Information Systems Management

- study degree – Graduate/ Master
- language – English
- credits/ study duration – 120 ECTS/ two years study program
- form of study – full-time program
- start of studies – in September
- application deadline – 28 February/ 30 April
- tuition fee – 5.000,- EUR per academic year
- two specializations: **Management of Business Informatics (MBI)** and **Data and Business (DAB)**
- students choose their specialization during the admission procedure

Study plan

MBI	DAB
Compulsory core courses - 90 ECTS Elective/optional courses – min. 18 ECTS Final state exam and Thesis defence – 12 ECTS	Compulsory core courses – 90 ECTS Elective/optional courses – min. 18 ECTS Final state exam and Thesis defence – 12 ECTS

1st Semester

MBI	DAB
Information Systems Management Data Analytics Fundamentals Artificial Intelligence in Cloud for non-Programmers ICT Project Management Communication and Presentation of Information Information Modelling of Organizations I Management of Enterprise IT	

2nd Semester

MBI	DAB
Basic of Enterprise of Information Service Information Technologies in Entrepreneurship Software Process Improvement Information Management Information Systems Audit Enterprise Architecture	Basic of Enterprise of Information Service Fundamental Analytics and Reporting Architecture of Business Analytics Probability and Mathematical Statistics I Machine Learning I Elective courses for 6 ECTS

3rd Semester

MBI	DAB
Diploma Seminar Innovations of Information Systems Competitive and Business Intelligence Elective courses for 12 ECTS Exchange semester abroad - optional	Diploma Seminar Neural Network and Deep Learning Big Data Processing Management of Data and Analytics for Business Competitive Intelligence Machine Learning 2 Elective courses for 3 ECTS Exchange semester abroad - optional

4th Semester

MBI	DAB
Modern Web Development - CMS Elective courses for 6 ECTS Final State Exam and Thesis Defence	Modern Web Development - CMS Elective courses for 9 ECTS Final State Exam and Thesis Defence

Compulsory core courses (syllabus)

Information Systems Management -SA431, 3ECTS

Aims of the course:

The main goal of the course is to discuss and explore management actions which can increase probability that IS/IT will add value to business.

Learning outcomes and competences:

Upon successful completion of this course, students will be able to explain the specifics of IS/IT management within an organization and effectively communicate with its management.

Course contents:

a) Synopsis of lectures
1. Evolution and terminology of information systems management (ISM)
2. IT management models and frameworks
3. IT Governance -- the current IT management framework
4. IS/IT Planning (content, methodologies, phases)
5. IS/IT organization (general types of organizational models, centralization versus decentralization)
6. Standards and procedures (external, internal)
7. Legal issues (areas of computer law, software protection, IS/IT contracts)
8. Financial issues: departmental and project accounting (cost allocation models, budgeting, metrics of IT value)
9. IS/IT quality management(quality of SW development processes, quality of IS/IT performance, quality of SW products, quality of IS/IT services)
10. IS/IT security (security standards, information assurance, ROSI)
11. Information systems development/implementation (types of SDLC models, types of project management methodologies and SW tools
b) Synopsis of tutorial
1. Setting the studies (semester works)
2. Presentation of studies
3. Discussion about IS specific problems

Reading:

RQ		ITIL service operation	London	TSO	2011	978-0-11-331307-5
RQ		ITIL service transition	London	TSO	2011	978-0-11-331306-8
RQ	SVATÁ, V.	Information systems management	Praha	Oeconomica	2007	978-80-245-1257-0
RE	Castillo, F. Managing Information Technology, ISBN 978-3-319-38890-8, ISBN 978-3-319-38891-5 (eBook), 2016, Springer
RE	COBIT 5, A Business Framework for the Governance and Management of Enterprise IT, ISACA, 2012
RE	Journal of information systems and technology management, ISSN 1807-1775, http://www.jistem.fea.usp.br/index.php/jistem

Data Analytics Fundamentals – 4IT560, 3 ECTS

Aims of the course:

The aim of the course is to introduce students with the basics of work with data within the enterprise and practical analytical work, show the advantages and limits of data analysis and teach them to use appropriate software tools for data analysis and presentation.

The course is taught in a modern form of an management game, where participants immediately test all acquired knowledge and their applicability to a practical project from the topical area of sales and marketing.

Learning outcomes and competences:

Upon successful completion of this course, students will be able to:
1. recognize the types of data in an enterprise and their life cycle,
2. quickly identify the basic characteristics of the data file they work with,
3. select and link relevant data sets needed for their work,
4. visualize and interpret the results of the analysis,
5. use appropriate software tools for data analysis and presentation.

Course contents:

1. The basics for work with data
What are data, what kinds of data we have, data terminology, data connection
b. What can be done with data, data tracking (data awareness and responsibility)
c. Added-value of data for business
d. Data quality (basic concepts and their importance), data profiling
e. Data sets, their interconnection, selection, aggregated (derived) data, dimensions, metrics / KPIs, granularity
f. Data visualization and interpretation (output validation)

2. Use of software for data analysis and presentation
Advanced MS Excel functions (pivot tables, data functions)
b. Power BI
c. Effective presentation
d. Tools to support teamwork and sharing

3. Management Game
Simulation of business decisions without analytical tools
b. Preparation of market research analysis tools
c. Simulation of business decisions using analytical tools

Reading:

SLÁNSKÝ, David. Data and Analytics for the 21st Century: Architecture and Governance. Praha: Professional Publishing, [2018]. ISBN 978-80-88260-16-5.

Artificial Intelligence in Cloud for non-Programmers – 4IZ575, 3 ECTS

Aims of the course:

The course focuses on cloud platforms for data mining. This course covers the complete process of data mining – from data preparation in various formats (tables, text, multimedia), modelling, to the deployment of models as web services and integration with programming languages for data science.

Learning outcomes and competences:

Upon successful completion of the course, students will be able to use common cloud-based platforms for data mining to complete a range of data mining tasks (e.g. data preparation, clustering, regression, classification). Graduates of this course will be equipped with the skills required to process different types of input data. For example, for input in a natural language, they will be able to perform entity detection and tokenization. The course will follow-up on current trends, such as explainable (symbolic) models.

Course contents:

Introduction to cloud-based services. Selected cloud-based platforms.
1. Overview of selected machine learning, natural language processing and optimization tasks.
2. Preprocessing tabular data (data cleaning, handling imbalanced data, dummy variables).
3. Preprocessing textual data (entity spotting, lemmatization, stemming).
4. Processing multimedia datasets.
5. Handling big datasets (subsampling).
6. Modelling algorithms, manual and automatic parameter optimization.
7. Evaluation and model comparison.
8. Advanced and emerging topics (such as fully automatic workflows, optimization).
9. Guest lecture(s) from the industry (optional).

