### Program

**Business Inf. Systems**

**Level:** Master

**SPO:** 3 (24.05.2006)

### Code

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<th>Code</th>
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<th>Course title</th>
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<td>WI1807</td>
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<td>Application Architectures</td>
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### Prerequisites

- AM dur. 1 S
- AM dur. 120
- GFN 1
- FP 3

### Type

L+E

### Type

Prereq.

### AM

PE 1 S

### AM

WE 120

### GFN

1

### FP

3

### Comment

### Course responsible:

Prof. Dr. Andreas Heberle

### Lecturer, Lecture, SWS:

| Prof. Dr. Andreas Heberle | Application Architectures | 5 |

### Learning outcomes:

After having successfully completed the course the students should

- be aware of a software architect’s tasks
- be capable of analyzing and specifying non functional requirements that determine the architecture of business applications
- know the established structural patterns of business applications as well as anti-patterns that impair the quality of an application
- understand the importance of well-defined and exactly specified interfaces
- be able to document different architectural views
- understand the concept of Service-oriented Architecture (SOA)
- be able to design services and service oriented applications (lower complexity)
- be capable of analyzing and assessing architecture concepts and techniques with respect to developing business applications

### Contents:

This lecture gives an introduction to the architecture of distributed business applications. In particular, we discuss the concept of Service-oriented Architecture which is agreed to be the most promising approach for the flexible implementation of business processes.

- Definition of software architecture
- Non-functional requirements
- Aspects of software architectures (Transaction, Security, Error Handling etc)
- Architecture patterns
- Documentation of application architectures
- Service-oriented Architecture
  - Service Design
  - Service Level Agreements
  - Service Life Cycle
- SOA and the implementation of business processes

### Teaching methods:

Lectures and exercises (case studies, small projects). Black board, slides, tutorials.

### Reading:

- Martin Fowler: Patterns of Enterprise Application Architecture, Addison Wesley. 2003

### Prerequisites:

Programming in Java/JavaEE or C#/Net, XML/XSL, Web Service Basics

### Workload:

- face-to-face teaching: 75, independent learning: 75

### Year of study, Offer:

First year, each year

### Language:

german
Learning outcomes:

Knowledge
- of the structure and coherency of business processes,
- of processes and strategies for the management of a company under the financial point of view,
- of the impact of internal and external effects of market parameters

Skills
- to methodologically model and simulate business processes,
- to develop business strategies and their implementation scenarios and to evaluate their effectiveness,
- to present and prosecute these business strategies in a market structure

Competencies
- in modeling internal and cross-company processes,
- in assessing and analysing corporate strategies,
- in acting and interacting on simulated markets

Contents:
Basic overview of the insurance sector with focus on internal and external products and processes. In addition to the structuring and modeling of the questions a special emphasis lies on the practical implementation of a business management game. Here, in collaboration with groups from the local insurance industry and the University of Karlsruhe our students simulate the processes of the insurance market. Of particular significance the cooperation between various “simulated companies” is focussed. Due to the necessity of negotiating reinsurance contracts this leads to a strengthening of the socio-economic skills. In the groups “the company” - focuses on the identification of strategies to strengthen the market position, obtaining market position, the management and training of staff, the modulation of information strategy and an adequate investment policy. In all areas the modeling and the requirements for information systems and also the critical consideration of proposed boundaries were developed.

Teaching methods:
The lecture is largely based on media-based presentations. The presentation material as well as the current literature are available electronically. To foster independent studies the students may have to work on case studies from specific topics. In the exercise part the main focus lies on the collaboration with groups from the local insurance industry and the University of Karlsruhe when simulating the processes on the insurance market. This simulation includes the interesting discussion with local businesses and the opportunity to learn the processes of company control.

Reading:
- Wirth, A.: Skript Versicherungswirtschaft Hochschule Karlsruhe.
- Handbuch Versicherungsplanspiel, Universität Karlsruhe.

