Science Gesundheitsökonomie: Core and Advanced Section Bachelor of Arts Regionalstudien China - Volkswirtschaftslehre: Economics Regional Studies China Bachelor of Arts Regionalstudien Lateinamerika - Sozialwissenschaften:				

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	<p>Social Sciences Regional Studies Latin America, East and Middle Europe</p> <p>Bachelor of Science Mathematik: Business and Economics Sciences Mathematics</p> <p>Bachelor of Science Wirtschaftsmathematik: Business and Economics Sciences Bachelor Business Mathematics</p> <p>Bachelor of Science Wirtschaftsinformatik: Core and Advanced Section</p> <p>Bachelor of Arts Lehramt: Core Section</p> <p>Bachelor of Arts Medienwissenschaft: Media Management and Economics</p> <p>Bachelor of Arts Regionalstudien China - Betriebswirtschaftslehre: Business Administration Regional Studies China</p> <p>Bachelor of Arts Regionalstudien Lateinamerika - Volkswirtschaft: Economics Regional Studies Latin America, East and Middle Europe</p> <p>Bachelor of Science Geographie: Business Administration Bachelor Geography</p>
9	<p>Module Manager Geschäftsführende*r Direktor*in des Instituts für Berufs-, Wirtschafts- und Sozialpädagogik</p>
10	<p>Miscellaneous</p>

Core Module Mathematics					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
5722BMMa00	360h	12	German	every 2nd term - winter term	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 lecture practice				
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 Wirtschaftsinformatik: Core and Advanced Section				
9	Module Manager Mathematisches Institut				
10	Miscellaneous Mandatory reading is announced every semester.				

AM Statistics and Econometrics					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
1314BAMST1	180h	6	German	every term	1 Term
1	Courses Statistical Inference and Econometrics		Contact Hours 90h	Self-Studies 90h	Course Language German
2	Module Content <ul style="list-style-type: none"> • Continuation of probability theory from the Core Module • Fundamentals of statistical inference • Fundamentals of econometrics 				
3	Learning Objectives Students... ... use methods in the area of statistics and econometrics in pre-structured contexts in a solution-oriented way. ... systematize and synthesize data. ... communicate continuously and purposefully within teaching and learning groups. ... design their learning and working processes independently.				
4	Teaching and Learning Methods lecture practice				
5	Module Entry Requirements Recommendation: CM Statistics or CM Mathematics (Information Systems)				
6	Mode of End-Of-Module Examination Written test: WT (90)				
7	Prerequisites for Awarding of Credit Points Passing the module examination				
8	Other Programmes that Use the Module Bachelor of Science Betriebswirtschaftslehre: Core and Advanced Section Bachelor of Science Mathematik: Business and Economics Sciences Mathematics Economics Bachelor of Science Volkswirtschaftslehre: Core and Advanced Section Bachelor of Science Wirtschaftsmathematik: Business and Economics Sciences Bachelor Business Mathematics Economics Bachelor of Science Volkswirtschaftslehre sozialwissenschaftlicher Richtung: Core and Advanced Section Bachelor of Science Wirtschaftsinformatik: Core and Advanced Section				
9	Module Manager Prof. Dr. Rainer Dyckerhoff Dr. Bastian Gribisch				
10	Miscellaneous In the self-study phase, tutorials are offered.				

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 I (2. Midterm)		Contact Hours 60h	Self-Studies 210h	Course Language German
2	Module Content This course first introduces foundations of Corporate Governance and Corporate Strategy. Building on this, concepts of Organizational Design and Instruments of Human Resource Management are presented and analysed.				
3	Learning Objectives Students... ... know and understand basic theories in the area of corporate governance, business strategy, organizational design and HR-management. ... apply theories in pre-structured contexts (e.g. case studies) in a solution-oriented way. ... analyse (current) questions and challenges within the framework of pre-structured contexts. ... establish and evaluate independently developed positions. ... develop an understanding of the impact of decisions that take into account environmental, economic, social and/or ethical criteria.				
4	Teaching and Learning Methods lecture tutorial				
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 Science Gesundheitsökonomie: Supplementary Section Bachelor of Science Betriebswirtschaftslehre: Core and Advanced Section Bachelor of Science Volkswirtschaftslehre: Supplementary Section Bachelor of Science Wirtschaftsinformatik: Supplementary Section Bachelor of Arts Lehramt: Core Section Bachelor of Arts Medienwissenschaft: Media Management and Economics Bachelor of Arts Regionalstudien China - Betriebswirtschaftslehre: Business Administration Regional Studies China Bachelor of Science Psychologie: Interdisciplinary Integration				
9	Module Manager Univ.-Prof. Dr. Matthias Heinz				

