Module compendium of the Master's degree course of Information Systems
(Version 2012-05)

Bemerkung zu den Modulbeschreibungen:

Das vorgegebene Formular wurde den Gegebenheiten des Studiengangs angepasst und vereinfacht. Die folgenden Punkte wurden ausgelassen:

Punkt	Bezeichnung	Grund
Heading	Programme	Der Studiengang ergibt sich aus der Zuordnung zu diesem Modulhandbuch.
Heading	Module Title German	No German title available
6	Wahlmöglichkeiten innerhalb des Moduls	Die Zusammensetzung eines Moduls ist festgelegt, es gibt keine Wahlmöglichkeiten
7	Leistungsüberprüfung	Die Leistung wird in der Regel durch eine Modulabschlussleistung erbracht. Setzt diese sich aus Einzelleistungen zusammen, ist dies unter Punkt 8 beschrieben.
9	Studienleistungen	Es gibt keine unbewerteten Studienleistungen.
11	Gewichtung der Modulnote	Die Gesamtnote setzt sich aus allen Prüfungsleistungen im Verhältnis ihrer Leistungspunkte zusammen. Da angerechnete Leistungen nicht in diese Rechnung eingehen, gibt es keine feste Prozentzahl.
14	Verwendbarkeit in anderen Studiengängen	Die Möglichkeit der Verwendung in anderen Studiengängen ist in deren Prüfungs- oder Studienordnungen beschrieben – auf die fehlerträchtige Angabe wird daher hier verzichtet.
15	Fachbereich	Der Fachbereich Wirtschaftswissenschaften ist in allen Fällen verantwortlicher Anbieter.

Master of Information Systems: Course Schedule

	Information Management	Process Management	Business Networks	Business Intelligence
Winter term	Managing the Information Age Organization (6) IM Tasks and Techniques (6)	Workflow Management (6) Model driven Software Development (6)	Supply Chain Management and Logistics (6) Interorganizational Systems (6)	Data Integration (6) Management Information Systems and Data Warehousing (6)
Summer term	Information Management Theories (6) Information Systems Architecture (6)	Information modeling (6) Production Planning and Control (6)	Enterprise Application Integration (6) Information Security (6)	Data Analytics – Theory (6) Data Analytics – Applications (6)

Every term: Elective Modules (6 CP) – Project Seminar (12 CP) – Master's Thesis (30)

Module Title:	Information Management: Managing the Information Age Organization					

1	**Module No:** IM1		**State:** Compulsory			

2	**Turn:** every winter term	**Duration:** 1 term	**Semester:** 1-2		**CP:** 6	**Workload (h):** 180

3	**Module Structure:**					
	No	Type	Course	CP	Presence (h + CH)	Self-Study (h)
	1	L	Lecture		45 (3 CH)	90
	2	E	Exercise		15 (1 CH)	30

4	**Contents:**
	Background: The lecture *Managing the Information Age Organization* assumes that students have a basic understanding of Business Administration, Management Studies, and business applications of information technology as conveyed in Bachelor Programs in IS and related fields.
	Main topics and learning objectives: The lecture provides students with a sound understanding of management and management theories as well as with the foundations of the information society. On the basis of this understanding, students are confronted with management challenges prevalent in the information age. While doing this, special emphasis is laid on how information technology affects the capabilities of an organization to compete in the information economy.
	Teaching is conducted through traditional lectures complemented with case study work and discussions in the classroom. Additional reading material is provided in order to allow students to review parts of the content at their leisure and to extend their knowledge in areas of personal interest.

5	**Learning outcomes:**
	Academic: After attending the course students should be familiar with the foundations of management, i.e. (strategic) planning, controlling, organization, and leadership. They should understand the specific conditions organizations are exposed to in the "Information Age" and be able to explain the technological, social and economic phenomena constituting it. Furthermore, they are expected to have an idea of how the information age challenges traditional management concepts and what appropriate responses to these challenges might look like.
	Soft skills: The course introduces students to the analysis of case studies in small groups and furthers their ability to actively participate in classroom discussions.

8	**Relevant Work:**		
	Number and Type; Connection to Course	**Duration**	**Part of final mark in %**
	Written Exam	90 Min.	100

10	**Prerequisites for Credit Points:**
	The credit points will be granted when the module has been successfully completed, i.e. when the written examination is passed.

12	**Module Prerequisites:**
	None

13	**Presence:**
	Presence is strictly advised.

15	**Responsible Lecturer:**
	Prof. Dr. Stefan Klein

16	**Misc.:**

Module Title:	Information Management: Tasks and Techniques				

1	Module No: IM2		State: Compulsory			

2	Turn: every winter term	Duration: 1 term	Semester: 1-2	CP: 6	Workload (h): 180

3	Module Structure:					
	No	Type	Course	CP	Presence (h + CH)	Self-Study (h)
	1	L	Lecture		40 (4 CH)	90
	2	E	Exercise		20 (1 CH)	30

4	Contents: *Background*: The course requires a sound understanding of both management studies and information processing in business. This course interlinks with the course "Managing the Information Age Organization", which deepens the students' understanding of management basics that this course builds upon. In order to provide students from a non IS-background with the managerial understanding of information processing necessary for participating successfully in this course, an extensive script on this subject is provided at the beginning of the semester. *Main topics and learning objectives*: The lecture provides students with an overview of executives' duties in managing an organization's information and communication capabilities. These duties include tasks such as strategic information planning, strategy implementation, as well as sourcing and organizing the information function. These tasks are structured in a comprehensive framework based on management theory. While identifying critical IM tasks and responsibilities, the course presents methods and techniques that can be applied to deal with them. Class discussions on case studies give students the opportunity to consolidate their newly acquired knowledge and apply the techniques presented to typical problems. In addition, occasional discussions with IT executives allow students to reflect their conceptual knowledge in light of real world practices.

5	Learning outcomes: *Academic*: The course provides students with skills indispensable for an IT executive. In particular, students will obtain a comprehensive overview of the field of IT management and get acquainted with the typical tasks IT managers are charged with. They will also get to know prominent frameworks and techniques to solve IM tasks as proposed in textbooks. *Soft skills*: In addition to expertise in the fields mentioned above, students will deepen their skills in constructively analyzing and solving case studies in both classroom settings and as part of individual assignments.

