

BACHELOR IN INFORMATICS AND MANAGEMENT OF DIGITAL BUSINESS
CORSO DI LAUREA IN INFORMATICA E MANAGEMENT DELLE AZIENDE DIGITALI
BACHELOR IN WIRTSCHAFTSINFORMATIK

Content of the lectures
Contenuto degli insegnamenti
Inhalt der Lehrveranstaltungen

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

Economics of Digital Markets

- Introduction to Microeconomics
- Consumer Theory
- 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 with Project (Modeling and Databases for the cohorts until 2023)

Module 1: Data and Process Modeling for Business Informatics

- Introduction to Business Process Management
- Data modeling
- 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 development processes
- Requirements Engineering
- Software Architectures and Design Patterns
- Source Code Management
- Software testing

Web and Internet Engineering with Project (Web and Internet Engineering for the cohorts until 2023)

- 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
- Basics of web application design and server-side web development

Second Year / 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

- Fundamentals of Marketing (segmentation, targeting, positioning)
- Marketing Mix in Digital Marketing (product strategy, pricing strategy, distribution strategy)
- Branding in the Digital Age
- Basics of Advertising in the Digital Space (digital advertising channels, marketing funnel, unit economics, user experience, SEO, and CRM)
- Metrics and Analytics in Digital Marketing (Key Performance Indicators (KPIs) and the Customer Journey, conversion tracking and optimization)

Module 2: Advanced Topics in Digital Marketing and Advertising

- Understanding Consumer Behavior and Consumer Decision Making (factors influencing consumer behavior, decision making, decision making biases, user experience)
- Understanding B2B Marketing (B2B marketing strategies, B2B customer journey mapping)
- Content Marketing in B2C and B2B
- Market Research in B2C and B2B (customer development approach, job to be done approach).

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 CSCW (IT Management and ERP Systems for the cohorts until 2023)

Module 1: Computer Supported Collaborative Work (IT Management and Enterprise Modeling for the cohorts until 2023)

- Concepts and technologies

- Articulation work
- User Interfaces
- Usability and Custom experience
- Symbolism, brand identity and trust

Module 2: ERP Systems and IT Management (ERP Systems and IT Service Management for the cohorts until 2023)

- Concepts, technologies and systems in the ERP market
- ERP project lifecycle
- ERP systems from the developer perspective (customizing and developing)
- Basic concepts of IT Management and IT related standards, laws and regulations
- Risk management and security issues in IT Management
- IT Service Management
- Management simulation game on the information and technology function in organizations

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

Legal aspects of IT

- Internet Governance and Domain Name System
- Personal Data Protection, Big Data and their use
- Electronic Contracts and Digital platforms
- The law regulation of Artificial Intelligence

Third Year / 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

HCI for Business (only for the cohort of 2023)

- Concepts and technologies
- Articulation work
- User Interfaces
- Usability and Custom experience
- Symbolism, brand identity and trust

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

Current Topics in Digital Finance and Financial Markets (Specialisation) (for the cohorts from 2024)

- Microstructure and technical aspects of financial markets
- Trading strategies and backtesting
- Automatic trading algorithms

- Overview of cryptocurrencies and blockchain technology
- Smart contracts
- Automatic exchanges and decentralised finance

Current Topics in Digital Marketing and Advertising (Specialisation) (for the cohorts from 2024)

- Analytical models for Consumer Behaviour Modelling
- Prediction models for Consumer Behaviour Modelling
- Case studies in Digital Marketing and Advertising

Financial Trading and Algorithms (Specialisation) (for the cohorts until 2023)

- 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) (for the cohorts until 2023)

- 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