Reading:

RQ	LARSEN, L.	Learning Microsoft cognitive services : leverage machine learning APIs to build smart applications	Birmingham	Packt Publishing	2017	978-1-78862-302-5
RE	BARGA, R S. -- FONTAMA, V. -- TOK, W.	Predictive analytics with Microsoft Azure Machine Learning	[Berkeley]	Apress	2015	978-1-4842-1201-1
RE	COOK, D.	Practical machine learning with H2O : powerful, scalable techniques for deep learning and AI	Beijing	O'Reilly Media	2017	978-1-49196-460-6
RE	PERRIER, A.	Effective Amazon machine learning : machine learning in the cloud	Birmingham	Packt	2017	978-1-78588-323-1
RE	MILLER, J.	IBM Watson projects : eight exciting projects that put artificial intelligence into practice for optimal business performance	Birmingham	Packt Publishing	2018	978-1-78934-371-7
RE	LAKSHMANAN, V.	Data science on the Google cloud platform : implementing end-to-end real-time data pipelines : from ingest to machine learning	Sebastopol	O'Reilly Media	2018	978-1-49197-456-8

ICT Project Management – 4IT524, 6 ECTS

Aims of the course:

The aim of the course is to explain the fundamentals of project management and the specific aspects of IT projects. It also aims to provide an overview of the project management tools and methodologies, e.g. MMDIS PM, PMBOK, PRINCE2. This course should help students to understand the different approaches used to achieve the project outcomes and explain how the development approaches affect project management. It should also help them to become familiar with methods and techniques applicable in project initiation and planning and to understand the importance of project organization. Finally, it should help the students to understand projects from a strategic perspective.

Learning outcomes and competences:

Upon successful completion of this course, students will be able to explain project management as a discipline and a specific area of management that is applied in order to achieve the project objectives. They will also be able to explain how strategic management relates to project management and vice versa. Students will be able to initiate, plan, execute, monitor, control and close a project. Students will also be able to apply project planning techniques and to use project management software. Finally, they will be able to describe the established project management methodologies and be able to choose between predictive and adaptive approaches based on the characteristics of a project.

Course contents:

1. Objectives of the course, key terms and concepts, project management and its fundamental principles and elements, project success factors, and specific aspects of IT projects.
2. IT projects in the context of strategic management in general and IT strategic management in particular.
3. Key attributes of projects, project lifecycle and development lifecycles. Relationships between the project lifecycle and the development lifecycles. Project management processes and knowledge areas.
4. Methods, techniques and management products over the project lifecycle.
5. Project initiation, project planning, project execution and project closure.
6. Project organization and project team. Skills and competencies of project managers.
7. Project and portfolio management software tools.
8. Project management methodologies, standards and best practices.
9. Tailoring and adoption of project management methodologies.
10. Interdependencies between project management and product management.

Reading:

RQ	WYSOCKI, R K.	Effective project management : traditional, agile, extreme, hybrid	Indianapolis	Wiley	2019	978-1-119-56280-1
RE	KERZNER, H.	Project management : a systems approach to planning, scheduling, and controlling	Hoboken	Wiley	2017	978-1-119-16535-4
RE		Individual competence baseline : for project, programme & portfolio management : version 4.0	Zurich	IPMA	2015	978-94-92338-00-6
RE		The standard for project management and A guide to the project management body of knowledge : (PMBOK GUIDE)	Chicago	Project Management Institute	2021	978-1-62825-665-9
RE	SCHWABER, K. and J. SUTHERLAND. The Scrum Guide. In: Scrum Guides [online]. November 2020 [cit. 2022-06-20]. Available from: https://scrumguides.org/docs/scrumguide/v2020/2020-Scrum-Guide-US.pdf					

Communication and Presentation of Organizations – 4SA612, 6 ECTS

Aims of the course:

The main aim of this course is the development of individual and team abilities to communicate and work with information effectively. The course is focused particularly on significance and practical applications of information in interpersonal communication primarily with regard to business processes.

Learning outcomes and competences:

Upon successful completion of this course, student will be able to apply different strategies, styles and kinds of communication in organization and outside. To propose, provide, organize presentation of information. To practice effective communication in team/project activities. To apply reasonable procedures during the prevention and solving of communication problems in practice.

Course contents:

1. Fundamental terms of communication.
2. Forms and types of communication. Strategies, styles and tactics of communication.
3. The art of listening. Questions and answers. Persuasion and argumentation.
4. Assertiveness, aggressiveness and submissiveness in communication.
5. Conversations, dialogue, discussion. Proceedings and negotiation.
6. Pronouncements, presentations, meetings.
7. Communication in teamwork.
8. Problems and barriers in communication. Criticism, conflicts in communication.
9. Communication with troublesome people. Tricks and attacks in communication. Manipulations.
10. Nonverbal communication.
11. Written communication.
12. Intercultural communication.
13. IT in communication.

Reading:

RQHARGIE, O.Skilled interpersonal communication : research, theory and practiceLondonRoutledge2011978-0-415-43204-
RQHYNES, G E.Managerial communication : strategies and applicationsLos AngelesSAGE2016978-1-4833-5855
RQBALDWIN, J R.Intercultural communication for everyday lifeChichesterWiley-Blackwell2014978-1-4443-3236-0

Information Modelling of Organizations – 4IT525, 6 ECTS

Aims of the course:

Overview of principles, methodologies, and tools for the analysis and design on the IS.
Training in the use of methodologies with CASE tools.

Learning outcomes and competences:

Upon completing this course, students will be capable of analyzing the business system to develop its information system and re-engineer its business processes.

Course contents:

IS development methods and methodologies
Business system and information System
Methods of analysis
- Business System Planning (BSP)
- System analysis of objects (UML Class Diagram)
- System analysis of processes (TOGAF Event Diagram)
- Detailed analysis of an object (UML State Chart)
- Detailed analysis of a process (BPMN)
- Consistency of models
Other topics (meta-modeling, BPM, CASE, OO development trends, etc.)

Reading:

RQ	ŘEPA, V.	Information modelling of organizations	Praha	Vysoká škola ekonomická v Praze, Nakladatelství Oeconomica	2021	
RQ	ŘEPA, V. -- SVATOŠ, O.	Model Consistency as a Tool for Digital Business Architecture Verification			2019	ISSN 1877-0509
RE	CHAMPY, J. -- HAMMER, M.	Reengineering the corporation : a manifesto for business revolution	New York	Harper Business	1993	0-88730-687-X
RE	YOURDON, E.	Modern structured analysis	Englewood Cliffs	Prentice-Hall International	1989	0-13-598632-X
RE	ŘEPA, V.	Consistency in the Business System Model				978-1-60750-089-6

Management of Enterprise IT – 4IT528, 6 ECTS

Aims of the course:

IT Governance, Management of IT services, IT operations and IT resources, Information Systems, MMDIS, ITIL, information strategy, variants of enterprise IT development, IT sourcing, IT vendor management.

Learning outcomes and competences:

Familiarize students with principles of business IT management at strategic, tactical and operational levels, especially with development and management of IT services, with various forms of IT services delivery.