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	Univ.-Prof. Dr. Bernd Irlenbusch Univ.-Prof. Dr. Dirk Sliwka N.N.
10	Miscellaneous

Core Module Finance					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
1259BMFi01	270h	9	German	every term	1 Term
1	Courses Investition und Finanzierung		Contact Hours 60h	Self-Studies 210h	Course Language German
2	Module Content 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 Fundamentals of financing <ul style="list-style-type: none"> • Internal financing • External financing 				
3	Learning Objectives Students... ... know and understand basic theories in the area of finance. ... apply theories in the area of finance in pre-structured contexts (e.g. case studies) in a solution-oriented way. ... know and understand common methods in the area of finance. ... use methods in the area of finance in pre-structured contexts in a solution-oriented way. ... design their learning and working processes independently.				
4	Teaching and Learning Methods lecture practice				
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 Science Gesundheitsökonomie: Supplementary Section Bachelor of Science Betriebswirtschaftslehre: Core and Advanced Section Bachelor of Science Volkswirtschaftslehre: Supplementary Section Bachelor of Science Wirtschaftsinformatik: Supplementary Section Bachelor of Arts Lehramt: Core Section Bachelor of Arts Regionalstudien China - Betriebswirtschaftslehre: Business Administration Regional Studies China Bachelor of Science Psychologie: Interdisciplinary Integration				
9	Module Manager Univ.-Prof. Dr. Alexander Kempf				

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	Dr. Alexander Pütz Univ.-Prof. Dr. Heinrich R. Schradin
10	Miscellaneous

Core Module Marketing					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
1266BMMa00	270h	9	German	every term	1 Term
1	Courses Einführung ins Marketing (1. Midterm)		Contact Hours 60h	Self-Studies 210h	Course Language German
2	Module Content The module covers theories and methods to analyse key marketing decision problems and to develop sound recommendations how to solve these decision problems. To this end, it looks at (i) consumers' responses to marketing activities and the underlying psychological mechanisms (consumer behaviour), (ii) the collection and analysis of data about markets and key stakeholders (e.g., consumers) which serves as the empirical basis for decision-making (market research), (iii) the marketing planning process (strategic marketing decisions), and (iv) marketing mix decisions (e.g., brand/product, price, etc.).				
3	Learning Objectives Students... ... know and understand basic theories of a market-oriented management of businesses. ... know and understand common marketing planning methods, including strategic marketing decisions and marketing mix decisions.				
4	Teaching and Learning Methods lecture practice				
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 Science Gesundheitsökonomie: Supplementary Section Bachelor of Science Betriebswirtschaftslehre: Core and Advanced Section Bachelor of Science Volkswirtschaftslehre: Supplementary Section Bachelor of Science Wirtschaftsinformatik: Supplementary Section Bachelor of Arts Lehramt: Core Section Bachelor of Arts Regionalstudien China - Betriebswirtschaftslehre: Business Administration Regional Studies China Bachelor of Science Psychologie: Interdisciplinary Integration				
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 Operations Management		Contact Hours 45h	Self-Studies 225h	Course Language German
2	Module Content <ul style="list-style-type: none"> • Fundamentals of Operations Management • Demand Forecasting • Inventory Management • Production Planning • Supply Chain Management • Location Planning • Process Design 				
3	Learning Objectives Students... ... know and understand basic theories in the area of supply chain management. ... know and understand common methods in the area of supply chain management. ... use methods in the area of supply chain management in pre-structured contexts in a solution-oriented way. ... analyse (current) questions and challenges within the framework of pre-structured contexts. ... present and/or discuss results with teaching staff and other students. ... develop an understanding of the impact of decisions that take into account environmental, economic, social and/or ethical criteria.				
4	Teaching and Learning Methods lecture practice tutorial				
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 Science Gesundheitsökonomie: Supplementary Section Bachelor of Science Betriebswirtschaftslehre: Core and Advanced Section Bachelor of Science Volkswirtschaftslehre: Supplementary Section Bachelor of Science Wirtschaftsinformatik: Supplementary Section Bachelor of Arts Lehramt: Core Section Bachelor of Arts Regionalstudien China - Betriebswirtschaftslehre: Business Administration Regional Studies China Bachelor of Science Psychologie: Interdisciplinary Integration				