8	Relevant Work:		
	Number and Type; Connection to Course	Duration	Part of final mark in %
	Written Exam	90 Min.	100

10	Prerequisites for Credit Points:

12	Module Prerequisites: None

13	Presence: Presence is strictly advised. Participation in assignments for continuous assessment is a prerequisite to successfully complete the course.

15	Responsible Lecturer: Prof. Dr. Stefan Klein

16	Misc.:

Module Title:			Information Management: Theories				
1	**Module No:** IM3		**State:** Compulsory				
2	**Turn:** every summer term		**Duration:** 1 term	**Semester:** 1-2		**CP:** 6	**Workload (h):** 180

	Module Structure:						
3	No	Type	Course	CP	Presence (h + CH)		Self-Study (h)
	1	L	Class Discussion		45 (3 CH)		80
	2	E	Presentation, preparation of discussion		30 (2 CH)		25

	Contents:
4	*Background*: A sound understanding of management and information management as provided in the courses "Managing the Information Age Organization" and "Information Management Tasks & Techniques". *Main topics and learning objectives*: This course deepens the students' understanding of IM tasks and techniques in that it enables them to assess underlying theoretical propositions in more detail. To this end, the lecture introduces important management theories, including market, resource and capability based theories of strategic information systems, IT strategy theory, IT value and productivity theory, organization theory of IT and theories of sourcing and governing the information function. Moreover, on the basis of this theoretical knowledge, critical issues of IM are discussed in the light of the controversial academic discussions surrounding them. The course builds on well-prepared class discussions rather than traditional lectures. The lecturer will support learning by carefully selecting papers and placing them into a broader "theoretical landscape". He will moderate and facilitate the discussions, and provide feedback on the assignments during the semester (reading papers, preparing presentations, writing minutes).

	Learning Outcomes:
5	*Academic:* The overall aim of this course is to give students access to the academic debate on IM. More specifically, the course is intended to introduce students to the international academic debate on the most important or discussed issues of information management. The students will gain insight into the theories underlying the frameworks and techniques proposed for solving IM tasks and will be able to assess these tools and the underlying theories critically. *Soft skills*: In addition to providing students with the capabilities to deal with academic literature reflectively, the course helps to further the students' ability to take an active part in academic discussions. This ability is based on a combination of reading, thinking, writing, discussing and listening skills.

	Relevant Work:		
8	Number and Type; Connection to Course	Duration	Part of final mark in %
	Written Exam	90 Min.	60
	Course Assignments		40

	Prerequisites for Credit Points:
10	Regular class attendance and active participation in the discussion, solving the course assignments and passing the written examination.

	Module Prerequisites:
12	None

	Presence:
13	Presence is strictly advised. Participation in assignments for continuous assessment is a prerequisite to successfully complete the course.

	Responsible Lecturer
15	Prof. Dr. Stefan Klein

16	Misc.:

Module Title:		Information Management: Information Systems Architecture				
1	Module No: IM4	State: Compulsory				
2	Turn: every summer term	Duration: 1 term	Semester: 1-2	CP: 6	Workload (h): 180	

3	Module Structure:					
	No	Type	Course	CP	Presence (h + CH)	Self-Study (h)
	1	L	Lecture		30 (2 CH)	60
	2	E	Exercise		30 (2 CH)	60

4	Contents:
	This course provides insights into the methods of information system architecture giving a holistic view on information systems. The need for architecture in complex organizations is motivated by a wide interpretation of information systems. Architecture supports the effective planning and governance of enterprises. Consistently implemented, it facilitates the understanding of business entities' interrelationships and helps to explicate their contribution to superior enterprise goals. This course conveys an overview of concepts and methods typically discussed in the context of Information Systems Architecture. The introduction of a specialized modeling language introduces the students to the creation of architectural artifacts. The concrete architecture realization process is underlined by the study of architecture frameworks currently discussed in research and practice.
	Background and relations to other courses:
	This course stresses the aspect of IM as an engineering discipline, in contrast to being a management discipline only. The fundamental idea is to describe organizations as a whole, consisting of goals and strategies, business models, processes, people and information technology. Information Systems Architecture propagates a holistic approach that primarily aims at aligning the spheres of business and IT within one or across several companies and at facilitating and governing transformation processes The Information Manager thereby has the role of an architect of the corporate information infrastructure. The Module "Managing IT in the Information Age" introduces students to the tasks and tools in Information Management thus setting the scene for this Module.
	Main topics and learning objectives:

Themes	Learning objectives
Motivation of Information Systems Architecture	To learn about the challenges today's enterprises are facing and the solution statement Information Systems Architecture provides in this context.
Positioning Information Systems Architecture	To learn the definition and major concepts of Information Systems Architecture and about its key applications and its role in governance.
Management areas and best practices	To learn about the management areas relevant to Information Systems Architecture and associated best practices commonly applied.
Modeling of the Information Systems Architecture	To learn how to create different architectural artifacts and connect them to create a holistic, purposeful picture of the enterprise. Moreover, to learn to use viewpoints to generate stakeholder-specific views of the architecture.
Frameworks in Information Systems Architecture	To learn why frameworks play an important role in Information Systems Architecture and to get to know prominent frameworks that are vividly discussed in research and practice.

5	Learning outcomes:
	Academic:
	The students' ability to develop and implement an Information Systems Architecture is the course's major goal. An understanding of current developments and frameworks in the domain of architecture implementation should be obtained. Students are equipped with methods for planning, creating and governing such architectures. Furthermore, practical skills in architecture development will be conveyed with work on case studies and presentation of the results.
	Soft skills:
	Students are encouraged to prepare the contents of the lecture and exercise and to perform follow-up work in teams. This is supported by a Learnweb discussion forum that is guided by the chair. The case study is organized as group work and thus promotes the students' ability cooperate in teams and to manage their time efficiently. The intermediary results are presented regularly by the groups in front of the complete audience. This enhances the students' presentation and discussion skills. The creation of architectural models by using a syntactically and semantically defined modeling language sharpens analytical skills logic skills.

