MSc Study program: **COMPUTER AND SOFTWARE ENGINEERING**

Overview of Courses in Study Program

1st year: Computer and Software Engineering						
1st semester			Hours/week			
No	M/E	Course	L	NE	LE	ECTS
1.	M	Advanced algorithms	3	0	2	6
2.	M	Data preparation and visualization	3	0	2	6
3.	M	Artificial Intelligence	3	0	2	6
4.	M	Information Security	3	0	2	6
5.	M	Software Analysis and Design	3	0	2	6
2nd semester			Hours/week			
No	M/E	Course	L	NE	LE	ECTS
1.	M	Machine Learning	3	0	2	6
2.	M	Service Oriented Computing	3	0	2	6
3	M	Semantic Web	3	0	2	2
4.	M	Methodology of Scientific Research	3	0	2	6
4.&5. *Select one of the following electives*						
	E	System Programming	3	0	2	6
	E	Nature-Inspired Algorithms	3	0	2	6
	E	Internet of Things	3	0	2	6
	E	Analysis of Networks	3	0	2	6
	E	Image Processing	3	0	2	6

2nd year: Computer and Software Engineering						
3rd semester			Hours/week			
No	M/E	Course	L	NE	LE	ECTS
1.	M	Parallel Architectures and Programming	3	0	2	6
2.	M	Resource Management in Cloud Computing	3	0	2	6
3.	M	Internship Innovation Project	2	0	0	6
4.&5. *Select two of the following electives*						
	E	Natural Language Processing	3		2	6
	E	e-Governance	3		2	6
	E	Embedded System Programming	3		2	6
	E	Seminar in Data Science	3		2	6
	E	Seminar in Cyber Security	3		2	6
	E	Real Time Systems	3		2	6
	E	Seminar on Algorithms and Data Structures	3		2	6
	E	Big Data Analytics	3		2	6
	E	Intelligent Multimedia Systems	3		2	6
	E	Human Resource Management	3		2	6
	E	Strategic Management	3		2	6
4rth semester						
No	M/E	Course	L	NE	LE	ECTS
1.	M	Master's thesis	-	-	-	30*

**The thesis mentor is nominated by the Department and appointed by the Faculty Council.*

Further requirements and clarifications regarding the study program:

- Total workload for one academic year is 60 ECTS - credits.
- In the second and third semester, in addition to the obligatory courses (O), elective courses (E) are offered.
- After choosing a particular elective course (E), it becomes an obligatory course, so neither the student nor professor will be able to change the course.
-
- In the third semester, it is obligatory that the student choses one of the non-technical courses, i.e., either "Human Resource Management" or "Strategic Management".

Comparability of the proposed program with those offered from other universities:

Our study program is based on IEEE and ACM recommendations for the Computer Engineering study program, see link:

https://ieeecs-media.computer.org/assets/pdf/ce2016-final-report.pdf

Whereas, from the universities of the region we have taken as an example:

1. University of Zagreb
   - https://www.fer.unizg.hr/en/study_programs/undergraduate_study/computing, similarity 70-80%

2. Technical University of Vienna
   - https://tiss.tuwien.ac.at/curriculum/public/curriculum.xhtml?dswid=7221&dsrid=430&key=46100, similarity 70-80%

Short course descriptions

Course title: Advanced Algorithms

Lecturer: Prof. Asoc. Dr. Kadri Sylejmani

Course status: Mandatory, Semester I, 6 ECTS

Course goal: Course provides advanced knowledge about major algorithms and data structures techniques.

Learning outcomes: On successful completion of the course, students will be able to:

1. Use advanced divide and concur algorithm techniques;
2. Use advanced space for time algorithm techniques,
3. Use hashing techniques,
4. Use linked lists;
5. Know algorithms about pattern matching in texts;
6. Use techniques from linear programming;
7. Use techniques from dynamic programming;
8. Apply combinatorial search methods.