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9	Module Manager Univ.-Prof. Dr. Ulrich W. Thonemann
10	Miscellaneous

SpM Corporate Development I					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
1253BSMCD1	180h	6	German and English	every 2nd term - winter term	1 Term
1	Courses a) Entrepreneurship b) Organisational Design		Contact Hours a) 60h b) 60h	Self-Studies a) 120h b) 120h	Course Language a) German b) German
2	Module Content <ul style="list-style-type: none"> • Strategies on Market Entry, Products, Markets and Value Creation • Entrepreneurial Behaviour • Contingency Theory • Managing Organizational Change 				
3	Learning Objectives Students... ... know and understand basic theories. ... apply theories in pre-structured contexts (e.g. case studies) in a solution-oriented way. ... analyse (current) questions and challenges within the framework of pre-structured contexts. ... present and/or discuss results with teaching staff and other students. ... develop an understanding of the impact of decisions that take into account environmental, economic, social and/or ethical criteria.				
4	Teaching and Learning Methods lecture practice				
5	Module Entry Requirements Recommendation: Either Core Module Corporate Development, CM Statistics, AM Statistics and Econometrics or CM Digital Transformation and Entrepreneurship, CM Business Ethics, CM Introduction to Statistics, CM Data Analysis and Econometrics				
6	Mode of End-Of-Module Examination Written test: WT (60)				
7	Prerequisites for Awarding of Credit Points Passing the module examination of course a) or b)				
8	Other Programmes that Use the Module Bachelor of Science Betriebswirtschaftslehre: Specialization Section Bachelor of Science Volkswirtschaftslehre: Specialization Section Bachelor of Science Wirtschaftsinformatik: Supplementary Section				
9	Module Manager Univ.-Prof. Dr. Matthias Heinz Univ.-Prof. Dr. Bernd Irlenbusch Univ.-Prof. Dr. Dirk Sliwka N.N.				
10	Miscellaneous The lecture b) will be offered once in addition and for the last time in the summer semester 2023; it will no longer be offered from the winter semester 23/24.				

SpM Corporate Development II					
Module Code 1253BSMCD2	Workload 180h	ECTS Credits 6	Module Language German and English	Module Availability every 2nd term - summer term	Duration 1 Term
1	Courses a) International Strategic Management b) Organizational Behavior (Bachelor)		Contact Hours a) 30h b) 60h	Self-Studies a) 150h b) 120h	Course Language a) English b) English
2	Module Content <ul style="list-style-type: none"> • Theories of International Management • Human Resources: Tools, Selection and Development • Employee Participation and Corporate Governance • Equality and Diversity 				
3	Learning Objectives Students... ... know and understand basic theories. ... analyse (current) questions and challenges within the framework of pre-structured contexts. ... communicate in English. ... develop an understanding of the impact of decisions that take into account environmental, economic, social and/or ethical criteria. ... question and critically reflect on current social developments.				
4	Teaching and Learning Methods lecture practice				
5	Module Entry Requirements Recommendation: Either Core Module Corporate Development, CM Statistics, AM Statistics and Econometrics or CM Digital Transformation and Entrepreneurship, CM Business Ethics, CM Introduction to Statistics, CM Data Analysis and Econometrics				
6	Mode of End-Of-Module Examination Written test: WT (60)				
7	Prerequisites for Awarding of Credit Points Passing the module examination of course a) or b)				
8	Other Programmes that Use the Module Bachelor of Science Betriebswirtschaftslehre: Specialization Section Bachelor of Science Volkswirtschaftslehre: Specialization Section Bachelor of Science Wirtschaftsinformatik: Supplementary Section				
9	Module Manager Univ.-Prof. Dr. Matthias Heinz Univ.-Prof. Dr. Bernd Irlenbusch Univ.-Prof. Dr. Dirk Sliwka N.N.				
10	Miscellaneous The lecture b) will be offered for the first time in the summer semester of 2024.				