Course contents:

Business Informatics (BI) ,Basic terms, IT resource, IT process , IT service

BI stages and variants , IT – Business relationship development, Models of IT service delivery , Factors influencing BI management

Management principles in BI , Organizational structures , Structure of IT department

IT Architectures , IT architectures theory, Enterprise architecture, IT services architecture, application architecture, software architecture, technological architecture

Principles and models of IT management, IT management principles , IT management models – MMDIS (Multidimensional Management and Development of Information System)

Frameworks for IT management , ITIL, ISO/IEC 20000

Reference model of IT management, Reference model principles , MMDIS-MBI description, Customization and implementation of the model

Strategic IT management, IT and enterprise competitiveness , IT strategy – design and implementation principles

IT services management , IT service life cycle, IT service architecture, IT service definition (SLA)

IT sourcing, Reasons for outsourcing, Outsourcing risks, Outsourcing variants and their CSF, Process of outsourcing, Tender and vendor management

Reading:

RQ	FEUERLICHT, J. -- VOŘÍŠEK, J.	Enterprise Application Service Model	978-1-60566-770-6
RE	Carr, N. G. (2003). IT Doesn't Matter. Harvard Business Review, 81(5), 41–49.		
RE	ISACA. (2012). COBIT 5 - A Business Framework for the Governance and Management of Enterprise IT. Information Systems Audit and Control Association.		
RE	ITIL. (2007). ITIL: Introduction to the ITIL Service Lifecycle. London: TSO		
RE	Open Group. TOGAF Version 9. The Open Group Architecture Framework (TOGAF). The Open Group, 2009. str. 778. ISBN:978-90-8753-230-7		
RE	WEILL, P., & ROSS, J. (2004). IT Governance: How top performers manage IT decision rights for superior results. Working Paper No.326. Boston: Harward Business School Press.		

Basic of Enterprise of Information Service – 4SA636, 3 ECTS

Aims of the course:

To acquaint students with the basics of information security in organizations. The basic starting points of the course is the family of ISO / IEC 27000 standards. These starting points are supplemented by practical examples and examples in the company Škoda Auto, a.s. The course will provide the basics of information security in enterprise information systems - systems IPS, IDS, SIEM.

Learning outcomes and competences:

Upon successful completion of this course, students will be able to perform initial analysis of security risks, design basic measures for the protection of digital assets of organizations, manage basic information about the deployment of IPS, IDS and SIEM systems.

Course contents:

Day 1: Lecture - security (Part 1) - I. Introduction to sacurity basic concepts, security management systems and its audit, break, II. risk analysis, lunch, III. legal security anchoring - GDPR, authorities - NBU, NÚKIB, etc., security audit, break, IV. password strategies

Day 2: Lecture - security (Part 2) - Premises of Škoda Auto, a.s. - Use of the ISO / IEC 27,000 framework for security management in Škoda Auto, a.s., security management of ICT operation, excursions into operation - demonstrations of work with monitoring systems, incident identification, management of secure application development.

Day 3: Lecture - security - part 3 - I. SIEM, IPS, IDS systems, break, II. Incident management, lunch, III. Business Continuity planning, break, IV. penetration testing.

Reading:

RE ISO/IEC 27000:2018 – Information security management system – Overview and vocabulary
RE ISO/IEC 27001:2013 – Information security management system – Require¬ments
RE ISO/IEC 27002:2022 – Code of practice for information security management

Diploma Seminar – 4SA619, 6 ECTS

Aims of the course:

Early in the course (weeks 1-3), students present their intentions and preliminary thesis assignment, and reflect the feedback received in the preparation of the final thesis assignment. Based on that, each student then starts systematically working on his/her thesis, in accordance with the agreed timetable.

The course introduces students to the requirements, methods and resources needed to produce successfully final thesis. During the semester, students prepare a thesis objective, a detailed outline of the thesis based on the sub-objectives of individual chapters and literature/data search appropriate to the thesis. Later in the course (weeks 5-10) students present an actual work-in-progress version of the thesis (minimum 20%).

The course also provides a platform for advanced students to review each other's work and have a critical professional discussion.

Learning outcomes and competences:

Upon successful completion of the course, students will be able to:

* explain the aims, structure and benefits of their thesis,
* use an appropriate research method to achieve their objectives,
* demonstrate progress in the systematic development of their thesis,
* summarise the state of knowledge in the field,
* critically compare different approaches to the chosen problem and argue their own approach to the topic,
* critically evaluate and discuss scholarly work.

Course contents:

* Explanation of how the DP is prepared (formalities, content, academic practices, ...).
* Setting out the main steps and procedure of the work.
* Finding a suitable topic and appointing a supervisor for the DP.
* Formal submission of the DP into the information system InSIS.

In cooperation with the head of the DP then subsequently:

* Design of the structure of the thesis and the timetable for the thesis solution.
* Collection and selection of information sources/data.
* Selection of appropriate scientific methods.
* Beginning of the thesis development.
* Design of the methodology for the practical part of the thesis.
* Presentation of the developed parts of the thesis (min 20%).

Reading:

RQ	BUI, Y N.	How to write a master's thesis	Los Angeles	SAGE	2020	978-1-5063-3609-1	details
RQ	BAILEY, S.	Academic writing : a handbook for international students	London	Routledge, Taylor & Francis Group	2018	978-1-138-04873-7	details
RE	Opatření děkana Fakulty informatiky a statistiky č. 11/2018 k plnění studijních povinností https://fis.vse.cz/wp-content/uploads/page/579/Opatreni_2018_11.pdf						

Modern Web Development – CMS – 4SA660, 6 ECTS

Aims of the course:

The course focuses on new media, new technologies and especially on the creation of a dynamic and partially interactive website through a CMS system. The emphasis is on new trends in web application architecture and their application in practice. While the lectures cover the theory of web design, in the tutorials we will create a real functional website on the WordPress CMS platform. The course is structured in a way to help all students, regardless of their experience, learn WordPress.

Learning outcomes and competences:

Graduates of the course will understand the possibilities of new media technologies. They will be able to design practical solutions using web technologies (CMS WordPress), and use the web as a tool to support information sharing.

This course focuses on creating websites using CMS WordPress. No previous experience is needed. This course is structured in a way to help all students, regardless of their experience, learn WordPress.

Course contents:

The course focuses not only on the theoretical aspects of new media (current trends and principles of new media) and web design, but also on the practical characteristics of the modern web and its creation. In addition to the technological perspective, the social aspects of this modern phenomenon are also taken into account - i.e. user-oriented creation and distribution of web content, open communication, sharing and reuse of content.

The lectures cover theoretical topics of webdesign and webdevelopment, such as Basics of Web Designing, Multimedia and its Applications, Web Technologies, Introduction to Web Design & Applications, Basics of Computer Graphics, HTML, CSS, JavaScript, and basics of Content management systems Worpress, Drupal and Joomla.

The tutorials will discuss aspects of user-generated-content websites and social networks and map out how to use their potential in specific practical situations.

Students will learn how to:
Set up a domain and hosting account, Install WordPress, Plan their website by choosing color schemes, fonts, layouts, and more, Search for themes in WordPress, Select, install, and activate a theme, Add posts to their website, Create website pages, Add images, photo galleries, and more, Take care of basic SEO and categories to organize their posts, Use WordPress as a content management system (CMS), Use widgets and plugins, Integrate WordPress with social media, Customize a WordPress site by editing source-code, Employ third-party applications, such as Google Analytics

The outcome is a practical group project (creation of real websites) appropriately using/combining modern new media tools in a content management system (CMS) environment, primarily Wordpress.

