JACOBS UNIVERSITY

Information Management and Systems

Bachelor's Degree Program (BSc)

Disclaimer

As of September 1, 2014 the School of Engineering and Science and the School of Humanities and Social Sciences have been replaced by the Focus Areas Health, Mobility and Diversity. Handbooks and policies might still refer to the old structure of Schools.

If this is the case, references to the School of Engineering and Science include courses offered within the following disciplines:

- Electrical Engineering and Computer Science
- Life Sciences
- Logistics
- Mathematical Sciences
- Natural and Environmental Sciences

References to the School of Humanities and Social Sciences include courses offered within the following disciplines:

- Economics and Management
- History
- Humanities
- Law
- Psychology
- Social Sciences
- Statistics and Methods

Content

This table is subject to change. Students are required to check the online course catalogue for changes each semester.

Information Management and Systems						
	type	**course number**	**term**	**year**	**semester**	**credits**
CORE COMPONENT I						
Module I: Business Administration						**35.0**
Firms and Markets	Lecture	930 312	Spring	1	II	5.0
Applied Project Management	Seminar	990 221	Fall	1	I	5.0
Organization	Seminar	930 211	Fall	2	III	5.0
Marketing	Seminar	930 352	Spring	1	II	5.0
Finance	Seminar	930 241	Spring	2	IV	5.0
Global Leadership	Seminar	032 311	Fall	3	V	5.0
Managing Strategies and Innovation	Lecture	930 361	Spring	3	VI	5.0
Module II: Information Management and Systems						**40.0**
Introduction to Information Management and Systems	Seminar	080 101	Fall	1	I	5.0
General Logistics I	Lecture	050 101	Fall	1	I	5.0
General ICT I	Lecture	350 101	Fall	1	I	5.0
General ICT II	Lecture	350 102	Spring	1	II	5.0
General Logistics Lab I	Lab	050 111	Fall	1	I	2.5
SAP Lab	Lab	080 201	Fall	2	III	2.5
IT Management	Seminar	080 212	Spring	2	IV	2.5
Process Modeling and Simulation	Lecture	050 242	Spring	2	IV	2.5
Human-Computer Interaction	Seminar	080 222	Spring	2	IV	5.0
Information and Knowledge Society	Seminar	940 301	Fall	3	V	5.0
Module III: Information Technology						**30.0**
Natural Science Lab Unit Programming in Python I	Lab	350 111	Fall	1	I	2.5
Natural Science Lab Unit Programming in Python II	Lab	350 112	Spring	1	II	2.5
Algorithms and Data Structures for Information Management	Lecture	080 211	Fall	2	III	5.0
Programming in Java	Lecture/Lab	320 341	Fall	2	III	5.0
Software Engineering	Lecture	320 212	Spring	2	IV	5.0
Databases and Web Applications	Lecture	320 302	Fall	3	V	5.0
Computer Architecture	Lecture	320 241	Fall	3	V	5.0
CORE COMPONENT II (STATISTICS AND METHODS)						**35**
Module IV:						
Academic and Professional Skills	Modules	990 100	Fall	1	I	2.5
Bachelor Thesis & Guided Research Preparation	Seminar	n.a.	Fall	3	V	0
Bachelor Thesis Seminar	Seminar	990 301	Spring	3	VI	7.5
Module V: Research Methods and Techniques						
Math: ESM 1A - Single Variable Calculus	Lecture	120 101	Fall	1	I	5.0
Math: ESM 2A - Linear Algebra, Probability, Statistics	Lecture	120 102	Spring	1	II	5.0
Introduction to Empirical Research and Research Design	Lecture	990 111	Fall	2	III	5.0
Operations Research	Lecture	080 202	Spring	2	IV	5.0
Statistical Concepts and Data Analysis	Lecture/Lab	990 121	Spring	2	IV	5.0
COMPONENT III (SPECIALIZATION ICT, USCs AND LAGUAGE COURSES)						**40.0**
• 6 Electives from SES, SHSS, APS, USCs (3 USCs are mandatory)					I - VI	30.0
• Language Courses (4 courses á 2.5 credit points)					I - VI	10.0
1or 2 Internships						**0.0**
Total Credits for the BSc. in Information Management and Systems						**180**

Jacobs University Bremen reserves the right to substitute courses by replacements and/or reduce the number of mandatory/mandatory elective courses offered.

I. Concept

This section briefly introduces the philosophy and structure of the Information Management and Systems (IMS)-curriculum.

I.1. Philosophy

The development of the "Global Sustainable Information Society" is transforming nearly all business processes. Modern businesses cannot compete without the power of information systems. As a result, IMS skills are no longer optional for business professionals. The dynamic nature of our current business environment dictates that all areas of business including accounting, finance, management and human resources leverage the power of information systems to perform effectively. Therefore, Information Management and Systems is becoming of strategic importance to all business areas and the ability to successfully design and implement business information systems has become a cornerstone in all industries. The strategic role is of even greater importance in a globalized world, where businesses are internationally interrelated, where global supply chains, network firms and multinational enterprises are the key players.

In this global information society IMS professionals play a highly strategic role in all businesses through the integration of people, process, information technology, and cultures. This fact creates unprecedented opportunities for internationally oriented information management systems professionals. IMS professionals focus on integrating information technology and business processes to meet the information needs of businesses and other enterprises. This discipline views technology as an instrument for generating, processing, and distributing information. Professionals in the discipline understand both organizational needs and technical solutions. They are able to help an organization determine how information and technology-enabled business processes can provide a competitive advantage.

This program follows the recommendation of the German Academic Association for Business Research for "Wirtschaftsinformatik" and the objectives of the U.S. Ministry of Education for "Management Information Systems (MIS)" where students will gather a sound base of management theories, the knowledge of information technology, the ability of its application, and master systemic thinking, the method of analysis and design of information system, and the knowledge and ability of information management. Students will be engaged in information management, analysis and design and implementation administration and evaluation of information systems.

I.2. Structure

The IMS-curriculum is a three year program leading to a Bachelor of Science in Information Management and Systems. The course work is structured into 3 components:

- **Core Component I (Information Management and Systems)**: 24 mandatory courses introduce students to basic issues and theories in business administration and economics (Module 1) and information management and systems (Module 2) and information technology (Module 3).
- **Core Component II (Methods and Statistics)**: Management, economics and social sciences employ a wide variety of methodological approaches and research methods. Information technology requires a broad knowledge in mathematics and operation research. 3 math courses and 3 methods courses in this core component of the IMS curriculum familiarize students and provide training in their use and application. They also address practical management skills and techniques.
- **Core Component III (Electives, Language Courses, Specialization)**: Students take a maximum of 6 elective courses from the offerings of the SHSS, the SES, and the so-called University Studies Courses (USCs). University Studies Courses are a specialty of Jacobs University. They are taught jointly and in an

interdisciplinary way by professors of different disciplines. Additionally, students have to take 4 language courses.