Course content: Advanced divide and concur techniques. Advanced space for time techniques. Hashing techniques. Linked lists. Graph Algorithms. Pattern matching in texts. Linear programming. Dynamic programming. Combinatorial Search.

Methods of teaching: 45 hours of lectures + 30 hours of laboratory exercises. Approximately 80 hours of personal study and exercise including homework.

Grading System: Attendance and classroom activity 10%, Practical assignments 30 %, Final Exam 60 %

Literature:

- Algorithms, 4th Edition (2011), Robert Sedgewick, Kevin Wayne, Pearson
- Algorithmic Puzzles 1st Edition (2011), Anany Levitin, Maria Levitin, Oxford University Press,
- Deterministic Operations Research: Models and Methods in Linear Optimization (2010), David J. Rader, Wiley

Course title: Data preparation and visualization
Lecturer: Prof. Dr. Lule Ahmedi
Course status: Mandatory, Semester I, 6 ECTS

The goal: This course covers preparation of data for the analysis using machine learning techniques, as well as their visualization before, throughout and after the analysis.

Learning outcomes: Upon completion of this course, the student shall be able to:

1. Understand and deploy appropriate techniques to gather and prepare data for certain analysis.
2. Visualize data for exploration, and the analysis' output data.
3. Interpret the visualization.
4. Recognize and treat distinct analysis problems due to data.

Course content: Data gathering: access to data (APIs), regular expressions, crawling, crowdsourcing. Pre-processing for data analysis preparation: types of data, data quality, integration, aggregation, sampling, cleaning, empty values and sparse data, dimensionality reduction. feature subset selection, feature creation. discretization and binarization, transformation. Outlier detection. Skewed class data. Data volume importance. Measures of similarity and dissimilarity. Avoiding false discoveries. Data exploration: summary statistics, multivariate summary statistics. Data visualization: visualization according to type of data, static and interactive visualization, visualizing higher-dimensional data, dashboards and storyboarding, different visualization libraries and tools.

Methods of teaching: 30 hours of lectures + 30 hours of laboratory exercises. Approximately 80 hours of personal study and exercise including project work.

Grading System: Project assignment 3 x 20% = 60%. Final Exam 40 %.

Literatura bazë:

- Introduction to Data Mining (2nd Edition). Pang-Ning Tan, Michael Steinbach, Anuj Karpatne, Vipin Kumar. Pearson, 2018.
- Principles of Database Management: The Practical Guide to Storing, Managing and Analyzing Big and Small Data (1st Edition). Wilfried Lemahieu, Bart Baesens, Seppe vanden Broucke. Cambridge University Press. 2018.
- Mining of Massive Datasets (2nd Edition). Jure Leskovec, Anand Rajaraman, Jeff Ullman. Cambridge University Press. 2014

Course title: Artificial Intelligence

Lecturer: Dr.sc. Nysret Musliu

Course status: Mandatory, Semester I, 6 ECTS

The goal: The objective of this course is to give a broad introduction to core concepts of artificial intelligence (AI), including problem solving and search, constraint satisfaction problems and techniques, heuristic algorithms, AI and game playing, and machine learning.

Learning outcomes:

A student completing this course should:

1. be able to explain and use exact problem solving techniques in artificial intelligence
2. understand heuristic techniques and be able to apply them for solving different problems
3. understand concepts of machine learning and be able to explain supervised machine learning techniques
4. be able to apply supervised machine learning techniques in real-life applications
5. be able to implement small intelligent systems, which are based on artificial intelligence techniques

Course content: Topics include: intelligent agents, problem solving and search, constraint satisfaction problems and constraint programming techniques, heuristic techniques, AI and game playing, machine learning concepts, and supervised machine learning techniques.

Methods of teaching: Lectures, labs, demonstration of artificial intelligence applications, assignments/projects.