8	Relevant Work:

Number and Type; Connection to Course	Duration	Part of final mark in %
Written Exam	90 Min.	60
Course Assignments		40

10	**Prerequisites for Credit Points:** Regular class attendance, solving the course assignments, and passing the written examination.
12	**Module Prerequisites:** None
13	**Presence:** Presence is strictly advised.
15	**Responsible Lecturer:** Prof. Dr.-Ing. Bernd Hellingrath
16	**Misc.:**

Module Title:		Process Management: Workflow Management			

1	**Module No:** PM1		**State:** Compulsory		

2	**Turn:** winter	**Duration:** 1 term	**Semester:** 1-2	**CP:** 6	**Workload (h):** 180

3	**Module Structure:**					
	No	Type	Course	CP	Presence (h + CH)	Self-Study (h)
	1	L	Lecture		30 (2 CH)	70
	2	E	Exercise		30 (2 CH)	50

4	**Contents:**
	Background and relations to other courses:
	This course links the "business-view" on organizational business processes with the technical implementation of these. It therefore provides means for implementing business requirements in an organizational environment, as task related to topics in IM1, IM2, IM4, PM2, PM3, PM4, BN1 and BN3.
	Main topics and learning objectives:

	Themes	Learning objectives
	(1) Basics of Workflow Management	To be able to provide an overview of the entire process of workflow implementation and to explain its relevance
	(2) Conceptual workflow definition	To be able to understand and create workflow definitions.
	(3) Technical workflow implementation	To be able to understand and create workflow implementations, and to explain the relations between (2) and (3)
	(4) Workflow Management Systems	To be able to actually implement workflows with Workflow Management Systems used in practice.

5	**Learning outcomes:**
	Academic: The ability to manage business process redesign projects in organizations, an understanding of the challenges faced in the course of such a project, and techniques to cope with them.
	Soft skills: The ability to organize small working groups independently and to give presentations in front of a large audience.

8	**Relevant Work:**		
	Number and Type; Connection to Course	**Duration**	**Part of final mark in %**
	Written exam	90 min.	60
	Course Assignments		40

10	**Prerequisites for Credit Points:**
	The credit points will be granted when the module has been successfully completed, i.e. when both the written examination and the course assignments were passed.

12	**Module Prerequisites:**
	None

13	**Presence:**
	Presence is strictly advised.

15	**Responsible Lecturer:**
	Prof. Dr. Jörg Becker

16	**Misc.:**

Module Title:			Process Management: Model-Driven Software Development			

1	Module No: PM2		State: compulsory			

2	Turn: every winter term	Duration: 1 term	Semester: 1-2	CP: 6	Workload (h): 180

3	Module Structure:					
	No	Type	Course	CP	Presence (h + CH)	Self-Study (h)
	1	L	Lecture		45 (3 CH)	60
	2	E	Exercise		15 (1 CH)	60

4	Contents:
	Background and relations to other courses:
	It is assumed that the students have some experience with programming and software development as taught in the bachelor program.
	Depending of the subject of the intended master thesis, the taught material can be helpful.
	Main topics and learning objectives:
	The course consists of lectures providing the theoretical background and of 5 assignments where these concepts are applied in a practical example information system.

Themes	Learning objectives
Foundations of Model-Driven Software Development (MDSD)	Understanding the main concepts of MDSD such as meta- and meta-meta-modeling, model transformations.
Domain-Specific Languages	Understanding the foundations of domain-specific languages (DSL) and being able to develop own domain-specific languages.
Model-to-Model Transformations	Knowing leading tools (such as QVT) for describing model-to-model transformations and being able to apply them.
Model-to-Text Transformations	Knowing leading tools (such as Xtend) for describing model-to-text transformations and being able to apply them.
Case Study	Applying the MDSD approach to develop an example application.

5	Learning outcomes:
	Academic:
	The students learn to know the concepts of MDSD and to apply them to develop software.
	Soft skills:
	The assignments are solved in teams of 5 students. Hence, the students get some experience with teamwork.

8	Relevant Work:		
	Number and Type; Connection to Course	Duration	Part of final mark in %
	Exam	90 Min.	80
	Course assignments	every 14 days	20

10	Prerequisites for Credit Points:
	Solving the course assignments, and passing the written examination.

12	Module Prerequisites:
	none

13	Presence:
	Presence is strongly recommended.

15	Responsible Lecturer:
	Prof. Dr. Herbert Kuchen

16	Misc.:

Module Title:	Process Management: Information Modeling

1	**Module No:** PM3		**State:** Compulsory			

2	**Turn:** summer	**Duration:** 1 term	**Semester:** 1-2	**CP:** 6	**Workload (h):** 180

3	**Module Structure:**					
	No	Type	Course	CP	Presence (h + CH)	Self-Study (h)
	1	L	Lecture		30 (2 CH)	60
	2	E	Exercise		30 (2 CH)	60

4	**Contents:**
	Background and relations to other courses:
	This lecture introduces the theoretical foundation of one of the core methods in Information Systems: Modeling relevant parts of organizational information systems with diagrammatic modeling notations. It therefore provides a theoretical basis for courses applying these techniques, such as PM1, PM4, BN1, BI1, or IM4.
	Main topics and learning objectives:

Themes	Learning objectives
Meta modeling / meta meta modeling	To be able to explain and apply the concepts as well as to be able to explain the rationale behind them.
Modeling frameworks	To be able to provide an overview of the frameworks introduced, to be able to evaluate and compare them, and to be able to apply selected parts of them.
Advanced concepts	To be able to explain and apply the concepts taught, to compare them, and to explain how they work together.
Domain-specific modeling	To explain domain-specific modeling and to be able to argue both in favor and against the usage of such modeling approaches.

5	**Learning outcomes:**
	Academic: Impart a broad and profound understanding of the main tasks and challenges of modeling information. Facilitate understanding of different modeling approaches and judging their appropriateness for specific contexts of application.
	Soft skills: The ability to organize small working groups independently and to give presentations in front of a large audience.