Students may choose a specific field of study which creates links between management and information technologies, and 'neighboring' disciplines such as economics, law, electrical engineering or financial mathematics. Or students may choose their field of specialization in management or computer sciences.

I.3. Practical Experiences

Internship

At Jacobs University, a practical work experience is a required and valuable element of the bachelor education of every student. Therefore, practical experience is an integral part of all bachelor programs.

Internships give the students opportunities to apply academic concepts in practice and to explore possible future opportunities for employment. An internship must take place off campus. Due to the particular importance of this aspect for the IMS major, the total duration of work experience must be at least 2 months (it is possible to extend up to 6 months).

For more information on internships see http://www.jacobs-university.de/career-services/internship.

The program is designed in a way that the needs of potential future employers are taken into account. Therefore, intensive contacts with companies and managers are required as part of the program development. The program has been designed in close cooperation with business partners and institutions.

Guest Lectures from Industry

The study program includes experienced guest lecturers from selected fields who are in responsible positions in various industries and the public sector. The guest lecturers provide an insight into existing problems and present the application of methods coping with IMS challenges.

Theoretical basics combined with exercises

One main characteristic of the study program is the integration of interactive elements. Lectures include exercises as well as tutorials within the semester. The tutorials enable the students to apply the learned theories and methods on real examples and case studies.

I.4. Preparation for the Students' Future Careers

Students will be prepared to work with public organizations and private businesses to specify, design, develop, implement, and administer information technology solutions that address the organization's needs. With their interdisciplinary education, IMS students are highly valuable for companies such as Google, Microsoft, Xing, Facebook, eBay, SAP, as well as for traditional IT-based service companies such banks, insurance companies, and consultancies.

The IMS curriculum intends not only to prepare students intellectually for the global challenges within business and information technology, but also socially and culturally for the challenges of working in cross-cultural and international environments. Currently students from more than 100 countries are enrolled at Jacobs University. They represent a wide variety of experiences and concerns of different regions, cultures, and traditions. Students live and work together on an English language campus. In their daily lives, in extra-curricular activities as well as in their studies they define and re-define ideas and concepts for responsible leadership and sustainable development to face the challenges of the 21st century.

Besides a transdisciplinary curriculum and a cross-cultural learning experience the third dimension of the BSc in Information Management and Systems is an orientation towards practical applicability of knowledge. Our faculty pursues problem-oriented research and teaching in areas ranging from applications to theory. Students have ample opportunities to participate in leading edge business and research projects.

Students must do one internship but are encouraged to do more. Since experience shows that quite a few international students from Jacobs University become interested in their host country Germany and, in a later phase of their studies, in European and especially German labor markets, students are expected to acquire basic German language skills in their study.

Traditionally, many skills acquired in scientific research are transferable to other fields. In addition, however, a central element of the education will be the general and broad preparation of the students for their future careers, by developing personal and social skills, which are normally not part of an academic curriculum.

To this end, Jacobs University Bremen has professional Career Services which give complementary help to the "Skills and Careers" course: they provide graduate and undergraduate students with advice and with the tools to identify and follow up rewarding careers after their time at Jacobs University (see http://www.jacobs-university.de/career-services).

Furthermore, Jacobs University Bremen has established an Alumni Association that helps students to establish a long-lasting and worldwide network with colleagues representing additional expertise; it will also help them to explore job options in academia, industry, and elsewhere (see http://www.jacobs-university.de/alumni).

IMS Careers

IMS careers will continue to evolve rapidly as organizations adopt new advanced technologies. These changes present both opportunities and risks for IMS professionals. Students pursuing careers in IMS should be prepared for a demanding career that will require ongoing learning, but also offers tremendous opportunities for intellectual and career growth.

The IMS professional plays a key role in determining the requirements for an organization's information systems and is active in their specification, design, and implementation. As a result, such professionals require a sound understanding of organizational principles and practices so that they can serve as an effective bridge between the technical and management communities within an organization. IMS professionals are also involved in designing technology-based organizational communication and collaboration systems.

The IMS program prepares the next generation of managers to lead enterprises in innovative ways. Schooled in the interdisciplinary Jacobs University tradition and trained as analytical problem solvers, our graduates will develop and deploy IT to create value for their organizations and society.

The IMS curriculum is designed to develop skills in the analysis, design and implementation of business information systems. Our program teaches students to look at businesses holistically as an integrated system of people, business processes and information technology. We move beyond computer science skills to emphasize a functional understanding of technologies and how they can promote business strategies.

In a business environment where IMS professionals are in high demand across organizations, our program prepares students to effectively compete for positions in all areas of business. Our graduates will have an array of job opportunities in all business disciplines and industries.

Students graduating in IMS will be prepared to work with organizations such as Microsoft, eBay, Google and in industries such as New Economy, banking, consulting, telecommunication and other service sectors to specify, design, develop, implement, and administer information technology solutions that address the organization's needs. IMS students are prepared for careers in areas such as: Systems analysis, systems design, programming, web development, and IT project management. A successful IMS student must know how to apply IT to a particular business problem.

I.5 Support to the Students from Jacobs University

In order to attract the brightest students from abroad and from inside Germany, and to make their stay as efficient as possible for excellent scientific training, a number of services will be provided. These are generally aimed at meeting the special needs of foreign students.

- Jacobs University Bremen has an English-speaking administration. This makes it easy for international students to conduct their general paperwork, especially with visa and other legal matters with which Jacobs University has extensive experience.
- The ”Jacobs University Bremen volunteers” is a program of Bremen citizens who help non-German-speaking students with tasks in their daily life that require language or organizational knowledge, such as doctor’s or office appointments. This is organized through the university’s Student Service Center (see http://www.jacobs-university.de/service-center).
- Jacobs University Bremen runs a highly successful host families program, a scheme in which local Bremen families are introduced to one foreign student and help them adapt to the new environment, and introduce them to German culture and customs (see http://www.jacobs-university.de/community).
- Students will have the option of accommodation in one of the residential colleges on campus during their stay at Jacobs University.
- Jacobs University Bremen provides full-day English/German bilingual childcare for children from the age of 6 months to three years on campus (see http://www.jacobs-university.de/node/439).

II. Organization

This section provides information on the organizational principles and procedures of the IMS curriculum.