SpM Finance I					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
1259BSMF11	180h	6	German and English	every 2nd term - summer term	1 Term
1	Courses a) Corporate Finance b) Investment Management		Contact Hours a) 60h b) 60h	Self-Studies a) 120h b) 120h	Course Language a) English b) German
2	Module Content a) Corporate Finance • Analysing and Working with Financial Statements • Company Valuation • Mergers & Acquisitions b) Investment Management • Portfolio theory • Risk management • Investment strategies				
3	Learning Objectives Students... ... apply theories in the area of Finance in pre-structured contexts (e.g. case studies) in a solution-oriented way. ... use methods in the area of Finance in pre-structured contexts in a solution-oriented way. ... analyse (current) questions and challenges within the framework of pre-structured contexts. ... establish and evaluate independently developed positions. ... develop an understanding of the impact of decisions that take into account environmental, economic, social and/or ethical criteria. ... question and critically reflect on current developments at the capital market.				
4	Teaching and Learning Methods lecture practice				
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 module examination of course a) or b)				
8	Other Programmes that Use the Module Bachelor of Science Betriebswirtschaftslehre: Specialization Section Bachelor of Science Volkswirtschaftslehre: Specialization Section Bachelor of Science Wirtschaftsinformatik: Supplementary Section				
9	Module Manager Univ.-Prof. Dr. Dieter Hess Univ.-Prof. Dr. Alexander Kempf				

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	Dr. Alexander Pütz Dr. Wolfgang Spörk
10	Miscellaneous

SpM Finance II					
Module Code 1259BSMF12	Workload 180h	ECTS Credits 6	Module Language German and English	Module Availability every 2nd term - winter term	Duration 1 Term
1	Courses a) Bank Management b) Leasing c) Insurance Management d) Sustainable Finance		Contact Hours a) 60h b) 60h c) 60h d) 60h	Self-Studies a) 120h b) 120h c) 120h d) 120h	Course Language a) German b) German c) German d) German
2	Module Content a) Bank Management <ul style="list-style-type: none"> • The German commercial banking system • Central banks / supranational banks • Bank Accounting • Bank Controlling • Bank regulation b) Leasing <ul style="list-style-type: none"> • German leasing market and leasing contracts • Calculation of leasing rates • Capital costs of leasing relationships • Accounting of leasing relationships according to HGB and IFRS • Cost comparison of leasing and loan financing taking into account tax circumstances • Institutional economic analysis of leasing c) Insurance Management <ul style="list-style-type: none"> • Risk management and insurance production • Limits of insurability • Insurance and reinsurance markets / Historical roots of insurance • Lines of individual insurance • Reinsurance and alternative risk transfer • Institutional framework • Value-oriented insurance management d) Sustainable Finance <ul style="list-style-type: none"> • Sustainability ratings • Sustainability performance of conventional and sustainable investments • Financial performance of conventional and sustainable investments • Sustainability in investment management • Sustainability and asset pricing • Regulations • Research in the field of sustainable finance 				
3	Learning Objectives Students... ... know and understand basic theories in the areas of Insurance, Banking and Leasing. ... know and understand common methods in the areas of Insurance, Banking and Leasing. ... use methods in the areas of Insurance, Banking and Leasing in pre-structured contexts in a solution-oriented way. ... analyse (current) questions and challenges within the framework of pre-structured contexts. ... develop an understanding of the impact of decisions that take into account environmental, economic, social and/or ethical criteria.				
4	Teaching and Learning Methods lecture practice				

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5	<p>Module Entry Requirements Recommendation: Either CM Accounting I, CM Finance I or CM Finance and Accounting</p>
6	<p>Mode of End-Of-Module Examination Written test: WT (60)</p>
7	<p>Prerequisites for Awarding of Credit Points Passing the module examination of course a), b), c) or d)</p>
8	<p>Other Programmes that Use the Module Bachelor of Science Betriebswirtschaftslehre: Specialisation Section Business Administration Bachelor of Science Volkswirtschaftslehre: Specialisation Section Track Business Administration Bachelor of Science Management, Economics and Social Sciences: Specialisation Section Management, Economics and Social Sciences</p>
9	<p>Module Manager Jun.-Prof. Dr. Tobias Bauckloh Univ.-Prof. Dr. Thomas Hartmann-Wendels Univ.-Prof. Dr. Heinrich R. Schradin Dr. Wolfgang Spörk</p>
10	<p>Miscellaneous</p>