8	**Relevant Work:**		
	Number and Type; Connection to Course	**Duration**	**Part of final mark in %**
	Written exam	90 min.	100

10	**Prerequisites for Credit Points:**
	The credit points will be granted when the module has been successfully completed, i.e. when the written examination is passed.

12	**Module Prerequisites:**
	None

13	**Presence:**
	Presence is strictly advised.

15	**Responsible Lecturer:**
	Prof. Dr. Jörg Becker

16	**Misc.:**

Module Title:		Process Management: Production Planning and Control				

1	Module No: PM4		State: Compulsory			

2	Turn: every summer term	Duration: 1 term	Semester: 1-2	CP: 6	Workload (h):

3	Module Structure:					
	No	Type	Course	CP	Presence (h + CH)	Self-Study (h)
	1	L	Lecture		30 (2 CH)	60
	2	E	Exercise		30 (2 CH)	60

4	Contents:
	Background and relations to other courses:
	The "Production Planning and Control Systems" (PPC) lecture addresses the adaptation of process modeling concepts to the manufacturing sector. Taking an integrated process perspective data structures, information flows and business functions relevant to this domain are presented. The course encompasses processes like material management, capacity management, computer aided design, computer aided manufacturing, and computer aided quality assurance in an integrated manner. It therefore bases on and contributes to the theoretical foundation of PM1, PM2 and PM3.
	Main topics and learning objectives:
	The students learn to know the different approaches of PPC. Moreover, they learn to use the corresponding methods and instruments. In sum, the students shall gain insight into the theories behind Production Planning and Control and techniques proposed for tasks and be able to assess these tasks and the underlying theories critically.

Themes	Learning objectives
Demand Management	To be able to explain and apply the concepts as well as to be able to explain the rationale behind them.
Materials Management, Inventory Control, Scheduling and Capacity Management	To be able to explain and apply the concepts as well as to be able to explain the rationale behind them.
Data Models	To be able to understand the underlying data structures and information needs in PPC.
IT Systems	To get an overview of the main IT systems in PPC and get used to ERP usage in PPC.
Cost Engineering	To be able to explain and apply the concepts as well as to be able to explain the rationale behind them.

5	Learning outcomes:
	Academic:
	To understand and to be able to apply the addressed topics
	Soft skills:
	To manage and to organize group work regarding given task and presentations

8	Relevant Work:		
	Number and Type; Connection to Course	Duration	Part of final mark in %
	Written Exam	120 min.	100%

10	Prerequisites for Credit Points:
	Regular class attendance, solving the course assignments, and passing the written examination.

12	Module Prerequisites:
	None

13	Presence:
	Presence is strictly advised.

15	Responsible Lecturer:
	Prof. Dr. Jörg Becker

16	Misc.:

Module Title:		Business Networks: Supply Chain Management and Logistics			

1	Module No: BN1		State: Compulsory		

2	Turn: every winter term	Duration: 1 term	Semester: 1-2	CP: 6	Workload (h): 180

3	Module Structure:					
	No	Type	Course	CP	Presence (h + CH)	Self-Study (h)
	1	L	Lecture		30 (2 CH)	60
	2	E	Exercise		30 (2 CH)	60

Contents:

Supply chains focus onto value creation networks of often legally independent companies that are tightly connected via different linkages or flows (e.g. material, information and financial flows). The course "Supply Chain Management (SCM)" elaborates those linkages across companies and specifically addresses issues of supply chain design, planning, coordination and optimization. Collaborative process concepts integrating the different business activities of the companies in the supply chain are investigated in detail. For each lectured topic related IT-Systems are introduced and their application in Supply Chain Management is discussed. Furthermore, the different modes of usage and architectures of Information Systems in Supply Chain Management are examined. Case studies carried out with the help of SCM tools currently used in practice underline the practical aspects of the contents taught.

Background and relations to other courses:

This module studies companies in the context of the business ecosystem, i.e. inter-organizational relations of variable density to different stakeholders. It explores the contingencies and strategies that lie behind the evolution and use of inter-organizational IT infrastructures and applications (IOS). On the other side business networks of value creation and the hereby used IT systems and application will be examined in the context of Supply Chain Management (SCM).

4 | **Main topics and learning objectives:**

Themes	Learning objectives
Basic Principles of Supply Chain Management	To learn about basic terms, ideas, challenges and targets of Supply Chain Management.
Supply Chain Modeling	To learn about the basic elements to be modeled in a supply chain. To understand the intention and objectives of modeling supply chains and to be able to create such a model.
Supply Chain Design	To learn about the relevant influencing factors for supply chain design decisions and to understand design options and principles.
Supply Chain Planning	To understand the core tasks of supply chain planning and the methods being used for demand planning, network planning, supply planning, production planning and distribution planning as well as the objectives and key indicators of order promising.
Supply Chain Execution	To learn about the scope of supply chain execution. To get a basic understanding of the basic concepts and functions of Supply Chain Event Management.
IT-Systems in Supply Chain Management	To get an idea of features and characteristics of different SCM software systems.

Learning outcomes:

Academic:

The course's major academic outcome is a broad and profound understanding of supply chains' challenges, targets, and related concepts for managing supply chain activities. Furthermore, a profound knowledge in actual methods and concepts of supply chain design, modeling, planning, and optimization should be obtained.

5 | **Soft skills:**

Students are encouraged to prepare the contents of the lecture and exercise and to perform follow-up work in teams. This is supported by a Learnweb discussion forum that is guided by the chair. Case studies that accompany the lecture especially in Supply Chain Design and Planning provide the opportunity for students to get acquainted to selected SCM tools and to apply them in a realistic scenario. The case studies are organized as group work and thus promote the students' ability to cooperate in teams. The intermediary results are presented regularly by the groups in front of the complete audience. This enhances the students' presentation and discussion skills.