Prerequisites:

Workload:
face-to-face teaching: 60, independent learning: 90
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<th>Year of study, Offer:</th>
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Program:  Business Inf. Systems  Level: Master  SPO: 3 (24.05.2006)

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<td>Business Intelligence</td>
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Course responsible: Prof. Dr. Sven Martin

Lecturer, Lecture, SWS:
- nn  Data Warehouse  2
- Prof. Dr. Sven Martin  Data Mining  2

Learning outcomes:
After successful course completion the students should:
- know the basic techniques and principles of business intelligence, especially data warehouses and data mining
- be able to apply current software tools
- be able to identify the operational areas of business intelligence, to estimate the cost and effort of data and technologies and to apply the processes to implement a business intelligence approach

Contents:
Business Intelligence comprises techniques to allow analysts to interpret business data. The results of these analyses are related to customers, products and processes within the enterprise, supporting management decisions and improving the success of the enterprise.

In this course main analytical techniques are presented, like online analytical processing, statistical methods operating on multi-dimensional databases and data mining techniques operating on data warehouses, especially:
- the detection of unknown relationships of data collected in a data warehouse and the verification of supposed relationships based on the present data
- the necessary techniques for data mining
- the supporting four layers of a data warehouse architecture
- the assessment of the cost of hardware, software and the implementation effort of the solutions.

Teaching methods:
- presentation of subject matter by video slides and blackboard sketches
- data warehouse assignments to be solved using SAP BW
- data mining assignments to be solved using WEKA data miner
- lecture notes are made available to students using a course website
- self-studies of further subject matter

Reading:
- J. Han, M. Kamber: Data Mining, Morgan Kaufmann, 2006
- H.-G. Kamper, W. Mehanna, C. Unger: Business Intelligence Grundlagen und praktische Anwendung, Vieweg, 2004
- C. Mehrwald: Datawarehousing mit SAP BW 3.5, dpunkt.verlag, 2005
- R. Otte, V. Otte, V. Kaiser: Data Mining für die industrielle Praxis, Hanser, 2004

Prerequisites:
Skills in knowledge-based systems are a prerequisite. Knowledge in statistics, programming, data bases and business administration is helpful.

Workload: face-to-face teaching: 60, independent learning: 90

Year of study, Offer: First year, each year

Language: german
Program: Business Inf. Systems  Level: Master  SPO: 3 (24.05.2006 )

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Course responsible: Prof. Dr. Udo Müller

Lecturer, Lecture, SWS:
- Prof. Dr. Cosima Schmauch: Distributed Systems - Java
- Prof. Dr. Udo Müller: Distributed Systems - .Net

Learning outcomes:
After having successfully completed the course, the students should

- know methods of distribution and communication, architectural concepts and be able to use methods to describe interfaces and responsibilities, state-of-the-art. They should know the strength and weakness of distribution concepts and of current implementations of distributed systems
- be able to use software designed to implement distributed systems, to model business processes based on distributed systems and to assess the usage of distributed systems
- be able to choose and apply appropriate methods and software systems to implement business processes considering distribution and integration

Contents:
This course presents the concepts of the software architecture of distributed systems. Unlike for non-distributed systems problems concerning communication and coordination will play an important role. Although technical details like communication networks may be of interest we will show how the necessarily expensive communication influences the software architecture. Web services are a good example and we will present their technology base - Simple Object Access Protocol (SOAP), Web Services Description Definition Language (WSDL) and WS Security. Using these as building blocks more complex application structures can be built.

The orchestration of these structures is done using the Business Process Execution Language (WS-BPEL) which will be studied practically. The evolution of web services changed the meaning of application and the development of software resulting in a new approach called service-oriented architecture (SOA). We define SOA as a specific architectural style for structuring application systems. The impacts of this approach will be part of this course. Although the technologies are considered more as a means rather than as a main subject of this course, a deeper insight in the techniques of distributed systems is necessary. Therefore an adapted preparatory course will present the fundamentals of programming (C#) and of object-oriented modeling.