SpM Marketing I					
Module Code 1266BSMMA1	Workload 180h	ECTS Credits 6	Module Language German and English	Module Availability every 2nd term - winter term	Duration 1 Term
1	Courses Methods of Marketing Management (winter term)		Contact Hours 60h	Self-Studies 120h	Course Language English
2	Module Content <ul style="list-style-type: none"> • Design of market research projects • Sample selection and survey methods • Metrics and questionnaire design • Uni- and bivariate analyses • Application of multivariate analysis methods for marketing mix decisions • Introduction to causal analysis 				
3	Learning Objectives Students... ... know and understand common methods and approaches of market research. ... analyse (current) questions and challenges in the context of market research projects and investigate expected cause-effect relationships. ... communicate in English.				
4	Teaching and Learning Methods lecture practice				
5	Module Entry Requirements Recommendation: Core Module Marketing				
6	Mode of End-Of-Module Examination Written test: WT (60)				
7	Prerequisites for Awarding of Credit Points Passing the module examination				
8	Other Programmes that Use the Module Bachelor of Science Betriebswirtschaftslehre: Specialization Section Bachelor of Science Volkswirtschaftslehre: Specialization Section Bachelor of Science Wirtschaftsinformatik: Supplementary Section				
9	Module Manager Univ.-Prof. Dr. Hernán Bruno				
10	Miscellaneous				

SpM Marketing II					
Module Code 1266BSMMA2	Workload 180h	ECTS Credits 6	Module Language German and English	Module Availability every 2nd term - summer term	Duration 1 Term
1	Courses Concepts of Marketing Mix Management (summer term)		Contact Hours 60h	Self-Studies 120h	Course Language English
2	Module Content <ul style="list-style-type: none"> • Marketing mix decisions (e.g. brand management and new product development) • Management of innovations and established products • Price and distribution management • Communication management • Service Management/ Service Marketing 				
3	Learning Objectives Students... ... know and understand basic theories and concepts of marketing in the domain of marketing mix management. ... analyse (current) questions and challenges in the context of marketing mix management. ... communicate in English.				
4	Teaching and Learning Methods lecture practice				
5	Module Entry Requirements Recommendation: Core Module Marketing				
6	Mode of End-Of-Module Examination Written test: WT (60)				
7	Prerequisites for Awarding of Credit Points Passing the module examination				
8	Other Programmes that Use the Module Bachelor of Science Betriebswirtschaftslehre: Specialization Section Bachelor of Science Volkswirtschaftslehre: Specialization Section Bachelor of Science Wirtschaftsinformatik: Supplementary Section				
9	Module Manager Univ.-Prof. Dr. Marc Fischer				
10	Miscellaneous				

SpM Supply Chain Management I					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
1271BSMSC1	180h	6	German and English	every term	1 Term
1	Courses a) Strategic Procurement b) Supply Chain Planning c) Behavioral Management Science I		Contact Hours a) 45h b) 45h c) 30h	Self-Studies a) 135h b) 135h c) 150h	Course Language a) English b) German c) English
2	Module Content Selected Topics in Supply Chain Management: a) Strategic Procurement <ul style="list-style-type: none"> • Strategic Thinking • Sourcing Analysis • Sourcing Methods • Supplier Management • Behavioral Aspects b) Supply Chain Planning <ul style="list-style-type: none"> • Supply Chain Design • Demand Planning • Sales Planning • Supply Chain Management c) Behavioral Management Science I <ul style="list-style-type: none"> • Behavioral economics and psychology • Experimental methods • Applications to different fields of management 				
3	Learning Objectives Students... ... know and understand basic theories in supply chain management. ... apply theories in supply chain management in pre-structured contexts (e.g. case studies) in a solution-oriented way. ... know and understand common methods in supply chain management. ... use methods in supply chain management in pre-structured contexts in a solution-oriented way. ... analyse (current) questions and challenges within the framework of pre-structured contexts. ... communicate continuously and purposefully within teaching and learning groups. ... present and/or discuss results with teaching staff and other students. ... develop an understanding of the impact of decisions that take into account environmental, economic, social and/or ethical criteria. ... design their learning and working processes independently.				
4	Teaching and Learning Methods lecture practice				
5	Module Entry Requirements Recommendation: Core Module Supply Chain Management				
6	Mode of End-Of-Module Examination Written test: PO				

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7	Prerequisites for Awarding of Credit Points Passing the module examination of course a), b) or c)
8	Other Programmes that Use the Module Bachelor of Science Betriebswirtschaftslehre: Specialization Section Bachelor of Science Volkswirtschaftslehre: Specialization Section Bachelor of Science Wirtschaftsinformatik: Supplementary Section
9	Module Manager AD Dr. Johannes Antweiler Area Supply Chain Management
10	Miscellaneous