Grading System:

Final exam (50%), Assignments/Projects (50%)

Literature:

- Artificial Intelligence: A Modern Approach (Third Edition) by Stuart Russell and Peter Norvig; 2009

Course title: Information Security

Lecturer: Prof. Dr. Blerim Rexha

Course status: Mandatory, Semester I, 6 ECTS

The goal: This course provides a broad view of information assurance and security concepts, to appreciate the importance of information security, it provides knowledge to advanced cryptographic algorithms, protection of information assets; access to information system; legislation and industrial standards.

Learning outcomes: This course will prepare students to:

1. Information, Information Systems and Management Information Systems,
2. Identify threats to a computer network: intrusion, Denial of Service, attacks, and malware.
3. Information Security challenges brought about by computers and the Internet.
4. Importance of protecting information assets.
5. Information Security terminology and advanced cryptographic algorithms.
6. Database and database security.
7. Software and Operating System Security.

Course content: Information, Information Systems and Management Information Systems; Information Security awareness: Training, Education, Profession opportunities; Basic Information Security terminology: Confidentiality, Integrity, Availability, Authentication and Authorization, Configuration and control, Auditing, Policies, Risk Management; Passwords vs. Crypto keys, Database and database security, Information Security Countermeasures: Procedures, Industrial Practices, Physical Access, Software and operating system security, Security and AI

Methods of teaching: 45 hours of lectures + 30 hours of laboratory exercises. Approximately 80 hours of personal study including home/group project assignments seminars and seminar work in English language.

Grading System: Classroom Assessment 10%, Projects 40%, Final assessment 50 %

Literature:

- Mark Stamp, Information Security – Principles and Practice, Wiley, 2nd Edition, 2011
- Merkow, M, Breithaupt, J, Information Security: Principles and Practices Prentice Hall ISBN: 0-13-154729-1, 2006
- Cryptography and Network Security, by William Stallings, ISBN=0-13-187316-4, published by Prentice Hall, 2006.

Course title: Software Analysis and Design

Lecturer: Prof. Ass. Dr. Dhuratë Hyseni

Course status: Mandatory, Semester I, 6 ECTS

Course goal: This course enables students to prepared and successfully apply the concepts and techniques of design and software analysis.

Learning outcomes: On successful completion of the course, students will be able to:

1. Design, develop, and analyse software systems;
2. Problem analysis,
3. Requirements gathering and specification;
4. Use case analysis;
5. Understand the principles and tools of systems analysis and design;
6. Construct, integrate, and apply knowledge from instruction and experience;
7. Think critically and creatively in seeking solutions to practical and theoretical problems.

Course content: Software Systems Analysis and Design Fundamentals: systems, roles and development methodologies. Understanding and modelling organizational systems. The system development life cycle, Using CASE tools. Depicting system graphically, determining feasibility, activity planning and control. Information requirements analysis: Sampling and investigating data, interviewing, using questionnaires, agile modelling and prototyping. The analysis process: Using data flow diagram; using data dictionaries. Describing process specifications and structured decisions; the system proposal. The essentials of design: designing output; designing input. Designing the file or database. Designing the user interface. Designing data. Documenting the design. Software engineering and implementation: Quality assurance through software engineering. Implementing the information system.

Methods of teaching: 45 hours of lectures + 30 hours of laboratory exercises. Approximately 80 hours of personal study and exercise including homework.

Grading System:

Attendance 10%, Practical project 30 %, Final Exam 60 %

Literature:

- Kenneth E. Kendall and Julie E. Kendall, "Systems Analysis and Design", 9th Edition, 2014
- Alan Dennis, Barbara Haley Wixom, Roberta M. Roth, "Systems Analysis and Design", 7th Edition, 2018

Course title: Machine learning

Lecturer: Prof. Dr. Lule Ahemdi

Course status: Mandatory, Semester II, 6 ECTS

The goal: This course provides a broad coverage of machine learning and its whole cycle from theory to different methods/algorithms to applications.

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

1. Define and solve typical machine learning algorithms and implement them.
2. Decide which methods/algorithms of machine learning are appropriate for which type of learning problems, i.e. know about their most important weaknesses and advantages.
3. Understand how a machine learning works in its depth.
4. Know how to evaluate a model, recognise typical problems and suggest solutions and improvements.