II.1. Formal Requirements

A minimum of 40 courses lead to a BSc degree in Information Management and Systems after three years (i.e., six semesters). Most courses count 5.0 ECTS credit points. Hence, 180 ECTS credit points are needed to obtain the BSc degree. Jacobs University's grading scheme compares with other grading systems as follows:

Table 1: Jacobs University Grading Scheme

Jacobs University Numerical Value	European Credit Transfer System (ECTS)	American Grade	American Numerical Value	Jacobs Univ. GPA
1.0	Excellent (A)	A+	4.33	1.00–1.16
1.33 1.67	Very Good (B)	A A-	4.00 3.67	1.17 – 1.83
2.00 2.33	Good (C)	B+ B	3.33 3.00	1.84 – 2.49
2.67 3.00 3.33	Satisfactory (D)	B- C+ C	2.67 2.33 2.00	2.50 – 3.49
3.67 4.00 4.33	Sufficient (E)	C- D+ D	1.67 1.33 1.00	3.50 – 4.49
4.67 5.00	Failing (F)	D- F	0.67 0.00	4.50 – 5.00

For further information on grading regulations, please consult the Jacobs University internet site (http://www.jacobs-university.de).

All students have to complete one internship, normally to be accomplished between the second and the third year. The mandatory internship must last at least two consecutive months. Each student must file a report with the Career Services Center shortly after completion of the internship. Information about internships will be listed on the transcript.

Student performance is assessed exclusively within the courses taken. There are no separate final examinations. The requirements for each course are flexible and are specified in advance. For introductory courses, the usual assessment format consists of a mid-term exam and a final exam. In more advanced courses, it may include lab work, oral presentations, classroom discussion, case studies, position papers or a research paper. Each student carries out a guided project and reports the results in a bachelor's thesis.

Students are informed about their grades regularly and quickly. Through an electronic system (CampusNet) they have access to the grades of all courses taken and of their grade point average for each semester. Students also receive a transcript with the final degree. This detailed record is particularly important for students who apply to study programs abroad (e.g. graduate school).

II.2. Organization of the Coursework

The sequence of the IMS courses leads students from more general to more specific subjects. Each course lasts one semester (14 weeks). Students usually meet twice a week for sessions of 75 minutes. The course content is largely pre-defined by the curriculum. Introductory courses for each module are generally offered as lectures and more advanced courses as seminars and labs. Lab classes constitute an integral element of the IT and IMS courses.

Participation in a course requires electronic registration in the preceding semester. Courses can be dropped or added during the first two weeks of a semester. After that deadline, participation is mandatory. Each course has its own site in CampusNet with important information such as a short summary of the course content, substantive and formal course requirements, and a syllabus detailing reading material, forms of examination, substantial foci, thematic sequences as well as learning targets. An online discussion forum is available for each course where participants can further discuss class topics or access additional teaching materials. All students need laptops and will have access to a wireless network which allows for flexible use of electronic information resources inside and outside the classroom.

II.3. Faculty

The IMS curriculum is taught by a faculty with different disciplinary backgrounds. The professors are not separated into different departments, such as economics, management, political science, etc., but form integrated faculties in the two schools, the SHSS and the SES. Thus, the transdisciplinary character of the program also extends to the professors teaching it. The IMS curriculum will be taught primarily, but not exclusively, by the following Professors:

Prof. Dr. Peter Baumann, Database Systems and Web Services

Prof. Dr. Julia Bendul, Network Optimization in Production Logistics

Prof. Dr. Klaus Boehnke, Social Science Methodology

Prof. Dr. Dennis Dittrich, Behavioral Economics

Prof. Dr. Asvin Goel, International Logistics (Distribution Logistics)

Prof. Dr. Christoph Lattemann, Business Administration and Information Management

Prof. Dr. Peter Ludes, Mass Communication

Dr. Bendick Mahleko, Distributed Systems and Workflow Systems

Prof. Dr. Guido Möllering, Organization and Management

Prof. Marcel Oliver, PhD, Mathematics

Prof. Dr. Peter Oswald, Mathematics

Prof. Dr. Kaustubh Pathak, Electrical Engineering and Computer Science

Prof. Dr. Colin Vance, Quantitative Methods

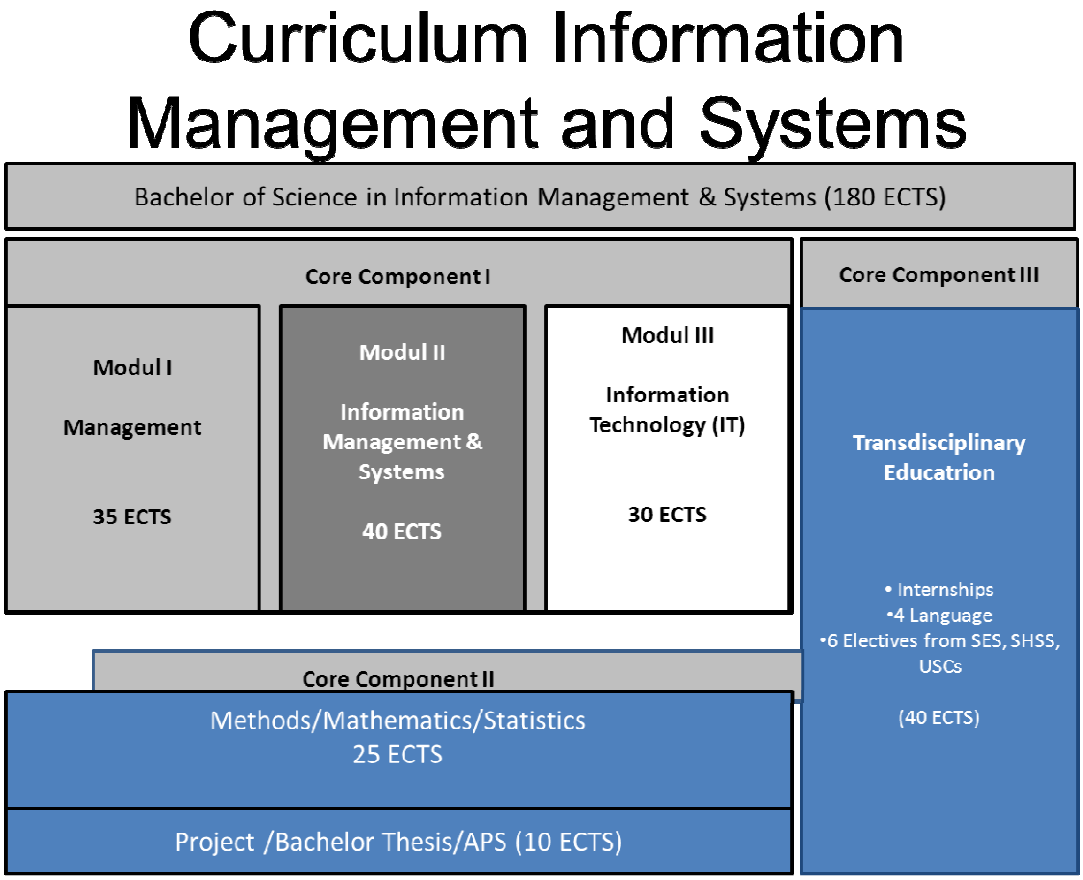
Prof. Dr. Sven Voelpel, Business Administration