Teaching methods:
Lecture supported by course book and power point presentation, project work

Reading:

Prerequisites:
Basic knowledge of object-oriented programming and design

Workload:
face-to-face teaching: 75, independent learning: 75

Year of study, Offer:
First year, each year

Language:
german
Program: Business Inf. Systems  Level: Master  SPO: 3 (24.05.2006 )

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Type: L+E  
Prereq.: AM dur.: PE 1 S  
AM dur.: WE 120  
GFN 1  
FP 8  
Comment

Course responsible: Prof. Dr. Karl Dübon

Lecturer, Lecture, SWS:
- Prof. Dr. Karl Dübon: Corporate Performance Management  
- Prof. Dr.-Ing. Karl-Robert Graf: Business Applications

Learning outcomes:
After having successfully completed the course, students should
- be capable of identifying, analysing, modeling typical integrated business performance and reporting processes (i.e. Cash Management, Business Planning, Balanced Scorecard, Operational Risk Management),
- be able to choose the appropriate methods and solution techniques for modeling business rules,
- have acquired competence in modeling the requirements of business performance and reporting processes,
- have acquired technical competence to use mathematical methods for business planning processes using SAS (linear programming, classification, regression),
- be able to analyse, structure and formally describe business performance processes,
- have gained a deeper overview of the links between business requirements in planning and computer science,
- be capable of communicating typical issues of business performance management,
- be capable of engaging in lifelong learning and meaningful using business literature.

Contents:
This lecture studies the architecture and function of integrated business applications. Taking a case study, the horizontal and vertical integration of business processes will be explored and reconsidered concerning the alternative integration conceptions for measuring business performance. Selected vertical business processes of business performance management will be implemented with the leading standard software SAP/R3 and SAS. Different architectural conceptions of Executive Information Systems (EIS) will be presented.

Teaching methods:
Lectures and exercises (case studies). Black board, lecture script, slides, Software: SAP, SAS, ARIS

Reading:
Course book,
- Allweyer: Geschäftsprozessmanagement, W3L 2005
- Identification and Adaption of Dynamic Aspects in Quality Riskanalysis, Forschungsbericht HSKA 2007
- Dübon: Maschinelle Lernverfahren zur Behandlung von Bonitätsrisiken, DUV Wiesbaden, 1999
- Fichter M., Dübon K.: Did SAP's fictive company IDES fall prey to fraud - an investigation using Benford's Law, Forschungsbericht HSKA 2008,  
- Gitte C., Schindler M., Dübon K.: Konzeption eines zweistufigen Verfahrens zur Verrechnung von IT-Prozesskosten, Forschungsbericht HSKA 2008
- Mertens: Integrierte betriebliche Informationsverarbeitung II, Gabler, aktuelle Ausgabe
- Gadatsch: Grundkurs Geschäftsprozess-Management, Vieweg, aktuelle Ausgabe
- Scheer: Architektur integrierter Informationssysteme – Grundlagen der Informationsmodellierung, Berlin aktuelle Ausgabe
- Scheer: ARIS vom Geschäftsprozess zum Anwendungssystem, Berlin, aktuelle Ausgabe
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Learning outcomes:

Knowledge
- of important accounting standards, in particular IAS resp. IFRS in comparison with the german HGB
- of different evaluation methods for the assessment of values, of assets and liabilities
- of the implications of accounting methods on the content of the annual statement of accounts
- of international capital and credit markets and the applicable financial instruments
- of alternative options in corporate finance
- of key figures for the assessment of financial concepts and alternative financing decisions
- about capabilities and limitations of key figures (key performance indicators).

Skills
- Reading and understanding accounting statements of companies as well as estimating the implications of management decisions and economical incidents in the accounting statements
- Working with case studies for evaluation of situations and gaining of insights into situations
- Assessing the applicability of key performance indicators (KPI)
- Applying formal systems of evaluations of companies
- Classifying problems in finance and accounting in an academic context.

Competences
- Formal and analytical competences in the application of business administration concepts
- Interdisciplinary competences in the processing of business problems
- Competences in the application of models for the evaluation of corporate finance
- Competences in the transfer of results from models to reality
- Competences in the design of business processes for the implementation of strategic goals and financial goals in the company.