8	Relevant Work:

Number and Type; Connection to Course	Duration	Part of final mark in %
Written Exam	90 Min.	60
Course Assignments		40

10	**Prerequisites for Credit Points:** Regular class attendance, solving the course assignments, and passing the written examination.
12	**Module Prerequisites:** None
13	**Presence:** Presence is strictly advised.
15	**Responsible Lecturer:** Prof. Dr.-Ing. Bernd Hellingrath
16	**Misc.:**

Module Title:	Business Networks: Interorganizational Systems				

1	Module No: BN2	State: Compulsory			

2	Turn: every winter term	Duration: 1 term	Semester: 1-2	CP: 6	Workload (h): 180

3	Module Structure:					
	No	Type	Course	CP	Presence (h + CH)	Self-Study (h)
	1	L	Lecture	3	30 (2 CH)	45
	2	E	Exercise	3	30 (2 CH)	75

4	**Contents:** Networks have become ubiquitous forms of organizing in and between economy, public administration and society at large. On the backdrop of this development this module introduces interorganizational systems and networks in a business context, yet with linkages to public administration (e.g. customs) and social networks. It aims to explore the contingencies and strategies that lie behind the evolution and use of interorganizational information infrastructures and applications (IOS). Further, students will examine the impact of IOS on distributed forms of value generation such as electronic markets and various types of networks. Drawing on case examples as well as theoretical concepts, a life cycle perspective of IOS management will be introduced. The implications of IOS will be discussed from various perspectives such as industry transformation, intermediation, strategic management, organization, information management and IS development. This discussion will be informed by theories addressing networking issues such as institutional economics, collective action or organization theory.

5	**Learning Goals:** *Academic:* The course will provide students with analytical skills enabling them to explain the emergence of networks. Students should be able to both identify specific network management tasks (networkability) and apply prominent theories and frameworks to explain the impact of IOS. *Soft skills*: In addition to providing students with the capabilities to deal with academic concepts and literature reflectively, the course helps to further the students' ability to take an active part in discussions. This ability is based on a combination of reading, thinking, writing, discussing and listening skills. Moreover, students will develop skills in applying these techniques to practical problems, e.g. through problem based learning exercises. Course assignments will be organized as group work, so that students can practice their collaboration skills and learn techniques for efficient collaboration.

8	**Relevant Work:**		
	Number and Type; Connection to Course	Duration	Part of final mark in %
	Written Exam	60 Min.	50
	Course Assignments		50

10	**Prerequisites for Credit Points:** Regular class attendance, solving the course assignments, and passing the written examination.

12	**Module Prerequisites:** None

13	**Presence:** Presence is strictly advised. Participation in assignments for continuous assessment is a prerequisite to successfully complete the course.

15	**Responsible Lecturer:** Prof. Dr. Stefan Klein

16	**Misc.:**

	Module Title:		**Business Networks: Enterprise Application Integration**			
1	**Module No:** BN3		**State:** compulsory			
2	**Turn:** every summer term	**Duration:** 1 sem.	**Semester:** 1-2	**CP:** 6	**Workload (h):** 180	

3	**Module Structure:**					
	No	Type	Course	CP	Presence (h + CH)	Self-Study (h)
	1	L	Lecture		45 (3 CH)	60
	2	E	Exercise		15 (1 CH)	60

4	**Contents:**
	Background and relations to other courses:
	It is assumed that the students have some experience with programming and software development as they are taught in the bachelor program. The learned concepts and techniques are (often) helpful in the master thesis.
	Main topics and learning objectives:
	Several technologies for the intra- and inter-organizational integration of information systems are presented, among them EJB, message-oriented middleware, and web services. Moreover, suitable software architectures are introduced.
	The participants learn how to apply these technologies in practical applications. This is mainly achieved by corresponding assignments.

Themes	Learning objectives
Basic EAI concepts	Knowing and being able to evaluate typical EAI topologies and possible integration layers.
Web applications and Middleware	Knowing typical concepts and frameworks for the development of enterprise applications. Being able to use these frameworks for developing enterprise applications with Java.
.NET	Being able to develop enterprise applications with .NET.
Web Services	Being able to connect existing enterprise applications using web-service technologies.
Message-oriented middleware	Being able to connect enterprise applications using message-oriented middleware.
BPEL	Knowing how to connect existing web services with BPEL.
Data integration	Knowing how to integrate software systems on the data layer.

5	**Learning outcomes:**
	Academic:
	The students learn to know and apply current integration technologies for software systems within a company and across collaborating enterprises
	Soft skills:
	The exercises are solved in teams of 5 students. Thus, the students are trained to collaborate in teams.

8	**Relevant Work:**		
	Number and Type; Connection to Course	**Duration**	**Part of final mark in %**
	Exam	90 Min.	75
	Course assignments	every 14 days	25

10	**Prerequisites for Credit Points:**

12	**Module Prerequisites:**
	none

13	**Presence:**
	Presence is strongly recommended.

15	**Responsible Lecturer:**
	Prof. Dr. Herbert Kuchen

16	**Misc.:**

	Module Title:	**Business Networks: Information Security**

1	Module No: BN4		State: Compulsory			

2	Turn: Summer	Duration: 1 term	Semester: 1-2	CP: 6	Workload (h): 180

3	Module Structure:					
	No	Type	Course	CP	Presence (h + CH)	Self-Study (h)
	1	L	Information Security		30 (2)	60
	2	E	Information Security		30 (2)	60

4	**Contents:** This lecture covers the foundations of information security including the specification of protection goals, adversary models, security mechanisms (e.g., identification, access control) and cryptographic primitives to enforce protection goals in distributed systems (e.g., symmetric and asymmetric encryption, integrity protection). Security mechanisms will be discussed both from the perspective of a system operator, who protects a larger distributed system, as well as from the end users' point of view, who may wish to use security technology to self-protect against untrustworthy system operators.
	Background and relations to other courses: None
	Main topics and learning objectives:

Themes	Learning objectives
Lecture: Theoretical Security, Practical Security, Security Strategy, Privacy Exercise: Primer on Information Theory, Primer on Coding Theory, Primer on Number Theory, Primer on Computational Complexity, Block Cipher Operating Modes, exercises accompanying the lecture	This course contributes to ensure that every graduate who potentially makes decisions with security impact has sufficient knowledge to a) identify security issues, b) communicate effectively with security experts, c) keep aware of changing technological limits, d) evaluate security advises critically and comprehensively, e) oversee the implementation of security measures, and f) assume responsibility for their effects and potential side-effects.