Reading:

RQ		Professional WordPress : design and development	Indianapolis, Indiana	Wrox	2015	9781118987186	details
RQ		Social media for WordPress [elektronický zdroj] : beginner's guide : a quicker way to build communities, engage members, and promote your site	Olton, Birmingham [England]	Packt Pub.	2012		details

RQ		Wordpress all-in-one for dummies [elektronický zdroj]	Indianapolis, Ind.	John Wiley & Sons	2013		details
RQ	NIEDERST ROBBINS, J.	Learning web design : a beginner's guide to HTML, CSS, Javascript, and web graphics	Beijing	O'Reilly	2018	978-1-4919-6020-2	details
RE		CMS security handbook [elektronický zdroj] : the comprehensive guide for WordPress, Joomla!, Drupal, and Plone	Indianapolis, Ind.	Wiley Pub.	2011		details
RE	BUREŠ, M. -- LAITA, A. -- LAURENČÍK, M.	WordPress : od základů k profesionálnímu použití	Praha	Grada Publishing	2021	978-80-271-0178-8	details
RE		Practical web design : learn the fundamentals of web design with HTML5, CSS3, Bootstrap, jQuery, and Vue.js	Birmingham	Packt	2018	9781788396455	details

MANAGEMENT of BUSINESS INFORMATICS

Information Technologies in Entrepreneurship – 4IT487, 6 ECTS

Aims of the course:

The aim of the course is to introduce the basic principles of entrepreneurship applied to projects in the field of information technology. The course will guide students through different phases of the process of preparing a startup project business plan and introduce them the innovative use of information technology for business support. Course will also present core business applications such as e -business and their integration in the architecture of the emerging small businesses.

Learning outcomes and competences:

Upon successful completion of this course, students will be able to:
- Prepare a business plan of a startup company and present to potential investors
- Understand and apply innovative use of information technology to support business
- Understand the development, functional possibilities and limits of e –business applications
- work in the larger team.

Course contents:

1. Course IT topic selection, communication tools, knowledge base creation (allowance 6/6)
   a. Course IT topic selection
   b. Communication tools
   c. Knowledge base creation

2. Entrepreneurial basics (allowance 6/6)
   a. Storytelling
   b. Lean Canvas
   c. Prototyping

3. Product and service design (allowance 6/6)
   a. Product and Service design basics
   b. Personas
   c. Customer Journey

4. Team project (allowance 6/6)
   a. MVP, prototype
   b. Validation
   c. Investor presentation outline

5. Demo Day (allowance 2/2)
   a. Final team project presentations

Reading:

RQ	LAUDON, J P. -- LAUDON, K C.	Management information systems : organization and technology in the networked enterprise	Upper Saddle River, New Jersey	Prentice-Hall	2000	0-13-015682-5
RQ	AULET, B.	Disciplined entrepreneurship : 24 steps to a successful startup	Hoboken	John Wiley & Sons	2013	978-1-118-69228-8

Software Process Improvement -4IT521, 6 ECTS

Aims of the course:

The aim of the course is to introduce software development methodologies, frameworks, standards and tools.

Learning outcomes and competences:

After successful completion of this course students will be able to use ISO/IEC 12207 process reference model, ISO/IEC 29110 standard for SW processes in very small entities, CMMI process reference model and most important IS development methodologies. Students will understand how to choose the right tool.

Course contents:

current state of IS development,
categorization of methodology elements,
ISO/IEC 12207 process reference model,
CMMI process reference model,
capability evaluation according to ISO/IEC 15504,
ISO/IEC 29110 for very small entities,
life cycle models,
IS development methodologies,
rigorous methodologies,
iterative (Rational Unified Process),
agile methodologies, especially Scrum, Feature Driven Development (FDD), Extreme programming (XP), OpenUP, Kanban,
scaling of agile methods (DAD, Less, SAFe),
selecting the right method

Reading:

RQ	FAUZI, S S M. -- NASIR, M H N M. -- RAMLI, N. -- SAHIBUDDIN, S.	Software process improvement and management : approaches and tools for practical development	Hershey	Information Science Reference	2012	978-1-61350-141-2
RQ	DORAIRAJ, S. -- GHANI, I. -- JAWAWI, D N A. -- SIDKY, A.	Emerging innovations in agile software development	Hershey	Information Science Reference	2016	978-1-4666-9858-1
RQ	CHRISSIS, M B. -- KONRAD, M. -- SHRUM, S.	CMMI for development : guidelines for process integration and product improvement	Upper Saddle River	Addison-Wesley	2011	978-0-321-71150-2
RE	MCMAHON, P E.	Integrating CMMI and agile development : case studies and proven techniques for faster performance improvement	Upper Saddle River	Addison-Wesley	2010	978-0-321-71410-7

Information Management – 4SA615, 6 ECTS

Aims of the course:
Course gives knowledge and skills for practical improvement of information management on enterprise level. Strategic schools of management are presetned at this course and its application in business. It accents modern concepts of change management, proactive strategies, re-engineering approach and learning organization.

Learning outcomes and competences:
Upon successful completion of this course, students will be able to:
• formulate strategy for enterprise informatics,
• apply concept of learning organization on corporate informatics management.

Course contents:

Lectures:
1. Concept of information management – components and thein relations
2. Innovation in ICT, business processes, ICT processes
3. Strategic management and its application in ICT management
4. Corporate informatics
5. Architecture of IS
6. Concept of multidimensional databases (OLAP) vs. relation databases (OLTP)
7. Metadata and their impact on corporate informatics management
8. Model for corporate informatics management – organization structures, proceses
9. Informatics management – enterprise informatics standards, COBIT process management model.
10. Informatics management – ITIL process management model.
11. Effectiveness and efficiency in corporate informatics management.
12. Invited lecture - Enterprise informatice management.
13. Final test.

Tutorials:
As part of the teamwork, the students perform a process analysis of the selected company with a specific focus on the information flows in the company, and on this basis then suggest appropriate ICT support for selected processes, alternatively risk analysis.

Reading:

RQ	EARL, M J.	Information management : the organizational dimension	Oxford	Oxford University Press	1998	0-19-825760-0
RQ	PORTER, M E.	Competitive advantage : creating and sustaining superior performance	New York	Free Press	2004	0-7432-6087-2
RQ	ANSOFF, H I.	Corporate strategy : an analytic approach to business policy for growth and expansion	New York	McGraw-Hill	1965	
RQ	KIM, W C. -- MAUBORGNE, R.	Blue ocean strategy : how to create uncontested market space and make the competition irrelevant	Boston	Harvard Business School Press	2005	1-59139-619-0
RQ	LAUDON, J P. -- LAUDON, K C.	Management information systems : managing the digital firm	Boston	Prentice-Hall	2012	978-0-13-214285-4
RE	BENNIS, W. G. -- GIBSON, R.: Rethinking the future : rethinking business, principles, competition, control & complexity, leadership, markets and the Word, London, Nicholas Brealey, 1998, ISBN 1-85788-108-7						
RE	HINTON, M., 2006. Introducing Information Management, the Buseiness Approach Elsevier, The Open University, 2006, ss. 205, ISBN 0-7506-6668-4						

Information Systems Audit – 4SA613, 6 ECTS

Aims of the course:

The aim of this course is to acquaint students with the development, content, tools and problems of implementation of the audit of information systems and its linkages to financial audits. It is therefore an attempt to contribute to reducing the gap between what users expect from an audit and what results they can actually receive (audit expectation gap).

Learning outcomes and competences:

Upon the successful completion, the students will be able on the base of risk analysis or other scoping procedures to refine the audit objectives, define the realistic objectives of the audit in a particular environment, select the appropriate evaluating criterion, design audit plan, realize the different types of audit / assurance (in cooperation with other professionals according to the focus of the audit), create the final audit report.