SpM Supply Chain Management II					
Module Code 1271BSMSC2	Workload 180h	ECTS Credits 6	Module Language German and English	Module Availability every term	Duration 1 Term
1	Courses a) Strategy and Innovation b) Production Management c) Behavioral Management Science II		Contact Hours a) 45h b) 45h c) 30h	Self-Studies a) 135h b) 135h c) 150h	Course Language a) English b) German c) English
2	Module Content Selected Topics in Supply Chain Management: <ul style="list-style-type: none"> a) Strategy and Innovation <ul style="list-style-type: none"> • Managing Projects and Processes • Strategic Innovation in Supply Chains b) Production Management <ul style="list-style-type: none"> • Lot-Sizing and Scheduling • Inventory Management c) Behavioral Management Science II <ul style="list-style-type: none"> • Behavioral economics and psychology • Experimental methods • Applications to different fields of management 				
3	Learning Objectives Students... <ul style="list-style-type: none"> ... know and understand basic theories in supply chain management. ... apply theories in supply chain management in pre-structured contexts (e.g. case studies) in a solution-oriented way. ... know and understand common methods in supply chain management. ... use methods in supply chain management in pre-structured contexts in a solution-oriented way. ... analyse (current) questions and challenges within the framework of pre-structured contexts. ... communicate continuously and purposefully within teaching and learning groups. ... present and/or discuss results with teaching staff and other students. ... develop an understanding of the impact of decisions that take into account environmental, economic, social and/or ethical criteria. ... design their learning and working processes independently. 				
4	Teaching and Learning Methods lecture practice				
5	Module Entry Requirements Recommendation: Core Module Supply Chain Management				
6	Mode of End-Of-Module Examination Written test: PO				
7	Prerequisites for Awarding of Credit Points Passing the module examination of course a), b) or c)				
8	Other Programmes that Use the Module Bachelor of Science Betriebswirtschaftslehre: Specialization Section				

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	Bachelor of Science Volkswirtschaftslehre: Specialization Section Bachelor of Science Wirtschaftsinformatik: Supplementary Section
9	Module Manager AD Dr. Johannes Antweiler Area Supply Chain Management
10	Miscellaneous

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 Wirtschaftsinformatik: 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.				

Supplementary Module Theoretical Computer Science					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
5722EMTI01	270h	9	German	every 2nd term - summer term	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.</p> <p>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</p>				

	<p>logical thinking. ... deepen the lecture material in the exercises and acquire communication and presentation skills there.</p>
4	<p>Teaching and Learning Methods lecture practice</p>
5	<p>Module Entry Requirements Recommended: Core Module Computer Science, Advanced Module Computer Science I, Advanced Module Computer Science II, Programming Project</p>
6	<p>Mode of End-Of-Module Examination Written test: WT (180)</p>
7	<p>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 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 Wirtschaftsinformatik: Supplementary Section</p>
9	<p>Module Manager Geschäftsführende*r Direktor*in 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 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	Module Content 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. 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. (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				
3	Learning Objectives Students... ... 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). ... 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). ... learn ways of thinking and techniques for the efficient use of parallel computer architectures. ... 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). ... 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	Teaching and Learning Methods lecture practice				

5	<p>Module Entry Requirements Recommended: Core Module Computer Science, Advanced Module Computer Science I, Advanced Module Computer Science II, Programming Project</p>
6	<p>Mode of End-Of-Module Examination Written test: WT (180)</p>
7	<p>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 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 Wirtschaftsinformatik: Supplementary Section</p>
9	<p>Module Manager 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 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	Module Content a) Modelling and Simulation: - 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 b) Automatic drawing of graphs: 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". 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.				
3	Learning Objectives Students... ... 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	Teaching and Learning Methods lecture practice				
5	Module Entry Requirements Recommended: Core Module Computer Science, Advanced Module Computer Science I, Advanced Module Computer Science II, Programming Project				
6	Mode of End-Of-Module Examination Written test: WT (180)				

7	<p>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 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 Wirtschaftsinformatik: Supplementary Section</p>
9	<p>Module Manager Geschäftsführende*r Direktor*in 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 Technical Computer Science					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
5722EMTI00	270h	9	German	every 2nd term - winter term	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 lecture practice				
5	Module Entry Requirements Recommended: Core Module Computer Science, Advanced Module Computer Science I, Advanced Module Computer Science II, Programming Project				
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 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.				
8	Other Programmes that Use the Module Bachelor of Science Wirtschaftsinformatik: Supplementary Section				

<p>9</p>	<p>Module Manager Geschäftsführende*r Direktor*in Institut für Informatik</p>
<p>10</p>	<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 1. Probability Calculus - 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 - Statistical decision problems - Special statistics and their distributions - Estimation of parameters - Testing hypotheses - Confidence ranges - Regression and Correlation - Vistas				
3	Learning Objectives Students... ... 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 lecture practice				
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 Wirtschaftsinformatik: 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.
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Supplementary Module Mathematics II					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
5722EMMa02	270h	9	German	every 2nd term - summer term	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 lecture practice				
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 Wirtschaftsinformatik: 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.				