Prof. Dr. Welf Werner, International Economics

Prof. Dr. Adalbert F. X. Wilhelm, Commerzbank Chair for Information Management

III. Content

This section describes the content of each of the three IMS-components in detail.



III.1. Core Component I (Information Management and Systems)

III.1.1 Structure

The purpose of this component is to give students a solid grounding in the most important theories, concepts, and findings in management, information management and systems, and information technology.

Module 1 (Business Administration & Economics) enables students to acquire fundamental knowledge that is primarily used in order to manage firms. An Introduction to International Management is followed by courses on topics such as Finance, Controlling, Organization, Project Management, and Marketing. Courses in module 1 are problem-oriented and employ case studies.

Module 2 (Information Management and Systems) focuses on integrating information technology and business processes to meet the information needs of businesses and other enterprises. This views technology as an instrument for generating, processing, and distributing information. Students will understand both organizational needs and technical solutions. They are able to help an organization determine how information and technology-enabled business processes can provide a competitive advantage by analyzing and developing business processes and use technologies for a strategic positioning in the business environment.

Module 3 (Information Technology) is a challenging and fascinating discipline with ample job opportunities. Almost all modern goods either directly incorporate computer systems or information technologies drive the manufacturing process. While computer technologies come and go at a fast pace, there are a number of fundamental principles underlying those

technologies. Information Technology provides an education which focuses on the understanding of these principles and how they are applied in practice.

III.1.2 Module I: Business Administration and Economics

Semester: 1 - 6

Frequency: yearly

Credits: 35 ECTS

930 312 Firms and Markets

930 211 Organization

930 241 Finance

050 352 Marketing

990 221 Applied Project Management

930 361 Managing Strategies and Innovations

032 311 Global Leadership

930312 Firms and Markets

Type: Lecture

Semester: Spring 1 / Semester II

Credit Points: 5 ECTS

This lecture continues the analysis of the market. It asks why in market economies, not all economic transactions take place within the market. Why are some transactions moved outside of the market and coordinated hierarchically within business firms? The seminar examines both the internal organization and management of business firms and their external behavior. The topics covered include the economics of transaction costs, agency theory, elementary game theory, competitive advantage, strategy formation, and strategic pricing.

930 211 Organization

Type: Seminar

Semester: Fall 2 / Semester III

Credit Points: 5 ECTS

The design of an organization is one of the most powerful management tools. However, often the organizational structure and business processes are (no longer) supporting the (changing) purposes and goals of a firm.

Traditionally, organizational design was understood as an inward looking activity focusing on the internal set-up of a single firm with permanent structures. With the fading boundaries of firms and with the increasing dynamism of the environment, however, the design of the entire network a company is part of and project management has become more important. This course discusses the basics of organizational principles needed to understand firms (functional, divisional or matrix set-up, jobs, groups, departments etc.). Further, an introduction on how to change organizational designs is provided.

Additionally, apart from internal structural and process organization a third focus of this course will be inter-organizational design (projects, shaping networks, supply chains, clusters).

Hands on project experiences will be gathered in this seminar.

930 241 Finance

Type: Seminar

Semester: Spring 2 / Semester IV

Credit Points: *5 ECTS*

Corporate Finance sits at the cornerstone of all businesses as they grow from small to large. Corporate finance is a critical component to the success of every firm. However, in the current global environment with liquidity scarce and capital markets in poor condition corporate finance is more critical than ever before.

This course is aimed at helping students understand corporate finance and corporate investment. This course will provide students with an introduction to the theory, analytical tools and techniques necessary for the financial management of a firm. We will discuss these techniques in the context of modern theories of corporate finance, corporate governance, value and capital budgeting, risk and return. We will also learn about stock, bond and derivatives trading.

930 352 Marketing

Type: Lecture

Semester: Spring 2 / Semester II

Credit Points: 5 ECTS

Marketing provides tools which help to align a firm's products and services with market demands. This class gives a comprehensive introduction into the principles of marketing, summarized by the four "Ps": product, price, promotion, and place.

This course has a specific focus on the international context in which modern businesses increasingly interact with their various stakeholders. This course focuses on marketing decision making and enforces leadership skills with a sensitivity and knowledge of internationalization and complexity of the different international consumer segments, markets, and products. It provides useful tools and framework helping to deciding how, where, why and when to select markets, penetrate markets (market entry), best internationalize, how to build, manage and coordinate products, pricing, promotion, and distribution channels on a local as well as on a global scale.

990 221 Applied Project Management

Type: Seminar

Semester: Fall 1 / Semester I

Credit Points: *5 ECTS*

Well-run projects depend entirely on the foundation laid in the initial planning stages, care and precision in project organization, and excellent teamwork. This course offers a detailed look at the characteristics of projects and a hands-on team simulation of the project planning and management process.

This course covers the explanation of various project phases, major tasks, and detailed tasks. It will deal with task assignment and resource allocation, budgeting, tracking, and scheduling techniques as well as with project leadership and team processes. The course will give students hands-on experiences in project management, as students have to run a project on their own in teams over the semester.

930 361 Managing Strategies and Innovations

Type: Seminar

Semester: Spring 3 / Semester VI

Credit Points: 5 ECTS

For the success of a company its strategic fit to market expectations and its innovation capability are vital. Managing Strategies and Innovations covers these both fields, because product strategies have to be defined, based on the knowledge of product life-cycles and market demands as well as based on the company's competences and innovation capability.