Course contents:

Lectures:
1. IS audit evolution and the role of auditor
2. Basic components and types of audit/assurance
3. Standards and IS audit (principles of EGIT, regulatory environment,assurance function perspective standards (ITAF, IPPF, SSAE), assessment perspective standards (IS security and quality standards)
4. Examples of criteria (standards) for IS security and quality assessment
5. Cobit framework, evolution, concept (Cobit 5 Business Framework, Cobit 5 Enabling Processes, Cobit 2019)
6. Cobit support of IS audit/assurance (audit process, Cobit 5 for Assurance, comparison of different frameworks)
7. Process maturity and capability assessment (CMMI, ISO 15504, Cobit 5 assessment program
8. Risk management process and its importance within the assurance engagement
9. Internal control systems of organizations (application and general controls, testing, relevance for financial audit
10. Audit documentation (audit agreement, audit documentation, audit evidence, audit report)
11. SW support of audit (CAAT, EGRC tools)
12. Examples of different types of IS audit (e.g. audit of IS department, audit of IS outsourcing (cloud computing, DB audit, chosen IT process audit, audit of project)
13. Invited lecture from practice
Tutorials:
Case studies and presentations of seminar papers

Reading:

RQ	CASCARINO, R.	Auditor's guide to IT auditing	Hoboken	John Wiley & Sons	2012	978-1-118-14761-0
RQ	CANNON, D L. -- KEELE, A. -- O'HARA, B T.	CISA : certified information systems auditor study guide	Hoboken	Sybex, a Wiley Brand	2016	978-1-119-05624-9
RQ		COBIT Focus [elektronický zdroj]				
RQ		COBIT 2019 design guide	Rolling Meadows	Information Systems Audit and Control Association	2018	978-1-60420-765-1
RQ		Cobit 2019 framework : governance and management objectives	Rolling Meadows	ISACA	2018	978-1-60420-764-4

RQ		Cobit 2019 implementation guide : implementing and optimizing an information and technology governance solution	Schaumberg	ISACA	2018	978-1-60420-762-0
RQ		COBIT 5 : enabling processes	Rolling Meadows	ISACA	2012	978-1-60420-239-7
RQ		COBIT 5 for Assurance	Rolling Meadows	Information Systems Audit and Control Association	2013	978-1-60420-340-0

RE ISACA Journal, http://www.isaca.org/Journal/Past-Issues/Pages/default.aspx

RE ITAF(IT Assurance Framework) http://www.isaca.org/Knowledge-Center/ITAF-IT-Assurance-Audit-/Pages/default.aspx

Enterprise Architecture – 4IT561, 6 ECTS

Aims of the course:

Provide complex insight in enterprise architecture, components and areas of enterprise architecture, used process and methods for its description and management. Describe relationship between architecture and enterprise goals and how to support achievement of enterprise strategy through changes of enterprise architecture.

Learning outcomes and competences:

Upon successful completion, students will be able to understand architecture of the organisation and its components in the context of corporate strategy and goals. They will be able to design the target enterprise architecture based on its current capabilities and prepare a development plan covering key areas, including IT.

Course contents:

Course syllabus:

1. Introduction, basic concepts of enterprise architecture, organisation and its architecture
2. Basics of enterprise architecture management, process, metamodel, architectural views, descriptions, architectural tools
3. Architecture vision, relation to the strategy and enterprise goals
4. Business architecture, relation to business processes and enterprise capabilities
5. Application architecture, relation to application portfolio and integration architecture
6. Data architecture, relation to Data Management
7. Technology architecture, relation to security architecture
8. Transition planning and opportunity management, relation to project management and risk management
9. Change management and requirements management, relation to ITSM
10. Architecture skills, maturity, role and personality of the architect

Study prepared in teams on enterprise architecture design supporting the achievement of the organization's goals and describing all the main architectures, including the transition plan.

Reading:

RQ	GÁLA, L. -- BUCHALCEVOVÁ, A. -- JANDOŠ, J.	Podniková architektura	Řepín	Tomáš Bruckner	2012	978-80-904661-6-6
RQ	LANKHORST, M M.	Enterprise architecture at work : modelling, communication and analysis	Berlin	Springer	2017	978-3-662-57169-9
RQ	FEUERLICHT, J.	Enterprise computing : concepts, standards and architectures	Praha	Oeconomica	2008	978-80-245-1367-6
RQ	ROBERTSON, D C. -- ROSS, J W. -- WEILL, P.	Enterprise architecture as strategy : creating a foundation for business execution	Boston	Harvard Business School	2006	1-59139-839-8

Innovations of Information Systems – 4IT568, 6 ECTS

Aims of the course:

The main goals of the course are as follows - to give the complex overview of methods and approaches applied in innovation of enterprise information systems, inc. their business effects and benefits, to apply the enterprise architecture paradigm, orientation on business services and processes. Sustainability principles are applied.

Learning outcomes and competences:

Upon successful completion of this course, students will be able to:

1. orientate in the current innovation trends of enterprise information systems (IS)
2. apply in this IS innovation the holistic approach of enterprise architecture, business services, processes and benefits
3. use potential of data offered by EUROSTAT, Czech Statistical Office and OECD in the area of enterprise IS
4. orientate in the EU funds and national programs offered to support the IS innovation, inc. ability to propose the application
5. apply the "thinking process" tools of the TOC method to create information strategy, preparation of implementation IS and measuring the effect, inc. the relations with SWOT, SPIN and Balanced Scorecard methods

Course contents:

Lectures

1. needs of economy and companies for enterprise IS
2. enterprise IS trends in information society based on the Czech Statistical Office, EUROSTAT and OECD and the potential of the EU funds
3. current trends of the enterprise IS market offer, with spec. attention to the SME and clusters, SaaS and Open Source approaches
4. functional, data and process trends of enterprise IS
5. innovation approaches to enterprise IS
6. business effects and benefits of enterprise IS
7. application of the TOC (Theory of Constraint) in enterprise IS innovation

Reading:

RQ	LAUDON, J P. -- LAUDON, K C.	Management information systems : managing the digital firm	Harlow	Pearson	2022	978-1-292-40328-1
RQ	CSIK, M. -- FRANKENBERGER, K. -- GASSMANN, O.	The business model navigator : 55 models that will revolutionise your business	Harlow	Pearson	2014	978-1-292-06581-6
RQ	MOORE, G A.	Crossing the chasm : marketing and selling disruptive products to mainstream customers	New York	Harper Business, an imprint of Haeper Collins Publishers	2014	978-0-06-235394-8
RQ	GOLDRATT, E M. -- PTAK, C A. -- SCHRAGENHEIM, E.	Necessary but not sufficient : a theory of constraints business novel	Great Barrington	North River Press	2000	0-88427-170-6

Competitive and Business Intelligence – 4IT555, 6 ECTS

Aims of the course:

Gain pre-requisites for the positions of analysts or consultants of managerial applications (directed to support business and strategic decision making), demonstrate them by interconnection of BusinessandCompetitive Intelligence tools.

Learning outcomes and competences:

Upon successful completion of this course, students will be able to design and implement Business Intelligence solution (strarting from multidimensional analysis, multidimensional cubes to client reporting). Students will be able to define information needs, find its appropriate sources, analyze found information and elaborate report to senior managers to support their strategic decisions in a Strategy or a Business Area within the organization.

