

**CORSO DI LAUREA IN INFORMATICA E MANAGEMENT DELLE AZIENDE DIGITALI**  
**BACHELOR IN WIRTSCHAFTSINFORMATIK**

**Contenuto degli insegnamenti**  
**Inhalt der Lehrveranstaltungen**

<b>Primo anno / Erstes Jahr</b>
<p>Introduction to Linear Algebra and Discrete Mathematics (part of the modular course Mathematics for Business Informatics for the cohort 2019/20)</p> <ul style="list-style-type: none"> <li>• Background on complex numbers, trigonometry and polynomials, sets, functions and counting</li> <li>• Vectors and matrices</li> <li>• Linear systems</li> <li>• Graphs and matrix representations</li> <li>• Logic of compound statements</li> <li>• Mathematical induction and recursion</li> </ul>
<p>Introduction to Programming</p> <ul style="list-style-type: none"> <li>• Basic algorithms and data structures</li> <li>• Data types and expressions</li> <li>• Classes and objects</li> <li>• Conditionals and loops</li> <li>• Object-oriented design</li> <li>• Arrays and collections</li> <li>• Input/Output and exception handling</li> <li>• Inheritance and polymorphism</li> <li>• Recursion</li> </ul>
<p>Accounting for Decision Making</p> <ul style="list-style-type: none"> <li>• Understanding of the concepts and language of accounting</li> <li>• Preparation of financial statements (income statement, balance sheet, statement of cash flows)</li> <li>• Basic interpretation and analysis of financial statements</li> <li>• Cost behavior and cost-volume-profit analysis</li> <li>• Fundamentals of internal decision-making</li> <li>• Introduction to budgeting and management control</li> </ul>
<p>Economics of Digital Markets</p> <ul style="list-style-type: none"> <li>• Introduction to Microeconomics</li> <li>• Consumer Theory</li> </ul>

- Producer Theory
- Basic Game Theory
- Industrial Organization
- Strategic Interactions

Introduction to Analysis and Optimization Techniques (part of the modular course Mathematics for Business Informatics for the cohort 2019/20)

- Sequences and series
- Univariate functions
- Derivatives and differentials
- Indefinite and Riemann integrals
- Basic optimization techniques in one variable
- Mathematical tools for decision making without and with uncertainty

Modeling and Databases

Module 1: Data and Process Modeling for Business Informatics

- Principles of data modeling
- Data modeling with ER and UML
- Relational mapping
- Descriptive process modeling
- Analytic process modeling
- Decision modeling

Module 2: Introduction to Databases for Business Informatics

- Relational Model
- Query languages (relational algebra and SQL)
- Query management
- Database design
- Building database applications
- NoSQL and large-scale data management

Application Engineering for Business Informatics

- Software Processes and Risk Management
- Information management
- Traditional and Agile Project Management
- Software Requirements and Architecture
- Application Construction and Implementation
- Testing and Quality Management

Web and Internet Engineering

- Development of web applications: basics of usability, accessibility and responsive design
- Web protocols and markup languages
- Client-side dynamicity and web scripting languages
- Client-side GUI frameworks
- Web application design and web services
- Languages and frameworks for server-side web development

## Secondo anno / Zweites Jahr

### Introduction to Digital Business, Strategy and Management

#### Module 1: Strategic Management and Digital Business

- Introduction to Business/Management
- Introduction to Digital Business
- Introduction to Strategic Management
- Corporate Strategy and Digitalization
- Digital Transformation
- Digital Business Models/Sharing Economy

#### Module 2: Change Management

- Organization Processes
- Business Modelling
- Designing Change Processes
- Management of Change
- ICT and Change

### Digital Finance and Financial Markets (Specialisation)

#### Module 1: Principles of Finance for CS

- Arbitrage principles in finance
- Risk and Return
- Real Investment Analysis
- Raising capital

#### Module 2: Financial Markets

- Financial system and Financial intermediation
- Banks and Non-Banks
- Capital Markets and Investment Banks
- Asset Management

### Digital Marketing and Advertising (Specialisation)

#### Module 1: Introduction to Digital Marketing and Advertising

- Strategic thinking alongside the use of digital media
- Essential elements of DM
- Techniques and platforms (social media, content marketing, SEO, user experience, personalisation, display advertising and CRM)
- Aspects of implementation (planning, integration)

#### Module 2: Analytics of Consumer Behavior

- Basics of Consumer Behaviour and Consumer Decision Making
- Concepts and Applications

- Analytical models for Consumer Behaviour Modelling
- Prediction models for Consumer Behaviour Modelling

#### Data Structures and Algorithms

- Searching and sorting
- Analysis of algorithms: correctness and complexity
- Divide and conquer, recurrences
- Pointers, dynamic data structures, linked lists
- Abstract data types: stacks, queues, priority queues, maps
- Binary trees, red-black trees