032 311 Global Leadership

Type: Seminar

Semester: Fall 3 / Semester 5

Credit Points: 5 ECTS

Leadership is an essential instrument for managing the increasingly diverse workforce in a globalized world. Tailored knowledge on how to make use of this challenge and turn it into an asset is of major importance for scholars, practitioners and managers in almost all professions around the world. In line with these demands, this course offers interdisciplinary approaches and empirical findings on successful leadership and explicitly takes into account the impact that different cultures as well as workforce diversity have on the leadership outcomes. The course covers a variety of theoretical and applied topics and takes account of recent human resource management as well as corporate and societal challenges to private, public and non-governmental organizations. Besides covering historical trends, new leadership paradigms as well as effective cross-cultural applications, particular emphasis is given to the effective management of diverse teams and multicultural workforces. The course's theories are grounded in psychological, behavioral and cultural theories that are applied to specific organizational challenges including those being posed by internationalization and multiculturalism.

III.1.3 Module II: Information Systems and Management

Semester: 1 - 6

Frequency: yearly

Credits: 35 ECTS

080 101 Introduction to Information Management and Systems
940 301 Information and Knowledge Society
350 101 General Information and Communication Systems ICT I
350 102 General Information and Communication Systems ICT II
080 222 Human-Computer Interaction
050 101 (Business) Process Management / General Logistics I
050 111 NatSciLab Unit BPM/Logistics I
050 242 Process Modeling and Simulation
080 212 IT Management
080 201 SAP Lab

080 101 Introduction to Information Management and Systems

Type: Seminar

Semester: Fall 1 / Semester I

Credit Points: 5 ECTS

This course deals with computer based information systems in business and management. This encompasses also an understanding of the management and organizational dimensions as well as technical dimensions of the systems as information systems literacy.

Major challenges and concerns in an information society and in IT business will be reflected: a) the role of information in an information society, b) globalization, c) strategic business, information system investments, d) information infrastructure, and e) ethics and security. The seminar will also address the organizational and managerial foundations of information systems; the various facets of the information technology infrastructure. It will describe several types of information systems and presents the process of building, implementing and managing the systems in organizations.

940 301 Information and Knowledge Society

Type: Seminar

Semester: Fall 3 / Semester V

Credit Points: 5 ECTS

Knowledge enables social actors to act competently in complex environments. It exists in many different forms ranging from common sense, to scientific laws and artistic expression. The process of knowledge creation and diffusion raises questions of accuracy, reliability, innovativeness and social acceptance. How these questions are addressed depends in large part on the available means of information distribution and communication. This seminar familiarizes students with theories and empirical evidence from this relatively new area of inquiry.

In this seminar, the various social and political theories that address the impact of mass and network-mediated information in contemporary societies are discussed first. This then allows the students to apply these theories empirically, and to present and discuss their findings in class. Each of the students participates in two group presentations, and an individual one, while the final exam has to be written in the form of short essays. A web-conference with colleagues and students from the United States discusses ‘Information Shifts: Challenges for New Professions’.

350 101 General Information and Communication Systems ICT I

Type: Seminar

Semester: Fall 1 / Semester I

Credit Points: 5 ECTS

The course General Information and Communication Technology I (ICT) introduces fundamental concepts underlying today's information and communication technology. The course is designed to provide an applied introduction to Computer Science concepts and information and communication technology. The course starts with introducing basic computer science terms and concepts and different programming paradigms. Afterwards, the basic components of computer systems will be introduced as well as Boolean logic, number representations, character sets their representation, and structured document formats. Finally, some key concepts of theoretical computer science such as complexity, correctness, and computability will be introduced.

Topics are: Algorithms and different classes of algorithms, programming models (imperative, object-oriented, functional, declarative), basic computer architecture, boolean logic and basic laws, number representation, character sets, structured document formats, data conversion, theoretical concepts (complexity, correctness, termination of algorithms, computability).

320 101 General Computer Science I can be credited instead of 350 101.

350 102 General Information and Communication Systems ICT II

Type: Seminar

Semester: Spring 1 / Semester II

Credit Points: 5 ECTS

The course General Information and Communication Technology II continues the applied introduction Computer Science concepts and information and communication technology. The course introduces systems, network and communication technology, software engineering concepts, and data security and data protection mechanisms. The main learning goal is to learn the fundamental skills of nowadays information and communication technologies including data base management which is essential in business.

Topics are relational database model, query languages, Internet protocols, wireline and wireless communication technologies, unified modeling language, software development processes, cryptographic algorithms, key management, authentication protocols and authorization models.

320 102 General Computer Science II can be credited instead of 350 102.

050 101 General Logistics I

Type: Lecture

Semester: Fall 1 / Semester I

Credit Points: 5 ECTS

The following subjects will be covered in the course (Business) Process Management, aligned to the processes: modeling methods for systems and networks, overview of the targets, planning and control method as well as parameters and strategies of procurement, production, distribution logistics including warehouse management and technologies and information systems for logistics. A special focus lies in the training of methods in order to analyze, (re)-design or control processes (e.g. methods of requirements planning, make-or-buy decision, safety stock calculation, logistic operating curves).

050 111 NatSciLab Unit BPM/Logistics I

Type: Lab

Semester: Spring 1 / Semester I

Credit Points: 2.5 ECTS

The Natural ScienceLab Unit BPM/ Logistics I substantiates and amends the technical concepts taught in the General Logistics I lecture by exercises, experiments and/or simulations: These include exercises to demonstrate the principles of logistics methods (e.g. design of warehouses, safety stock calculation, value-benefit analysis, ABC-analysis, operations research). In order to get familiar with new technologies used in logistics practical exercises will show an RFID experimental system. A planning game will address the bullwhip effect in supply chains and demonstrate the logistic understanding.
One excursion to logistic company in Bremen will be offered within one lab session.

050 242 Process Modeling and Simulation

Type: Seminar

Semester: Spring 2 / Semester IV

Credit Points: 2.5 ECTS

Without knowing processes, there is no clue how to improve them. In the course Process Modeling and Simulation, various concepts of process modeling will be introduced as well as modeling methods and modeling languages. One method of process modeling will be treated in details to demonstrate the ability how the process modeling can support the logistician in the optimization. Various exercises and simulation examples will be practiced both in class and as homework with real process modeling and simulation tool (e.g. Softwaretool PlantDesign).

080 212 IT Management

Type: Seminar

Semester: Spring 2 / Semester IV

Credit Points: 2.5 ECTS

The seminar “IT Management” provides a comprehensive overview to the field of Information Technology (IT) Management. The course covers topics in the field of enterprise resource and information management systems (ERP and EIS). The course includes topics such as enterprise IT architectures and models, the management and governance of IT, the CIO organization and processes, IT strategy and value proposition, IS lifecycles, IT service management, and IT performance measurement and controlling. The students in this course will learn from hands-on business cases and practical examples.