Course contents:

basic principles of Business Intelligence, development in BI area,
core OLAP (On Line Analytical Processing) technologies, demonstration of principles on examples,
BI, planning and analysis
design and modeling -- principles of dimensional modeling, relationship between measures and relevant dimensions, physical design and modeling, data quality management, data granularity problems management,
Server applications solution, basic principles of MS Analysis Services, functions and options
Client applications solution, ,
Characteristics, definition and classification of CI.
Strategic management system and the importance of information in a competitive fight.
CI intelligence cycle. Information Key Topics / Questions.
Evaluation of information. Time, financial and personnel constraints, reliability and consistency of data, data anomalies, false information.
Methods and analysis tools, presentation and communication of information

Reading:

RE Efraim Turban: Business Intelligence. Prentice Hall, 2000

RE Sheila Wright (ed): Competitive Intelligence, Analysis and Strategy: Creating Organisational Agility. Routlege, 2012

MBI - list of elective courses– min. 18 ECTS

Business Process Engineering (6 ECTS) – 4IT531
Czech for Foreigners (3 ECTS) – 4SA622
Financial Management for Business Informatics (3 ECTS) – 4IT564
Gamification (3 ECTS) – 4SA661
Information Ethics and Regulation (3 ECTS) – 4SA624
Information for Business (3 ECTS) – 4SA260
Information Modelling of Organizations II (3 ECTS) – 4IT567
Introduction to Cybersecurity (3 ECTS) – 4SA617
Markup Languages and XML Technologies (3 ECTS) – 4IZ574
MS Excel Skills for Business: Fundamentals (3 ECTS) – 4IT523
New Media and Social Network Services (3 ECTS) – 4SA526
Programming for Data science in Python (6 ECTS) – 4IZ565
Text Analytics (6 ECTS) – 4IZ577
Web Analytics and Optimizations (3 ECTS) – 4IZ579
International Week courses (3 ECTS) – intensive courses in January

DATA and BUSINESS

Fundamental Analytics and Reporting – 4IT562, 6 ECTS

Aims of the course:

The course focuses on fundamental principles, use cases and problems related to Business Intelligence. The purpose is to explain the underlying theory and architectural concepts and provide environment for practical end-to-end exercise in solving business problem covering all phases such as analysis of requirements and implementation of reports on data from data warehouse integrating several source systems.

Learning outcomes and competences:

Upon successful completion of this course, students will be able to understand and will be able to discuss:
1. Purpose and value of fundamental analytics and reporting
2. Problems arising from analytical usage of data
3. Possible architectural approaches
4. Process of design and implementation of Business Intelligence solution

Students will be able to independently design and implement reporting solution based on requirements identified in an organization.

Course contents:

1. Introduction

Fundamental principles and terms, Examples of use cases (Decision support; Performance monitoring - BSC, KPIs; Planning; Eternal reporting - Regulatory requirements), Typical problems (Inconsistent results from various systems; Inconsistent understanding of reported results; Data quality), Architecture and components (DWH; ETL; Reporting / Dashboarding; Self-service BI; Data Lake; OLAP / OLTP), Exercise (Introduction of a sample company, problem at hand and IS/ICT environment; Tasks - Business requirements identification, Indicators and dimensions identification, Design of target solution high-level architecture)

2. Architecture

Kimball / Inmon approach, EDWH layers (purpose and data modelling), ETL / ELT, Reporting, Data Vault (Agile DWH development), Principles of reports design, Exercise (Design of reports based on identified requirements; Identification of required data in source systems; Reports functional specifications; Design and implementation of DWH Core layer)

3. Data pumps

Tools and approaches for implementation of ETL / ELTs, Operational requirements, SQL Server Integration Services, Exercise (Design and implementation of Data mart; Implementation of Stage layer load; Implementation of Core layer load)

4. OLAP, SSBI

OLAP, MDX – principles, Self-service reporting tools, Exercise (Finalization Core layer load; Implementation of Data mart load)

5. OLAP, reporting

SQL Server Analysis Services, Reporting tool, Exercise (OLAP cubes implementation; Reports implementation)

6. Summary

Presentation of exercise outputs, Summary of the course

Reading:

RE LINSTEDT, Daniel a Michael OLSCHIMKE. Building a scalable data warehouse with Data Vault 2.0. Waltham, Massachusetts: Morgan Kaufmann, [2016]. ISBN 0128025107.

RE SLÁNSKÝ, David. Data and Analytics for the 21st Century: Architecture and Governance. Praha: Professional Publishing, [2018]. ISBN 978-80-88260-16-5.

Architecture of Business Analytics – 4IT563, 3 ECTS

Aims of the course:

The course focuses on the specification and explanation of basic building blocks in the field of architectural business of the analytical both theoretical and practical. The purpose is to clarify the different types of architectures in BA, their principles and characteristics, and their derived approaches by stealing. Further understand data, data sources, data structures, and access to and use of data.

Learning outcomes and competences:

Upon successful completion of this course, students will be able to discuss:

1. Basics of Data Architect job profile
2. Data Architecture Benefits for the Organization
3. Individual types of data architecture, principles of data architecture and characteristics of data architecture
4. Procedures for designing basic building blocks of business architecture
5. What aspects need to be addressed in the context of building and managing business architecture of business analysts
6. How Clearly and Properly Defined Architecture Helps to Sustain Business Analyst Business Development

Course contents:

Block 1
* Introduction to the course
* Getting to know the architecture in detail
1. Business: Basic acquaintance, influence on BA, influence on other layers of architectures
2. Application: Basic acquaintance, influence on BA, influence on other layers of architectures
3. Data / information: Basic acquaintance, influence on BA, influence on other layers of architectures
4. Technological: Basic acquaintance, influence on BA, influence on other layers of architectures
5. Enteprise architecture and solution architecture: Basic delimitation and differences
6. Architecture standards: Architectural Standards - DAMA, ISO, Certification

Block 2
* Data types - structured, unstructured, etc.
* Data / Information Architecture
1. Purpose, use in BA solution, 2. Data modeling, 3. Relevant components (DWH, Data Lake, ETL, MDM, metadata tools, ODS, IoT), 4. Data principles - data structures, data categories, usability in BA tasks
Block 3
* Architecture of Key Support Areas:
1. Data quality, 2. Master Data Management, 3. Reference Data Management, 4. Metadata Management
Block 4
1. Unstructured data, 2. Big Data, 3. Specific data sources, 4. Data Management Tools
Block 5
1. Operations, 2. Security, 3. Maturity assessment
Block 6
* Preparation of a case study on a selected topic
1. finance - banks / insurance companies, 2. pharmacy / healthcare, 3. industry, 4. retail, 5. energy / utility, 6. telco

Reading:

RQ	JOHN, T. -- MISRA, P.	Data lake for enterprises : leveraging lambda architecture for building enterprise data lake	Birmingham	Packt Publishing	2017	978-1-78728-134-9
RQ	BRACKETT, M H.	Data sharing : using a common data architecture	New York	John Wiley & Sons	1994	0-471-30993-1

Probability and Mathematical Statistics I – 4ST621, 6 ECTS

Aims of the course:

The course is designed for all students interested in deepening their knowledge of statistical concepts in the English language. The aim of the course is to get students acquainted with the elements of probability and mathematical statistics.