Supplementary Module Mathematics III					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
5722EMMa03	270h	9	German	every 2nd term - summer term	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 lecture practice				
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 Wirtschaftsinformatik: 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.				

SuM Information Systems I					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
1277BEWIF1	180h	6	German and English	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) 40h	Self-Studies a) 120h b) 140h	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 classifications • Historical Case Studies and Conclusions for Future Situations • Presentation of concrete attack techniques and threats • Design of secure systems (consideration in the development process, frameworks, 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 and IT-Forensics • Legal framework 				
3	Learning Objectives Students... ... know and understand common methods in the field of a) analysis and design of information systems; b) cryptographic procedures and protection requirements of information systems. ... communicate continuously and purposefully within teaching and learning groups. ... develop an understanding of the impact of decisions that take into account environmental, economic, social or ethical criteria. ... design their learning and working processes independently.				
4	Teaching and Learning Methods lecture practice				
5	Module Entry Requirements none				
6	Mode of End-Of-Module Examination Written test: PO				
7	Prerequisites for Awarding of Credit Points Passing the module examination of course a) or b)				
8	Other Programmes that Use the Module Bachelor of Science Wirtschaftsinformatik: Supplementary Section				

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9	Module Manager Sprecher des Fachbereichs Wirtschaftsinformatik
10	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 and is offered as a block course in the first or second half of the semester. 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.

SuM Information Systems II					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
1277BEWIF2	180h	6	German and English	every 2nd term - summer term	1 Term
1	Courses a) Information Systems Development b) Introduction to Data Science and Machine		Contact Hours a) 60h b) 30h	Self-Studies a) 120h b) 150h	Course Language a) German b) English
2	Module Content a) Information Systems Development <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.) • Procedures 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 • Ethics in the development of IS b) Introduction to Data Science and Machine Learning <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. forecast • Data visualization • Use of data to support entrepreneurial activity • Introduction to machine learning • Programming language: Python 				
3	Learning Objectives Students... ... know and understand common methods in the areas of (a Information Systems Development and (b) Data Science and Machine Learning. ... use methods in the areas of (a Information Systems Development and (b) Data Science and Machine Learning in pre-structured contexts in a solution-oriented way. ... communicate continuously and purposefully within teaching and learning groups. ... present and/or discuss results with teaching staff and other students. ... develop an understanding of the impact of decisions that take into account environmental, economic, social or ethical criteria. ... design their learning and working processes independently.				
4	Teaching and Learning Methods lecture practice				
5	Module Entry Requirements none				
6	Mode of End-Of-Module Examination Written test: PO				

7	<p>Prerequisites for Awarding of Credit Points Passing the module examination of course a) or b)</p>
8	<p>Other Programmes that Use the Module Bachelor of Science Wirtschaftsinformatik: Supplementary Section</p>
9	<p>Module Manager Geschäftsführende*r Direktor*in Kölner Institut für Wirtschaftsinformatik</p>
10	<p>Miscellaneous 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

Programming Project					
Module Code 5751PrPrak	Workload 270h	ECTS Credits 9	Module Language German	Module Availability every 2nd term - summer term	Duration 1 Term
1	Courses Programming Project		Contact Hours 30h	Self-Studies 240h	Course Language German
2	Module Content <ul style="list-style-type: none"> • 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. ... communicate continuously and purposefully within teaching and learning groups. ... establish and evaluate independently developed positions. ... present and/or discuss results with teaching staff and other students. ... design their learning and working processes independently. ... use under guidance techniques of scientific work and good scientific practice.				
4	Teaching and Learning Methods project				
5	Module Entry Requirements Recommendation: CM Computer Science, AM Computer Science I				
6	Mode of End-Of-Module Examination Combined examination: WT (60), PO				
7	Prerequisites for Awarding of Credit Points Passing the module examination				
8	Other Programmes that Use the Module Bachelor of Science Wirtschaftsinformatik: Specialization Section				
9	Module Manager Geschäftsführende*r Direktor*in Institut für Informatik				
10	Miscellaneous During the first weeks, the tasks to be processed are presented by the internship 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				