080 222 Human-Computer Interaction

Type: Seminar

Semester: Spring 2 / Semester IV

Credit Points: 5 ECTS

The field of Human-Computer Interaction (HCI) deals with the interaction between humans and computers - no surprise here. But what are the specificities of this interaction, what are the issues and how deal different approaches with these?

In this course, we will address the following topics:

- What are Digital Media?
- What is interactivity?
- Digitalization for Humans

- Between user friendliness and user experience
- Models of HCI
  - The communication perspective
    - Why signs and signals are different: Semiotics
    - Content and form
  - The activity perspective
    - Intentional : Activity Theory
    - Socio-cultural: Advanced Activity Theories
    - Cognitive: Human-Action Cycle
    - Behavior: Model of Human Behavior
- Design for Humans: Cognitive Psychology
  - Gestalt principles
  - Best practices
  - Mental models
- User-Centered Design
- Responsive Web Design - Designing for the Post-PC Era
- Agile and user centered approaches Design Thinking and SCRUM
- Mechanics – Dynamics – Aesthetics: Input from Game Design

080 201 SAP Lab

Type: Lab

Semester: Fall 2 / Semester III

Credit Points: 2.5 ECTS

Distribution as well as application of standard business software continually increases demanding for fundamental knowledge in handling and operating these software. Especially SAP standard software like SAP ERP for supporting and optimizing complex business processes is applied not only in big enterprises but also in small and medium-sized companies all over the globe. Accordingly, more and more firms expect students to have first experiences in SAP tools when they leave university. Current application requirements underline this trend.

The course SAP Lab offers students the opportunity to gain and apply first knowledge in the SAP ERP 6.0 software. In the course, the SAP ERP system will be introduced including basic terms of the system like organizational units, master data, transaction data, and documents. Afterwards, students will be trained in using and handling the SAP ERP system. This comprises an overview about the graphical user interface, system functionality, navigation etc. Additionally, students will work with different modules and execute tasks like entering master data, booking business transactions, or approve and release orders. In a nutshell, this course provides a basic and general overview and understanding of the SAP ERP 6.0 software suite and thus increases the attractiveness of students towards the relevant industries.

The course will be conducted as a workshop based on specific course materials in form of slides, case studies, and accompanying literature.

III.1.4 Module III: Information Technology

Semester: 1 - 6

Frequency: yearly

Credits: 30 ECTS

350 111 Natural Science Lab Unit Programming in Python I

350 112 Natural Science Lab Unit Programming in Python II

320 302 Databases and Web Applications

080 211 Algorithms and Data Structures for Information Management

320 212 Software Engineering

320 341 Programming in Java

320 241 Computer Architecture

350 111 Natural Science Lab Unit Programming in Python I

Type: Lab

Semester: Fall 1 / Semester I

Credit Points: *2*.5 ECTS

The NatSciLab Unit Computer Science I is a first introduction to programming using the programming language Python. Python is a multi-paradigm programming language. Rather than forcing programmers to adopt a particular style of programming, it permits several styles: object-oriented programming and structured programming are fully supported, and there are a number of language features which support functional programming and aspect-oriented programming (including by meta-programming and by magic methods). The course covers fundamental programming constructs and simple algorithms in a hands-on manner.

350 112 Natural Science Lab Unit Programming in Python II

Type: Lab

Semester: Spring 1 / Semester II

Credit Points: 2.5 ECTS

Prerequisite: *350111*

The NatSciLab Unit Computer Science II contents an advanced course in introduction into object-oriented programming using the programming language Python. The unit is a continuation of the first year CS lab unit and covers the object-oriented programming constructs in Python in a hands-on manner.

320 302 Databases & Web Applications

Type: Lecture

Semester: Fall 3 / Semester V

Credit Points: 5 ECTS

The Databases & Web Applications course introduces into (relational) database systems in theory and practice, with special emphasis on Web-based information services. In the accompanying project, design and implementation of database and Web service components will be addressed, culminating in a sample database-enabled Web service based on the LAMP open source package. This course is mandatory for all students specializing in IMS. The course requires basic knowledge about algebraic expressions and laws, basic data

structures like trees, object-oriented concepts, as well as – for the lab work – HTML and Linux.

Topics are: Topics Database design (ER, UML), SQL, relational design theory, transaction management, security, web applications, n-tier architectures, HTML, PHP, XML, XPath/XQuery

080 211 Algorithms and Data Structures for Information Management

Type: Lecture

Semester: Fall 2 / Semester III

Credit Points: 5 ECTS

This course introduces a basic set of data structures and algorithms that form the basis of almost all computer programs. The data structures and algorithms are analyzed with respect to their computational complexity.
Topics: Growth of functions, divide and conquer, probabilistic analysis and randomized algorithms, fundamental data structures (lists, stacks, trees, hash tables), fundamental algorithms (sorting, searching, dynamic programming, comprehensive treatment of graph algorithms).

320 212 Software Engineering

Type: Lecture

Semester: Spring 2 / Semester IV

Credit Points: 5 ECTS

This course is an introduction to software engineering (SE) and object oriented software design. At the core of the lecture is the notion of software quality and the methods to achieve and maintain it. Based on their pre-existing knowledge of an object-oriented programming language, students are familiarized with software architectures, design patterns and frameworks, software components and middleware, UML-based modeling, and validation by code analysis and testing. Both classical development and modern variants, in particular: Web Engineering, are covered. Further, the course addresses the more organizational topics of project management and version control.

Topics are software quality, process models, design patterns and frameworks, components and middleware, UML, testing, tools, project management, version control.

320 341 Programming in Java

Type: Lecture / Lab

Semester: Fall 2/Semester III

Credit Points: 5 ECTS

Java is an object-oriented programming language which is very widely used for the development of applications running on the Internet, and in particular electronic commerce applications. Java has some unique features such as platform independence and a very rich set of reusable class libraries. This course introduces the core language and the most important core Java packages.

Topics are Java Virtual Machine, object-oriented programming in Java (types, objects, interfaces, abstract classes, etc.), Java threads, core packages (java.net, java.io, java.sql), Java web programming (servlets, JSP, beans, enterprise beans).

320 241 Computer Architecture

Type: Lecture

Semester: Fall 3/Semester V

Credit Points: 5 ECTS

Starting from essential logical circuits, this course introduces core components (processors, memory systems, buses) and architectures of modern computing systems. Topics are computer architectures, processors, instruction sets, memory systems, system busses, parallel processing

III.2. Core Component II - Methods and Statistics

120 101 ESM1A – Single Variable Calculus

Type: Lecture

Semester: Fall 1 / Semester I

Credit Points: 5 ECTS

ESM1A concentrates on complex numbers, functions of one variable (in particular exponential, logarithm, and trigonometric functions), graphs of functions and equations, limits and continuity, differentiation with applications, integration with applications, as well as brief introductions to series, differential equations (scalar and separable examples only), and vectors in two and three dimensions.