Contents:

Financing options for companies of different size and legal forms, overview on capital markets and credit markets, clarification of terms. Relevance of derivative financial instruments in financial markets, in particular the role of credit derivatives and their possible fields of application with case studies.

Teaching methods:
Lecture with case studies

Reading:
- Betsch, O., Groh, A., Lohmann, L.: Corporate Finance, 2. Auflage München
- Kaserer, Ch.: Investition und Finanzierung case by case, Frankfurt/Main 2006
**Prerequisites:**
Basics in accounting and finance, basics in the concept of time value of money

**Workload:**
face-to-face teaching: 60, independent learning: 90

**Year of study, Offer:**
First year, each year

**Language:**
german
Course Book

Program: Business Inf. Systems Level: Master SPO: 3 (24.05.2006)

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<td>IT Security</td>
<td>L+E</td>
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Sem. CP SWS
1 5 4

Course responsible: Prof. Dr. Sven Martin

Lecturer, Lecture, SWS:
Prof. Dr. Sven Martin IT Security 4

Learning outcomes:
- knowledge about current threats, technical and social attacks, technical and organizational countermeasures and their mathematical foundations
- ability in the handling of organizational measures and technical tools for the protection of IT systems
- competences in decision making about the adequate use of IT protection measures after a preceding modeling and risk measurement of IT systems, applications and networks

Contents:
Business information systems ought to be secured for the protection of the intellectual properties of an organization like companies and public administration and for the compliance with laws and regulations. To this end, technologies as well as organizational measures must be employed, in compliance with the processes of the organization. This course has three parts:

- fundamentals and technologies (lecture, 90 ms per week)
  - terms and aims of IT security
  - technical forms of attacks
  - technical protection measures
  - social engineering
- cryptographical techniques
  - symmetric/asymmetric encryption
  - hash functions
  - signatures and certificates
  - authentification and identity management
- security management using BSI IT-Grundschutz (self-studies)
  - risk analysis
  - planning of protection measures
  - responsibilities
  - working out a security concept within a case study

Teaching methods:
- presentation of subject matter by blackboard sketches, video slides and live video of computing sessions
- computing excercises using IT security tools on virtual machines
- lecture notes are made available to students using a course website
- self-studies in security management by developing a security concept based on BSI IT-Grundschutz for a small sample IT infrastructure

Reading:
- Bundesamt für Sicherheit in der Informationstechnik: IT-Grundschutz-Kataloge, Bundesanzeiger-Verlag (o.J.)
- C. Eckert: IT-Sicherheit, Oldenbourg, 2007
- M. Kappes: Netzwerk- und Datensicherheit, Teubner, 2007
- C. Peikari, A. Chuvakin: Security Warrior, O'Reilly, 2004
Prerequisites:
No prerequisites. Knowledge in computer communication networks, operating systems and mathematics is helpful.

Workload: face-to-face teaching: 60, independent learning: 90

Year of study, Offer: First year, each year

Language: german
Learning outcomes:

After having successfully completed the course, the students should:

- know methods of knowledge representation and semantic technologies, the characteristics of intelligent software agents and the techniques to implement them, the application areas of knowledge-based systems in enterprises
- be able to develop formal descriptions of sets of concepts, to understand and apply rule-based systems and fuzzy systems to support planning and decision support systems
- be able to decide on the usage and development of knowledge-based systems to support business processes

Contents:

The evolution of the Semantic Web and the Electronic Commerce raise the value of knowledge-based systems. For, semantic technologies enable programs to interpret web sites and to automatically integrate business processes based on semantic annotations. Software agents substitute humans, fulfilling their duties and thus are forced to have human-like capabilities. In this course methods and techniques for the representation of semantic are presented, and the modeling and implementation of the requirements and human-like capabilities are shown.