Learning outcomes and competences:

After a successful completion of this course, students will be able to apply
the most important probability and statistical methods.

Course contents:

The course gives an introduction to the fundamental elements of the theory of probability and mathematical statistics. It covers the following areas:
- concept of probability,
- random variables,
- probability distributions,
- multidimensional random variables,
- discrete distributions,
- continues distributions,
- limit theorems,
- estimation of parameters,
- confidence intaervals,
- hypothesis tests.

Reading:

RQ	WEISS, N A.	Elementary statistics	Boston	Addison-Wesley	2012	978-0-321-70998-1	details
RQ	ANDERSON, D R. -- SWEENEY, D J. -- WILLIAMS, T A.	Statistics for business and economics	Saint Paul	West Publishing	1990	0-314-66500-5	details
RQ	ROSS, S M.	A first course in probability	Boston	Pearson	2014	978-0-321-79477-2	details

Machine Learning I – 4IZ576, 6 ECTS

Aims of the course:

The aim of the course is to provide introduction to main machine learning methods. The course will provide an overview of detailed understanding of representative selection of algorithms addressing individual machine learning tasks. In the practical part, the students will work with available machine learning software systems.

Learning outcomes and competences:

Upon successful completion of the course, students will be able to understand principles of selected methods of knowledge discovery in databases and machine learning (clustering, classification, association rule discovery, model evaluation). The knowledge gained in the course can be applied in a range of applications for automating decision processes.

Course contents:

• Introduction to machine learning.
• Machine learning tasks.
• Data preprocessing
• Decision tree learning (goodness criteria, pruning, continuous attributes, limitations).
• Bayesian methods (Bayesian networks, Naive Bayes).
• Memory-based learning (distance measures, K Nearest Neighbour).
• Introduction to Support Vector Machines and neural networks.
• Introduction to Clustering (distance measures, hierarchical and non-hierarchical approaches).
• Association rule learning (Apriori, FP-Growth, AMIE).
• Evaluation.

Reading:

RQ	FRANK, E. -- HALL, M A. -- PAL, C J. -- WITTEN, I H.	Data mining : practical machine learning tools and techniques	Amsterdam	Elsevier	2017	978-0-12-804291-5
RQ	FRIEDMAN, J H. -- HASTIE, T. -- TIBSHIRANI, R.	The elements of statistical learning : data mining, inference, and prediction	New York	Springer	2009	978-0-387-84857-0
RE	GUIDO, S. -- MÜLLER, A C.	Introduction to machine learning with Python : a guide for data scientists	Beijing	O'Reilly	2017	978-1-449-36990-3
RE		Mastering machine learning with scikit-learn : learning to implement and evaluate machine learning solutions with scikit-learn	Birmingham, England	Packt	2017	9781788298490
RE		Python machine learning : machine learning and deep learning with python, scikit-learn, and tensorflow 2	Birmingham, England	Packt	2019	9781789958294
RE	RASCHKA, S.	Python machine learning : unlock deeper insights into machine learning with this vital guide to cutting-edge predictive analytics	Birmingham	Mumbai	2015	978-1-78355-513-0
RE	JOSHI, P.	Python machine learning cookbook : 100 recipes that teach you how to perform various machine learning tasks in the real world	Birmingham	Packt Publishing	2016	978-1-78646-447-7

Neural Network and Deep Learning – 4IZ578, 3 ECTS

Aims of the course:

The aim of the course is to provide students with theoretical knowledge and practical skills in the field of artificial neural networks and their applications in text and image data processing. The course will focus on basic principles of neural network functioning and applications of deep neural networks in Python.

Learning outcomes and competences:

Upon successful completion of the course, students will be able to explain the basics of artificial neural networks (biological vs. artificial neural networks, simple perceptron, multilayer perceptron, learning process of artificial neural networks, principles of primary activation, and loss functions) and deep neural networks (convolutional networks, data augmentation, transfer learning, and recurrent networks). Next, students will be able to apply (deep) neural networks for text and image data processing in Python.

Course contents:

• Biological neural networks and artificial neural networks.
• Simple Perceptron and Multilayer Perceptron.
• Learning algorithm for artificial neural networks.
• Activation functions (linear, sigmoid, hyperbolic tangens, ReLU, softmax).
• Loss functions (MSE, Cross Entropy, Hinge Loss).
• Practical considerations of artificial neural network learning (Regularizations, Dropout).
• Artificial neural networks and textual data.
• Word Embeddings and Word2Vec.
• Recurrent neural networks (RNN and LSTM).
• Artificial neural networks and image data.
• Convolutional neural networks, data augmentation, and transfer learning.
• Deep Learning and text generation.

Reading:

RE	SKANSI, S.	Introduction to deep learning : from logical calculus to artificial intelligence	Cham	Springer	2018	978-3-319-73003-5
RE	BENGIO, Y. -- COURVILLE, A. -- GOODFELLOW, I.	Deep learning	Cambridge, Massachusetts	The MIT Press	2016	978-0-262-03561-3

Big Data Processing – 4IT559, 3 ECTS

Aims of the course:

The course focuses on big data processing and the specifics of machine learning in the case of big data.

Learning outcomes and competences:

Upon successful completion of the course, students will be able to pre-process big data and use programming tools designed for big data machine learning.

Course contents:

1. Introduction to big data: Big data characterization, Where and when big data is useful, Introduction to big data technology

2. Introduction to Spark: From Hadoop to Spark, Evolution of the Apache Hadoop and the Apache Sparks, Spark technology stack, Spark API, Spark logical and physical architecture

3. (Py)Spark architecture: Introduction to PySpark internal architecture, Introduction to RDD, Introduction to spark streaming

4. Introduction to programming in Pyspark: Creating and managing a Spark session, Viewing and basic data manipulation, Introduction to the Koalas package

5. Spark data manipulation: Exploratory data analysis using PySpark, Data transformation and feature engineering, Introduction to the machine learning pipeline, Machine learning models and hyper-parameter optimization

Reading:

RE Ganelin, Ilya, et al. Spark: Big data cluster computing in production. John Wiley & Sons, 2016.

RE Guller, Mohammed. Big data analytics with Spark: A practitioner's guide to using Spark for large scale data analysis. Apress, 2015.

RE Karau, Holden, et al. Learning spark: lightning-fast big data analysis. " O'Reilly Media, Inc.", 2015.

Management of Data and Analytics for Business – 4IT565, 6 ECTS

Aims of the course:

The course focuses on management of data and analytics that is strictly aligned with business needs. It covers methods of alignment with business goals, management of services aimed at data utilization, management of projects in data and analytics field and management of financial and organizational aspects of data and analytics applications. Finally, Data Governance and Data Management are discussed as necessary requirement of sustainable practice of using data to support business in an organization.