#### Probability Theory and Statistics

- Basic concepts: probability spaces, conditional probability, Bayes' Theorem, independent events
- Random variables: distribution, density, expectation, variance, covariance, law of large numbers
- Special distributions: Bernoulli, Binomial, Poisson, Exponential, Normal, Chi-Square, t-Distribution
- Sampling: sums of random variables, central limit theorem, sample variance
- Parameter Estimation: maximum likelihood estimates, interval estimates, confidence intervals
- Hypothesis testing: significance levels, test statistics, p-values

#### Management of System Security and Networks

- Key concepts of system security and networked systems, threats and data security
- Basic mechanisms of cryptography
- Identification, authentication and biometrics
- Chip cards
- Security infrastructures and certificates
- Web and internet security

#### English for Informatics and Digital Business

- Writing skills: practice of coherent academic discourse to produce subject-specific texts;
- Spoken skills: improvement of spoken interaction and production through the practice and production of academically and professionally acceptable presentations and other domain-specific speaking activities;
- Development of receptive skills through the exposure to and analysis of various types of written and spoken discourse typical in Computer Science and development of grammatical and lexical range and accuracy so that communication is fluent and spontaneous.

#### IT Management and ERP Systems

##### Module 1: IT Management and Enterprise Modeling

- Basic concepts of IT management
- Managing technical environments
- Security issues in IT management
- IT related standards, laws, and regulations
- Risk management and disaster recovery
- Service-based management of IT

##### Module 2: ERP Systems and IT Service Management

- Concepts, technologies and systems in the ERP market
- ERP project lifecycle
- ERP systems from the developer perspective (customizing and developing)
- IT service management processes
- Management simulation game on the information and technology function in organizations
- Best practice case studies, frameworks and tools

#### Engineering of Mobile Systems

- Functional and declarative programming
- Design of mobile applications
- Frameworks and platforms for mobile development
- Data and resource management in a mobile context
- Mobile device sensors
- Internet of Things

### Terzo anno / Drittes Jahr

#### Data Mining and Decision Making

##### Module 1: Introduction to Data Mining

- Introduction to Knowledge Discovery in Data
- Programming for Data Science
- Data quality and data preparation
- Data Mining tasks and algorithms
- Methods and techniques for data analysis, visualization and decision support
- Projects/Case studies on data-driven decision making

##### Module 2: Data-driven Decision Making

- Decision Theory and Human Decision Making
- Introduction to Artificial Intelligence
- Machine Learning and Deep Learning algorithms
- AI frameworks and tools
- Ethical and social implications of AI
- Projects/Case studies on AI-driven decision making

#### Legal aspects of IT

- Privacy and data protection
- Copyright and Intellectual property rights
- E-Commerce and governance of the Internet

#### German for Informatics and Digital Business

- Writing skills: practice of coherent academic discourse to produce subject-specific texts;
- Spoken skills: improvement of spoken interaction and production through the practice and production of academically and professionally acceptable presentations and other domain-specific speaking activities;

- Development of receptive skills through the exposure to and analysis of various types of written and spoken discourse typical in Computer Science and development of grammatical and lexical range and accuracy so that communication is fluent and spontaneous.

#### Italian for Informatics and Digital Business

- Writing skills: practice of coherent academic discourse to produce subject-specific texts;
- Spoken skills: improvement of spoken interaction and production through the practice and production of academically and professionally acceptable presentations and other domain-specific speaking activities;
- Development of receptive skills through the exposure to and analysis of various types of written and spoken discourse typical in Computer Science and development of grammatical and lexical range and accuracy so that communication is fluent and spontaneous.

#### Seminar in Business Informatics and Information Systems

- Research methods in business informatics and information systems
- Literature research
- Scientific writing
- Models for quality control in scientific research
- Current topics in business informatics and information systems
- Presentations of seminar papers on topics in business informatics and information systems

#### Advanced Economics for Digital Business (Specialisation)

- Productivity, Technology, Institutions, and Economic Growth
- Employment/Unemployment/Business Cycles
- Trade/Exchange Rate/Open Economy
- Introduction to Applied Research
- Identifying Causal Effects
- In-depth Discuss of Empirical Methods for Causal Analysis

#### Financial Trading and Algorithms (Specialisation)

- Economics and finance of trading markets
- Trading in electronic markets
- Automatic strategies for intra-day trading
- Blockchain financial applications

#### Market Research and B2B Digital Marketing (Specialisation)

- The Digital Evolution in B2B Marketing
- B2B Companies and the Use of Digital Marketing
- Designing the Market Research Project
- Gathering and Collecting Accurate Data
- Data Preparation, Analysis, Interpretation, and Reporting the Results
- Creating a B2B Digital Marketing Plan

#### Software Project Management

- Project Planning
- Team Building and Management

- Competitive Bidding and Client Interaction
- Risk Analysis and Management
- Quality Assurance - Monitoring and Evaluation
- Budgeting and Cost Control