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valid for students of the ER 2015 (enrolment for winter semester 2020/21 at the latest)

	the project. In addition, a 15 to 45-minute examination can take place. A graded certificate of achievement is issued.
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SpM Information Systems					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
1277BSWIF1	450h	15	German and English	every term	1 Term
1	Courses Capstone Project Information Systems		Contact Hours 90h	Self-Studies 360h	Course Language German
2	Module Content <ul style="list-style-type: none"> • Independent and autonomous development of an information system in a team in a project • Project and team management • Requirements analysis • Draft • Implementation • Testing • Customer communication and management 				
3	Learning Objectives Students... ... communicate continuously and purposefully within teaching and learning groups. ... establish and evaluate independently developed positions. ... present and/or discuss results with teaching staff and other students. ... develop an understanding of the impact of decisions that take into account environmental, economic, social or ethical criteria. ... design their learning and working processes independently. ... reflect their own performance and implement feedback constructively.				
4	Teaching and Learning Methods Research project				
5	Module Entry Requirements Recommendation: CM Information Systems I, CM Information Systems II, AM Information Systems, SuM Information Systems I, SuM Information Systems II; CM Computer Science, SpM Computer Science, AM Computer Science I, AM Computer Science II				
6	Mode of End-Of-Module Examination Combined examination: PRES, PO				
7	Prerequisites for Awarding of Credit Points Passing the module examination				
8	Other Programmes that Use the Module Bachelor of Science Wirtschaftsinformatik: Specialization Section				
9	Module Manager Univ.-Prof. Dr. Christoph Rosenkranz				
10	Miscellaneous The preliminary course at the beginning of the course may include examinations. Basic knowledge of programming, databases, modeling, architectures, data structures and algorithms as well as project management is required. The students work self-organized in 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, 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.				

Bachelor Seminar Information Systems					
Module Code	Workload	ECTS Credits	Module Language	Module Availability	Duration
1277BSSWF1	180h	6	German and English	every term	1 Term
1	Courses a) Bachelorseminar Information Systems for Sustainable Society (Prof. Ketter) b) Bachelorseminar Information Systems and Digital Technology (N.N.) 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> <p>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</p> <p>b) Conceptual Modeling, Business Process Management, Information Systems Development, Systems Analysis and Design, Digital Innovation, Digital Entrepreneurship, Green IS, Environmental Sustainability</p> <p>c) IT Outsourcing, IT Strategy, Information Systems Development & IT Project Management, Open Source Software Development, Agile Development, Business Process Management, Digital Transformation</p> <p>d) Media Mass Customisation, Electronic Commerce, Social Media & Social Network Analysis, Openness, Management of information spheres and IT platforms, Decision Support Systems, artificial intelligence</p>				
3	<p>Learning Objectives</p> <p>Students...</p> <p>... know and understand basic theories from the above mentioned areas.</p> <p>... collect, systematize and synthesize literature and data material for a scientific work on a selected topic.</p> <p>... present and/or discuss results with teaching staff and other students.</p> <p>... reflect their own performance and implement feedback constructively.</p> <p>... use under guidance techniques of scientific work and good scientific practice.</p>				
4	Teaching and Learning Methods seminar				
5	Module Entry Requirements none				
6	Mode of End-Of-Module Examination Combined examination: PRES, TP				
7	Prerequisites for Awarding of Credit Points Passing the module examination of one of the courses a) to d)				

<p>8</p>	<p>Other Programmes that Use the Module Bachelor of Science Wirtschaftsinformatik: Specialization Section</p>
<p>9</p>	<p>Module Manager Geschäftsführende*r Direktor*in Kölner Institut für Wirtschaftsinformatik</p>
<p>10</p>	<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 N.N. 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 Transac-tive 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 Bachelor's Thesis				
5	Module Entry Requirements 100 CP successfully passed; Recommended: Bachelor Seminar				
6	Mode of End-Of-Module Examination Written test 12 weeks				
7	Prerequisites for Awarding of Credit Points Passing the written test.				
8	Other Programmes that Use the Module Bachelor of Science Wirtschaftsinformatik: Bachelorthesis				
9	Module Manager Geschäftsführende*r Direktor*in Kölner Institut für Wirtschaftsinformatik				

10	<p>Miscellaneous</p> <p>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>
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