5	**Learning outcomes:**
	Academic: See objectives a), c), d), e)
	Soft skills: See objectives b) and f)

8	**Relevant Work:**		
	Number and Type; Connection to Course	**Duration**	**Part of final mark in %**
	Written assignment	1	20
	Oral examination	20 min.	80

10	**Prerequisites for Credit Points:** The credit points will be granted when the module has been successfully completed, i.e. all parts of the examination are passed.

12	**Module Prerequisites:** None

13	**Presence:** Presence is recommended

15	**Responsible Lecturer:** Prof. Dr. Rainer Böhme

16	**Misc.:**

Module Title:		Business Intelligence: Management Information Systems and Data Warehousing				
1	**Module No:** BI1		**State:** Compulsory			
2	**Turn:** every winter term		**Duration:** 1 term	**Semester:** 1-2	**CP:** 6	**Workload (h):** 180

3	**Module Structure:**					
	No	Type	Course	CP	Presence (h + CH)	Self-Study (h)
	1	L	Lecture		45 (3 CH)	60
	2	E	Exercise, Case Study, Presentations		15 (1 CH)	60

4	**Contents:**
	Background and relations to other courses:
	Business Intelligence (BI) refers to a variety of methods and techniques for the analysis of business data such as data warehousing (DWH), reporting, Online Analytical Processing (OLAP), and data mining. This course addresses the methodical design and implementation of data warehouse systems in support of management's decision making, particularly via appropriate use of multidimensional schema design, ETL, and OLAP techniques. All relevant concepts are demonstrated from both a theoretical and a practical perspective.
	In this course, traditional lectures are complemented by student presentations that provide additional content. In addition, exercises and case studies provide ample opportunities to perform the various development phases in realistic and practical settings.
	Main topics and learning objectives:
	Students will be able to explain the problems, issues, solutions, techniques, tools, and applications relating to BI and DWH. They will be able not only to design and implement ETL processes and OLAP solutions but also to discuss differences among OLAP design approaches and to evaluate the quality of multidimensional schemata.

Themes	Learning objectives
Data Warehousing Fundamentals	To define architectures and use cases of data warehousing and management information systems and to assess their roles for companies
Query Processing and Optimization	To describe query processing in database systems and to demonstrate appropriate query optimization techniques
OLAP Processing and Optimization	To compare differences between OLTP and OLAP; to contrast OLAP workloads and demonstrate appropriate OLAP optimization techniques
ETL Design	To compare different ETL processes and tools; to design simple ETL processes
OLAP Modeling	To describe the role of functional dependencies for the identification of multidimensional structures; to design multidimensional structures
OLAP Modeling Approaches	To assess different OLAP modeling approaches; to demonstrate conceptual modeling of scenarios according to an appropriate approach
OLAP Implementation	To describe the architecture and functionality of OLAP systems; to implement OLAP reports with a standard OLAP system according to a case study
Project Management	To compare different approaches to engage in a MIS/DWH project; to demonstrate exemplary OLAP system implementations

5	**Learning outcomes:**
	Academic: To understand and to be able to apply the addressed topics
	Soft skills: To manage and to organize group work regarding given task and presentations

8	**Relevant Work:**		
	Number and Type; Connection to Course	**Duration**	**Part of final mark in %**
	Written Exam	60 min.	50
	Course Assignments		50

10	**Prerequisites for Credit Points:** Regular class attendance, solving the course assignments, and passing the written examination.
12	**Module Prerequisites:** None
13	**Presence:** Presence is strictly advised.
15	**Responsible Lecturer:** Prof. Dr. Jörg Becker, Prof. Dr. Gottfried Vossen
16	**Misc.:**

Module Title:	Business Intelligence: Data Integration

1	**Module No:** BI2		**State:** Compulsory			

2	**Turn:** every winter term	**Duration:** 1 term	**Semester:** 1-2	**CP:** 6	**Workload (h):** 180

3	**Module Structure:**					
	No	Type	Course	CP	Presence (h + CH)	Self-Study (h)
	1	L	Lecture		30 (2 CH)	75
	2	E	Exercise, Case Study, Presentations		15 (1 CH)	60

4	**Contents:**
	Background and relations to other courses: Business Intelligence (BI) refers to a variety of methods and techniques for the analysis of business data. As business data usually reside in a variety of sources, data integration becomes a necessary prerequisite for successful BI projects. In this course, a collection of tools and techniques is presented that can be applied in modern data integration tasks; these range from view construction and query processing in heterogeneous distributed databases to schema mapping and matching, Web services and mash-up APIs. In this course, lectures are complemented by student presentations that provide additional content. In addition, exercises provide ample opportunities to apply the various techniques in realistic and practical settings.
	Main topics and learning objectives: Students will become able to explain the problems, issues, solutions, techniques, and tools relating to data integration. They will be able not only to locate and present relevant sources and research in the area, but also to apply data integration techniques in practical scenarios. Moreover, they will be familiarized with the current research literature in the field.

Themes	Learning objectives
Introduction, Background, Architectures	To familiarize the audience with the problems, issues, solutions, techniques, and tools relating to data integration
Mash-up creation	To get some initial hands-on experience in a data integration task
Data cleansing, data fusion, data quality	To learn about basic activities in data integration
Schema matching, schema mapping	To appreciate formal issues arising when data schemas are present or given
GaV/LaV Modeling	To recognize the importance of traditional database topics (in this case relational algebra) in the novel context of data integration
Distributed Query Processing and Optimization	To become able to apply classical optimization techniques in distributed scenarios
Web Crawling and Search and Recommendation	To take integration to the Web as the currently most dominating integration application
Web Data Representation and Processing (RDF, SPARQL, OWL, linked data)	To become familiar with recent developments regarding the handling of data on the Web and to apply relevant techniques in sample scenarios

5	**Learning outcomes:**
	Academic: In the oral presentation, the student should demonstrate the ability • to select, engage with, assess, and apply pieces of literature, • to build a concise, yet coherent argument, and • to identify open issues. In the written examination, the student should demonstrate the ability • to integrate and apply several concepts, • to apply the concepts to a data integration scenario.
	Soft skills: All assignments are group assignment. Hence the student should demonstrate the ability • to productively work in groups, • to coordinate with a peer.