120 102 ESM2A – Linear Algebra, Probability, Statistics

Type: Lecture

Semester: Spring 1 / Semester II

Credit Points: 5 ECTS

ESM2A – Linear Algebra, Probability, Statistics is a course for students majoring in Information Management and Systems (IMS). It covers the following topics: Linear Algebra (equations of lines and planes, matrix algebra, system of linear equations, matrix inverse, vector spaces, linear independence, basis, dimension, linear transformations, change of basis, eigenvalues and eigenvectors, diagonalization). Probability (basic notions of set theory, outcomes, events, sample space, probability, conditional probability, Bayes' rule, permutations and combinations, random variables, expected value, variance, binomial, Poisson, and normal distributions, central limit theorem). Statistics (one-sample hypothesis testing, two sample hypothesis testing, chi-square hypothesis testing, analysis of variance, bivariate association, simple linear regression, multiple regression and correlation).

080 202 Operations Research

Type: Lecture

Semester: Spring 2 / Semester IV

Credit Points: 5 ECTS

Operations research is an interdisciplinary mathematical science that focuses on the effective *use* of technology by organizations.

Employing techniques such as mathematical modeling, statistical analysis, and mathematical optimization, operations research finds optimal or near-optimal solutions to complex decision-making problems. Operations Research is concerned with determining the maximum (of profit, performance, or yield) or minimum (of loss, risk, or cost) of some real-world objective.

990 111 Introduction to Empirical Research and Research Design

Type: Lecture

Semester: Fall 2 / Semester III

Credit Points: 5 ECTS

This is an introductory lecture on the basic problems and strategies involved in data collection in the social sciences. It explains how quantitative and qualitative researchers acquire their data. It gives an overview of basic approaches to empirical research, such as field studies, case studies, longitudinal research, cross-cultural comparisons, and non-reactive studies.

The course also discusses sampling strategies and research techniques, including surveys, observation, experiments, and narrative interviews. The theoretical concepts and paradigms are introduced by presenting real-world research projects and following a case-oriented approach. A first short introduction to methods of statistical analysis in empirical research is offered in this lecture as well. To foster practical experience with empirical research students are offered the opportunity to gain partial course credits by volunteering as participants in experiments in the social and behavioral sciences.

990 121 Statistical Concepts and Data Analysis

Type: Lecture / Lab

Semester: Spring 2 / Semester IV

Credit Points: 5 ECTS

This course extends the discussion of quantitative methods beyond the introductory level. It reviews some exemplary pieces of quantitative research in management, economics, and the social sciences in order to explain fundamental statistical concepts and examine their potential and limitations in practical data analysis. The topics covered include descriptive statistics, hypothesis testing, and statistical modeling with a focus on regression type models, such as ordinary least squares regression, logistic regression and analysis of variance. The course is equally divided between lecture and lab sessions. During the lab sessions, the tools and concepts discussed during the lecture sessions are applied to real life data sets. The course also serves as a basic training in the statistics software SPSS. Lab classes are run with small student numbers to ensure optimum supervision and learning outcome.

In regular homework tasks, students will work in teams to apply their acquired knowledge to typical data analysis situations.

990 100 Academic and Professional Skills

Type: Modules

Semester: Semester I-VI

Credit Points: 2.5 ECTS

“Academic skills in a nutshell: an introduction to preparing an academic paper" introduces students to the basic principles and procedures of scientific inquiry. In a two-day weekend workshop, students will learn about the requisites of preparing an academic paper (gathering literature, citing and referencing appropriately, avoiding plagiarism, etc.). This will train them for academic life at the university level and enable them to feel at ease with the formalities of academic writing throughout their studies. Upon successful completion of the course students will be awarded 1 credit toward the overall APS module credit.

The elective credits in the APS module cover a wide range of professional, academic, coping, and interpersonal skills. Workshops are offered by the academic units of Jacobs University, by Career Services, the Information Resource Center, the Counseling Center, Financial Services, and more. The university publishes a schedule and description of upcoming elective credits at the start of every semester. Students are able to choose workshops tailored to their needs and wishes (to a total of at least 1.5 credits).

Bachelor Thesis & Guided Research Preparation

Type: Seminar

Semester: Fall 3 / Semester V

Credit Points: 0 ECTS

The purpose of the guided research preparation is to enable students to select an appropriate thesis topic and to possibly find a project partner from business in time (if applicable). An idea of a thesis topic could be already defined during an internship or during other student activities in companies. The guided research preparation should be used to bring all involved parties (student, academic advisor, company) together and to come up with a shared understanding of the topic. Meetings (individual or group level) will be initiated by the thesis supervisor.

990 301 Bachelor Thesis Seminar

Type: Seminar

Semester: Spring 3 / Semester VI

Credit Points: 7.5 ECTS

The research seminar helps the student to define a field of study, states the research questions/hypotheses, surveys the expected results, and sets up a work plan with timetable.

Topics are offered by the individual faculty members.

Classes are organized around related topics of the baccalaureate thesis. Each group is instructed by a regular faculty member and will meet in at least *four workshops* organized around the following topics:

- Brief review of research design issues
- Developing a research question and writing a research proposal
- Discussing and improving the research proposal.
- Presentation of progress report.
- Presentation and discussion of main scientific contribution of thesis.

The bachelor thesis in IMS represents an important document for the job application process. It shows the ability of a student to analyze and solve a single problem based on an aimed usage of scientific instruments, a critical reflection of the status quo in scientific literature, and an original development his/her own ideas. Therefore, the necessary quality standards need to be fulfilled. The topic of the thesis can be related with a real IMS problem in a company. Guidelines of the bachelor thesis within the Bachelor Study Program Information Management and Systems will be published separately.

The bachelor thesis can also be written in the programs “Computer Science” and in “International Logistics”.

The purpose of the course Bachelor Thesis seminar is to guide students through the process of writing their baccalaureate thesis. The seminar serves as a source of technical advice and as a forum for the discussion of problems encountered in the writing process. It also trains students to review, critically assess and discuss research projects.

III.3 Core Component III – Language Courses, USC's, Electives

Electives

Type: Seminar/Lectures/Labs

Semester: Semester I-VI

Credit Points: 6 x 5 ECTS

The Bachelor of Science in Information Management and Systems degree is grounded in the idea of a Liberal Arts College, enabling students to master the critical thinking, analysis, and communication skills they need to successfully confront complex challenges in their work. Therefore students will be educated with a broad range of knowledge. Electives help to extend student's knowledge in various fields.