Learning outcomes and competences:

Upon successful completion of this course, students will be able to understand and discuss:

1. Necessities of management of data and analytics alignment with goals of an organization and how to achieve it
2. Approaches to manage data-oriented services
3. Which organizational aspects are crucial with respect to data management, what are the necessary roles and responsibilities, that need to be established in an organization and for what purposes
4. How metadata support sustainable development of data environment in an organization
5. What are the specifics and options in management of data-oriented projects

Course contents:

1. Strategy and business-IT alignment, Strategy of data and analytics – contents and relationships to other components of an organization

2. Services management: Design and implementation of data and analytics services, Evaluation of quality of services, Sourcing (sourcing strategy, tenders, RFPs), Operations of business analytics environment, Technological resources – analysis, evaluation, configuration

3. Organizational aspects: Management of human resources for business analytics, Management of relationships with external partners, Organizational aspects impacting Agile architectures and Cloud / hybrid environment applicability

4. Data Governance & Data Management: Data Governance principles, areas of Data Management, Data Management goals definition in relation with organizational goals and stratégy, Roles in Data Management, data ownership, identification of business requirements on data and their quality, Metadata management

5. Principles and specifics of management of business analytics projects, Project phases and specifics of data-related projects

6. Financial aspects: Management of business analytics economy, Cost calculations, specifics of economic and non-economic effects resulting from business analytics application, Infonomics and Data monetization

Reading:

RE BOTHE, Ondřej, et al. Data Analytics Initiatives: Managing Analytics for Success. CRC Press, 2022. ISBN 9781032208510

RE INTERNATIONAL, Dama. DAMA-DMBOK: Data Management Body of Knowledge. Technics Publications, 2017. ISBN 9781634622349.

Competitive Intelligence – 4IT566, 3 ECTS

Aims of the course:

Competitive Intelligence (CI) is one of the key processes of businesses and organizations in the context of their ability to respond to market and societal changes. From a lifecycle perspective, it is a continuous process that is based on relevant Key Intelligence Questions and Key Intelligence Topics followed by the identification of primary data and information sources that provide inputs for situation analysis, synthesis of intelligence conclusions including reporting. Among other things, students will learn about Technology Intelligence (TECHINT) and the relationship between competition and intellectual property protection. Specifically, the role of patent protection in society, their importance to businesses, and the use of patent data to obtain critical technological information about competitors, including identifying technology trends.

Learning outcomes and competences:

Upon successful completion, students will be able to identify key corporate and institutional information needs, navigate and effectively search two critical web layers (surface web, deep web), use information sources for the collection phase, analyze the data and information obtained, and synthesize the data for decision making. Within the TECHINT processes, students will be able to work with database systems with a focus on the process of retrieval of patent, trademark, industrial and utility model data, including the use of classification schemes in these systems. These topics will be discussed in terms of advanced search methods in CI.

Course contents:

1. Competitive Intelligence: an introduction to the study
This introductory lecture introduces the principles and methods of Competitive Intelligence (CI), including case studies of technology companies.
2. The Intelligence Cycle
The genesis of the intelligence cycle and its role in the security policy community, then its transformation into the business environment.
3. Information entities
The data, information, and knowledge within each stage of CI and its impact on business decision-making.
4. Weak signals
The theory and nature of weak signals as information entities enabling the detection of megatrends (market, societal, technological) in order to strategically exploit these opportunities, eventually defending and preventing an enterprise against potential emerging risks
5. Web environments & information resources
The evolution of the external information environment, the emergence of significant industry resources and the web, including their impact on the business environment.
6. Search strategies and tactics
The ability to determine the business information need, identify relevant information sources, and conduct specific search tactics in relation to the recall and precision of the document sets searched.
7. Database Vendors
Overview of the major database vendors, analysis of search capabilities, analysis of document structure, and ability to leverage them within CI processes.
8. Information-seeking behavior
Analysis of human factors in information retrieval, risks, and opportunities within the contemporary information world from the perspective of data, information, and knowledge retrieval.
9. Technology Intelligence
Introduction to patent law and protection of inventions, trademarks, industrial and utility designs. Overview of classification systems and information sources for TECHINT.

Reading:

RQ	KAHANER, L.	Competitive intelligence : how to gather, analyze, and use information to move your business to the top	New York	Simon & Schuster	1997	0-684-84404-4	details
RQ		Early warning [elektronický zdroj] : using competitive intelligence to anticipate market shifts, control risk, and create powerful strategies	New York	AMACOM	2004		details

RE BRENNER, Merrill, 2005. Leveraging Analysis and Collection Techniques. Competitive Intelligence Magazine [online]. 8(3), 6–19 [vid. 2017-09-25]. Avail. from: https://www.thevantagepoint.com/resources/articles/CI_May-Jun_05_Brenner.pdf

RE PORTER, Michael E., 2008. The five competitive forces that shape strategy. Harvard Business Review [online]. 86(12), 143. ISSN 00178012. Avail. from: doi:10.1111/j.0955-6419.2005.00347.x

RE ZHANG, Yi, Douglas K.R. ROBINSON, Alan L. PORTER, Donghua ZHU, Guangquan ZHANG a Jie LU, 2016. Technology roadmapping for competitive technical intelligence. Technological Forecasting and Social Change [online]. 110, 175–186. ISSN 00401625. Avail. from: doi:10.1016/j.techfore.2015.11.029

Machine Learning 2 – 4IT569, 6 ECTS

Aims of the course:

The course focuses on expanding extending the knowledge of the subject Machine Learning 1. The theoretical foundations of individual machine-learning methods and their real application in case studies, including interpretation of results, will be taught in the course.

Learning outcomes and competences:

Upon successful completion of the course, students will be able to understand principles of selected methods of machine learning (ensemble models, shallow neural networks) and tools for interpretability of the model results.

Course contents:

1. Ensemble methods in regression and classification tasks
2. Bootstrap in machine learning
3. Support vector machines
4. Loss functions and its optimization
5. Optimization of hyper-parameters
6. Boosting and basis expansion, forward stage-wise additive modelling
7. Gradient boosting machine
8. Stochastic gradient boosting machine
9. Extreme gradient boosting
10. Neuron, activation functions, weights
11. Shallow neural networks – architecture, fitting and optimization
12. Machine learning and missing values
13. Categorical variables encoding
14. Case studies for regression problems
15. Case studies for classification tasks
16. Propensity models and calibration curves

Reading:

RQ	FRIEDMAN, J H. -- HASTIE, T. -- TIBSHIRANI, R.	The elements of statistical learning : data mining, inference, and prediction	New York	Springer	2009	978-0-387-84857-0
RQ	BENGIO, Y. -- COURVILLE, A. -- GOODFELLOW, I.	Deep learning	Cambridge, Massachusetts	The MIT Press	2016	978-0-262-03561-3
RE	GÉRON, A.	Hands-on machine learning with Scikit-Learn, Keras and TensorFlow : concepts, tools, and techniques to build intelligent systems	Beijing	O'Reilly	2019	978-1-4920-3264-9

DAB - list of elective courses– min. 18 ECTS

Business Process Engineering (6 ECTS) – 4IT531
Czech for Foreigners (3 ECTS) – 4SA622
Gamification (3 ECTS) – 4SA661
Information Ethics and Regulation (3 ECTS) – 4SA624
Information for Business (3 ECTS) – 4SA260
Information Modelling of Organizations II (3 ECTS) – 4IT567
Markup Languages and XML Technologies (3 ECTS) – 4IZ574
MS Excel Skills for Business: Fundamentals (3 ECTS) – 4IT523
New Media and Social Network Services (3 ECTS) – 4SA526
Programming for Data Science in Python (6 ECTS) – 4IZ565
Text Analytics (6 ECTS) – 4IZ577
Web Analytics and Optimizations (3 ECTS) – 4IZ579
International Week courses (3 ECTS) – intensive courses in January