8	Relevant Work: Number and Type; Connection to Course	Duration	Part of final mark in %
	Written Exam	60 min.	60
	Course Assignments		40

10	**Prerequisites for Credit Points:** Regular class attendance, solving the course assignments, and passing the written examination.

12	**Module Prerequisites:** Basic database knowledge

13	**Presence:** Presence is strictly advised.

15	**Responsible Lecturer:** Prof. Dr. Gottfried Vossen

16	**Misc.:**

Module Title:	Business Intelligence: Data Analytics - Theory				

1	Module No: BI3		State: Compulsory		

2	Turn: summer	Duration: 1 term	Semester: 1-2	CP: 6	Workload (h): 180

3	Module Structure:				
	No	Type	Course	CP	Presence (h + CH)	Self-Study (h)
	1	L	Lecture "Data Analytics"		60 (4 CH)	120

4	Contents:	
	Background and relations to other courses: The track "Business Intelligence" ideally complemented by electives from marketing and by a seminar, offers a way to start a career in database management and the like. The students are supposed to be familiar with the basic concepts from probability theory and statistics.	
	Main topics and learning objectives:	
	Themes	Learning objectives
	Data Analysis and Data Mining	To have a survey of data analysis and data mining. To overview the main techniques in data mining: regression, classification, association rules and clustering.
	Input-Output-Analysis: Linear and T-Linear Models	To have insight into models for regression and classification. To apply the least squares method in linear regression. To use models for logistic regression. To measure utility by conjoint analysis. To use support vector machines in regression and classification
	Input-Output-Analysis: Nonlinear Models	To know regression and classification techniques based on tessellations (nearest neighbours and trees)
	Risks	To assess models using risk estimation by subsampling and resampling
	Interdependencies	To describe Interdepencies by correlation measures. To find association rules in transaction analysis. To measure interdepencies in Input-/Output-models by PCA,CCA and PLS. To learn about path modeling and causal analysis.
	Latent Variables	To find latent variables by model clustering, multidimensional scaling and homogeneity analysis
	Data Preparation	To structure the process of data preparation. To deal with insufficiencies in data like missing values.

5	Learning outcomes:	
	Academic: The student is supposed to have an understanding of state of the art techniques in data analysis.	
	Soft skills:	

8	Relevant Work:		
	Number and Type; Connection to Course	Duration	Part of final mark in %
	Written Exam	90 min	100%

10	**Prerequisites for Credit Points:** The credit points will be granted when the module has been successfully completed, i.e. when the written examination is passed.

12	Module Prerequisites: None

13	**Presence:** Presence is strictly advised

15	Responsible Lecturer: Prof. Dr. Ulrich Müller-Funk

16	Misc.:

Module Title:	Business Intelligence: Data Analytics - Applications				

1	Module No: BI4	State: Compulsory			

2	Turn: summer	Duration: 1 term	Semester: 1-2	CP: 6	Workload (h): 180

	Module Structure:					
3	No	Type	Course	CP	Presence (h + CH)	Self-Study (h)
	1	S	Seminar		15 (1CH)	60
	2	E	SPSS Tutorial		15 (1CH)	30
	3	E	Case Studies		15 (1CH)	45

4	**Contents:** In the SPSS tutorial which is held in the PC-lab, the standard software and its applications to data analysis is presented and can be used by the students. Additional case studies deepen the methodological knowledge. The seminar is dealing with topics supplementing the methodological aspects, e.g. topics like data quality, customer relationship analytics and the like.
	Background and relations to other courses: The courses are directly related to the lecture "Data Analytics", as they discuss the use of elementary and more complicated data analysis techniques using statistical software.
	Main topics and learning objectives:

Themes	Learning objectives
SPSS-Tutorial	To get an introduction to SPSS coping, at the same time, with basic problems of statistical data analysis.
Case Studies	To solve practical problems related to the data analysis lecture using, e.g., SPSS.
Seminar	To elaborate a specific topic of data analysis in business applications.

5	**Learning outcomes:**
	Academic: The students have insight into statistical standard software and its application to problems of statistical analysis given in the lecture
	Soft skills: The students are able to present a statistical topic giving a talk

	Relevant Work:		
8	Number and Type; Connection to Course	Duration	Part of final mark in %
	Seminar presentation		60%
	SPSS certificate		20%
	Case Study presentation	1	20%

10	**Prerequisites for Credit Points:** The credit points will be granted when the module has been successfully completed, i.e. all parts of the examination are passed.
12	**Module Prerequisites:** None
13	**Presence:** Presence is strictly advised
15	**Responsible Lecturer:** Prof. Dr. Ulrich Müller-Funk
16	**Misc.:**

	Module Title:	Elective Modules 1 - 3 (Lecture)

1	**Module No:** El 1-5		**State:** Compulsory			
2	**Turn:** every term		**Duration:** 1 term	**Semester:** 1–4	**CP:** 6	**Workload (h):** 180

3	**Module Structure:**					
	No	Type	Course	CP	Presence (h + CH)	Self-Study (h)
	1	L	Lecture		30 (2 CH)	60
	2	E	Exercise		30 (2 CH)	60

4	**Contents:** Selection of modules with 6 CP from the "Minor" programs of the Master program of the department of Business Administration, namely "Basis Accounting", "Basis Finance", "Organisation und Personal", "Strategisches Management", "Krankenhausmanagement" and "Basis Marketing". Preconditions defined for the selected modules have to be obeyed. The module "Advanced Market Research" is excluded. Or: Choosing modules out of the not previously enrolled modules within IM, PM, BN and BI Or: Choosing special modules in Information Systems or Computer Science Two of the selected modules have to be seminars!
	Background and relations to other courses: to be found in the descriptions of the above mentioned modules
	Main topics and learning objectives: to be found in the descriptions of the above mentioned modules