The course content comprises:

- techniques of representation of knowledge, i.e. semantic nets, frames and ontologies described in the Web Ontology Language (OWL),
- techniques of computer-based reasoning by using predicate logic, realized by the resolution method, and rule-based systems implemented by forward- and backward-chaining interpreters and realized by the Semantic Web Rule Language (SWRL),
- the development of communication languages used by software agents to communicate with agents and with humans,
- fuzzy systems to implement applications using fuzzy knowledge.

Teaching methods:

Lecture supported by course book and power point presentation, project work

Reading:

- Beierle Christoph, Kern-Isberner Gabriele: Methoden wissensbasierter Systeme, Vieweg-Verlag
- Bigus Joseph, Bigus Jennifer: Constructing Intelligent Agents with Java, Wiley
- Caglayan Alper, Harrison Colin: Intelligente Software-Agenten, Hanser
- Pellegrini Tassilo, Blumauer Andreas: Semantic Web: Wege zur vernetzten Wissensgesellschaft, Springer
- Russell Stuart, Norvig Peter: Artificial Intelligence – A modern approach, Prentice Hall
- Von Altrock Constantin: Fuzzy Logic - Band 1: Technologie, R. Oldenbourg Verlag
- Winston Patrick Henry: Artificial Intelligence, Addison-Wesley

Prerequisites:

Predicate logic, programming, object-oriented modeling, database systems, web technologies
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<th><strong>Workload:</strong></th>
<th>face-to-face teaching: 60, independent learning: 90</th>
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**Course title:** Risk Management

**Type:** L+E

**Prereq.:** AM dur. 1 S AM dur. 120 GFN 1 FP 4

**Comment:**

**Course responsible:** Prof. Dr. Andrea Wirth

**Lecturer, Lecture, SWS:**

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<th>SWS</th>
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<td>Prof. Dr. Andrea Wirth</td>
<td>Financial Risk Management</td>
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<tr>
<td>Prof. Dr. Karl Dübon</td>
<td>Credit and Operation Risk</td>
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**Learning outcomes:**

**Knowledge**
- of tasks and processes in risk management,
- of process elements and basic approaches for risk analysis, risk measurement and risk management
- of the practical methods and their underlying theoretical model

**Skills**
- to analyse and model risk situations and their classification within the risk process,
- to apply the essential methodological tools,
- to systematically analyse assess risks

**Competences**
- to create, analyse and assess risk profiles,
- to understand and critically question the applicability of methods and assessments,
- to actively manage company risks and target the change of risk profiles

**Contents:**

The lecture starts with the requirements set to manage risk within a company as well as the structure and design of risk management processes. In addition, basic approaches for modeling, risk identification, and sample procedures for risk assessment, but also for risk control are discussed. Typical examples taken from the banking and insurance business and related methods for risk assessment complete the picture.

The main topics of this lecture are:

- Introduction and process of risk management
- Methodical and quantitative principles
- Use of financial instruments and their evaluation
- Market risk management
- Credit risk management
- Operational risk management
- Case studies

Furthermore, students will be expected to understand generic as well as specific information systems designed for risk management. They study typical modeling problems of risk management processes in SAP and the sample implementation of risk models, e.g. Value at Risk, of tool vendors like Algorithmics and Reuters.

**Teaching methods:**

In all parts of the lecture the students are led to the active problem solving by studying actual questions and problems. The theoretical concepts are initially motivated with a simple example, followed by the theoretical foundations, models and approaches and completed with advanced examples. In the exercise part, the focus lies on paper work and presentations of the students. Thematically, the students were faced with a company example and the applied risk management, showing success or failure. To verify their knowledge gained, the students are expected to independently prepare and present specific valuation methods in the field of risk analysis.

The lecture is largely based on presentation. The students receive the presentation material in electronic form, together with topical literature. As mentioned above in the exercise part independent lectures or elaborations on an overview and on detailed subjects are expected.
### Reading:

### Prerequisites:
Due to its highly integrative approach the lecture risk management is based on techniques and methods from different business sectors. Methodical nature of this integration, however, most in area of financial management and integrated operational information.

### Workload:
- face-to-face teaching: 60, independent learning: 90

### Year of study, Offer:
First year, each year

### Language:
german