In contrast to the three standardized core components, this component of the IMS curriculum offers students more choice. While students are encouraged to study a broad range of subjects and to sample courses from fields that do not immediately appeal to them, they are free to set their own priorities among the many offerings in Humanities and Social Sciences, in Engineering and Science and/or in University Studies Courses (USCs). University Studies Courses such as "From Cell to Community: How to Understand Animal and Human Societies" and "Mathematics and Democracy" are examples of the many transdisciplinary offerings outside the IMS curriculum.

Students can select various courses to get a broad perspective on various fields of sciences. But students have also the chance to further specify in the fields of Management or in Computer Sciences.

Language Courses

Type: Seminar

Semester: Semester I-VI

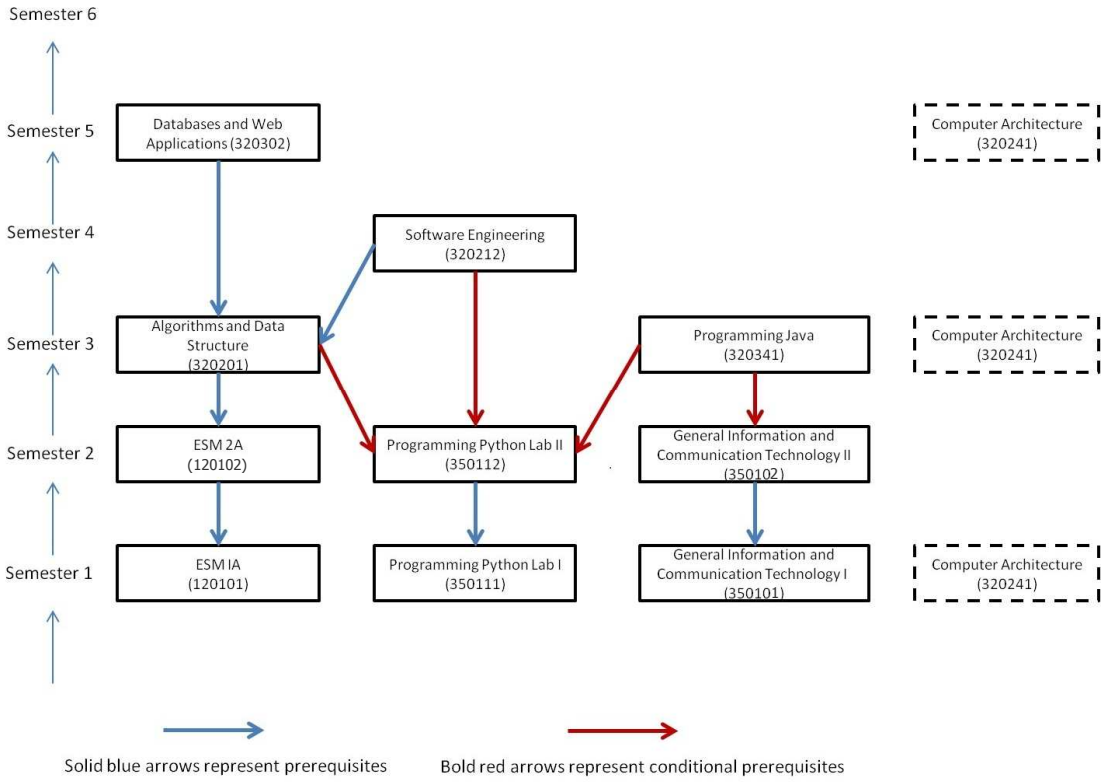
Credit Points: *4 x* 2.5 ECTS

In addition to the above-mentioned courses, students take four language courses. These courses are German language courses (for non-native Germans). These courses help students to communicate off campus. They are furthermore meant as an invitation to take more language classes later on. For German students a minimum of four courses in another foreign language are mandatory.

IV. Course Plan

Semester	Course	Credits	Area
I	Applied Project Management	5	Management
I	Introduction to IMS	5	IMS
I	General ICT I	5	IMS
I	General Logistics I – (Business) Process Management	5	IMS
I	General Logistics Lab I	2,5	IMS
I	Natural Science Lab Unit Computer Science I /Python I	2,5	IT
I	Academic and Professional Skills	2,5	Methods
I	Math: ESM 1A - Single Variable Calculus	5	Methods
I	Language	2,5	Language
		35	
II	Organization	5	Management
II	Firms & Markets	5	Management
II	General ICT II	5	IMS
II	Natural Science Lab Unit Computer Science II /Python II	2,5	IT
II	Math: ESM 2A- Linear Algebra, Probability, Statistics	5	Methods
II	Language / Elective	7,5	Language/Elective
		30	
III	Marketing	5	Management
III	Algorithms and Data Structures for Information Management	5	IT
III	Programming in Java	5	IT
III	Introduction to Empirical Research and Research Design	5	Methods
III	Language / Elective	5	Language
		25	
IV	International Finance	5	Management
IV	Human-Computer Interaction	5	IMS
IV	SAP Lab	2,5	IMS
III	IT Management	2.5	IMS
IV	Software Engineering	5	IT
IV	Operations Research	5	Methods
IV	Statistical Concepts and Data Analysis	5	Methods
IV	Process Modeling and Simulation	2.5	IMS
IV	Language	2.5	Elective
		35	
V	Global Leadership	5	Management
V	Information and Knowledge Society	5	IMS
V	Computer Architecture	5	IT
V	Databases & Web Applications	5	IT
V	Language / Elective	5	Elective
V	Bachelor Thesis & Guided Research Preparation	0	Methods
		25	
VI	Managing Strategies and Innovation	5	Management
VI	Language / Elective	17,5	Elective
VI	Bachelor Thesis Seminar	7,5	Methods
		30	
	Sum o f Credits	***180***	

IT courses in the IMS curriculum


Semester 6
Semester 5
Semester 4
Semester 3
Semester 2
Semester 1
Databases and Web Applications (320302)
Software Engineering (320212)
Algorithms and Data Structure (320201)
Programming Java (320341)
ESM 2A (120102)
Programming Python Lab II (350112)
General Information and Communication Technology II (350102)
ESM IA (120101)
Programming Python Lab I (350111)
General Information and Communication Technology I (350101)
Computer Architecture (320241)
Computer Architecture (320241)
Computer Architecture (320241)
Solid blue arrows represent prerequisites
Bold red arrows represent conditional prerequisites