5	**Learning outcomes:** (in general) The students deepen their knowledge in specific topics
	Academic: to be found in the descriptions of the above mentioned modules
	Soft skills: to be found in the descriptions of the above mentioned modules

8	**Relevant Work:** depending on the selected modules
10	**Prerequisites for Credit Points:** The credit points will be granted when the prerequisites of the selected module have been successfully completed.
12	**Module Prerequisites:** None
13	**Presence:** Presence is strictly advised.
15	**Responsible Lecturer:** Prof. Dr. Ulrich Müller-Funk
16	**Misc.:**

Module Title:		Elective Modules 4 – 5 (Seminar)				
1	**Module No: El** 1-5		**State:** Compulsory			
2	**Turn:** every term		**Duration:** 1 term	**Semester:** 1–4	**CP:** 6	**Workload (h):** 180

3	**Module Structure:**					
	No	Type	Course	CP	Presence (h + CH)	Self-Study (h)
	1	L	Seminar		30 (2 CH)	150

4	**Contents:** The elective seminars deal with topics that arise from recent research. They are usually organized in small groups of students. Each student gives a seminar talk and, to this end, writes a seminar elaboration. Main seminar-topics may change from term to term.
	Background and relations to other courses: Usually, The topics deepen the contents of one (or more) of the four tracks IM, PM, BN and BI. Therefore, knowledge of the contents of pertaining track(s) is strongly recommended.
	Main topics and learning objectives: To follow recent developments, the topics and, accordingly, the learning objectives are changing from term to term. Examples of earlier topics have been: • Structural Model Analysis • Model Visualisation - Layout and Perception • Network Evolution • Beautiful Data • ERP systems in industry, retail and supply chains • Information Retrieval • Coordination in Supply Chain Management • Theoretical Computer Science

5	**Learning outcomes:**
	Academic: The students deepen their knowledge in specific topics.
	Soft skills: Students improve their skills in acquiring profound scientific knowledge and presentation. Depending on the topic, group working abilities are supported.

8	**Relevant Work:**		
	Number and Type; Connection to Course	Duration	Part of final mark in %
	Seminar elaboration and talk		100

10	**Prerequisites for Credit Points:** The credit points will be granted when the module has been successfully completed.
12	**Module Prerequisites:** None
13	**Presence:** Presence is obligatory.
15	**Responsible Lecturer:** Prof. Dr. Ulrich Müller-Funk
16	**Misc.:**

Module Title:	Project Seminar				

1	**Module No:** PS		**State:** Compulsory			

2	**Turn:** every term		**Duration:** 1term	**Semester:** 3-4	**CP:** 12	**Workload (h):** 360

3	**Module Structure:**					
	No	Type	Course	CP	Presence (h + CH)	Self-Study (h)
	1		Project Seminar	12	120 (8CH)	240

4	**Contents:** In the project seminar, students realize an IS-project in a team.
	Background and relations to other courses: The project seminar builds on concepts that were introduced in former Tracks IM, PM, BN and/or BI.
	Main topics and learning objectives: The topics vary from term to term. Frequently, they originate from current research-questions that have interrelation with problems arising in professional area and, hence are organized together with industrial partners. Examples are:
	• Legally Compliant Information Systems Engineering
	• ERCIS CodeSharing
	• TAC/SCM - The Trading Agent Competition in Supply Chain Management
	• EARevLog - Developing an Enterprise Architecture for Reverse Logistics
	• IT-supported Semi-Automatic Analysis of Process Weaknesses
	• ITIL in a media company
	Learning objective depend on those topics and, hence, are varying.

5	**Learning outcomes:**
	Academic: The students learn to apply theoretical concepts in a practical environment given by a specific (e.g. industrial) project.
	Soft skills: Students learn to realize a project in a team. They acquire several soft skills, e.g. in presentations, writing of scientific texts, and collaboration in teams.

8	**Relevant Work:**		
	Number and Type; Connection to Course	Duration	Part of final mark in %
	Assignments (see 10)		100

10	**Prerequisites for Credit Points:** Seeking and reading relevant literature, presenting the material and writing a corresponding report. The project seminar may also include assignments in analyzing requirements, modeling, designing and implementing information systems.

12	**Module Prerequisites:** Concrete Project Seminars may require certain modules from IM, PM, BN and/or BI.

13	**Presence:** Presence is obligatory.

15	**Responsible Lecturer:** Prof. Dr. Ulrich Müller-Funk

16	**Misc.:**

Module Title:			Master's thesis				

1	Module No: MT			State:	Compulsory		

2	Turn: every term	Duration: 1 term	Semester: 3-4	CP: 30	Workload (h): 900

3	Module Structure:					
	No	Type	Course	CP	Presence (h + CH)	Self-Study (h)
	1		Writing the thesis	24		800
	2		Research Methods	6	20 (2 CH)	80

4	**Contents:**
	With his master's thesis the student is supposed to prove his ability to take part in the scientific process by doing a small piece of research and write an appropriate paper on it. The thesis should have a length of approximately 80 pages.
	Background and relations to other courses: The master thesis is written in the research context of one of the main tracks IM, PM, BN and/or BI.
	Main topics and learning objectives: Those are subject to the topic and area where the thesis is intended.

5	**Learning Outcomes:**
	Academic: The student can handle a research topic in a scientific way and apply the results to practical problems.
	Soft skills: The student can handle the formal requirements associated to a research paper: investigating the research context, collecting material from the scientific literature, performing and processing bibliographical inquiries, presenting own ideas in the scientific environment of the given topic.

8	**Relevant Work:**		
	Number and Type; Connection to Course	**Duration**	**Part of final mark in %**
	Master's thesis		100

10	**Prerequisites for Credit Points:**
	Writing of and fulfilling the requirements for a master's thesis.

12	**Module Prerequisites:**
	60 credit points.

13	**Presence:**

15	**Responsible Lecturer**
	Prof. Dr. Ulrich Müller-Funk

16	**Misc.:**