Course content: Well-established and recent topics in the field: 1. Supervised learning: Linear regression with one and multiple variables. Classification. Logistic regression. Multiclass classification. Neural networks. Backpropagation algorithm. Support Vector Machines (SVM). Kernels. 2. Unsupervised learning: k-Means algorithm for clustering. Dimensionality Reduction. Principal Components Analysis. 3. Learning theory: Cost function. Gradient descent. Overfitting and underfitting. Regularization. Data volume. Non-linear hyphothesis. Skewed classes. Anomaly detection. Multivariate Gaussian distribution. Evaluating a hypothesis. 4. Deep neural networks. Parameters vs Hyperparameters. Convolutional Neural Networks. 5. Applications of machine learning: Autonomous driving. Bioinformatics. Natural language and image processing. Speech recognition.

Methods of teaching: 45 hours of lectures + 30 hours of laboratory exercises. Approximately 80 hours of personal study and exercise including project work.

Grading System: Project assignment 3 x 20% = 60%. Final Exam 40 %.

Literature:

- Pattern Recognition and Machine Learning. Christopher Bishop. Springer, 2006.
- Pattern Classification (2nd edition). Richard Duda, Peter Hart, David Stork. John Wiley & Sons, 2001.
- Machine Learning. Tom Mitchell. McGraw-Hill, 1997.
- Introduction to Data Mining (2nd Edition). Pang-Ning Tan, Michael Steinbach, Anuj Karpatne, Vipin Kumar. Pearson, 2018.
- Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems (1st Edition). Aurélien Géron. O'Reilly Media, 2017.

Course title: Service Oriented Computing

Lecturer: Prof. Dr. Isak Shabani

Course status: Mandatory, Semester II, 6 ECTS

Course goal: The course prepares the students for design, development, and analysis systems based on service-oriented computing. Students are prepared to apply REST and RESTful principles in design of high-performance, scalable, and secure web services. In addition, students are prepared to analyse how existing web services fit into REST principles and derive redesign. Students gain practical knowledge about design and implementation of web servers, web clients, web proxies, and asynchronous web services based on contemporary Web socket protocol.

Learning outcomes: On successful completion of the course, students will be able to:

1. Define service as a software artefact and distinguish services from objects and components,
2. Identify protocol and standard stack in service-oriented computing,
3. Define the procedure of development of distributed systems based on reuse of existing services,
4. Explain coordination and management of service-oriented systems,
5. Explain service composition based on semantic descriptions,
6. Estimate and evaluate security and fault tolerance of service-oriented systems.

Course content: Introduction to service oriented computing. Service oriented programming and engineering. Web service implementation using WS-* standards: SOAP, WSDL and XML. REST and RESTful Web services. Enterprise and business applications. Principles of design and implementation of high-performance, scalable, and secure Web services. HTTP, Ajax, and Web socket protocol. REST architectural style. Design and implementation of RESTful web services and REST API. Security in service oriented systems. Quality of service in service oriented systems. Micro-services architecture.

Methods of teaching: 45 hours of lectures + 30 hours of laboratory exercises. Approximately 80 hours of personal study and exercise including homework.

Grading System: Attendance 10%, Practical project 30 %, Final Exam 60 %

Literature:

- B. Karakostas & Y. Zogios, (2008), Engineering Service Oriented Systems: A Model Driven Approach
- L. Richardson, M. Amundsen & S. Ruby, (2013) RESTful Web APIs: Services for a Changing World
- B. M. Balachandar, (2017), RESTful Java Web Services - Third Edition
- F. Halili (2018), Software Engineering - A perspective on Service Oriented Computing

Course title: Semantic Web

Lecturer: Prof. Dr. Lule Ahmedi

Course status: Mandatory, Semester II, 6 ECTS

The goal: The Internet is on the verge to make the vision of the Semantic Web a reality. In Semantic Web, almost every single resource ever including people (their profiles) is anchored to the Web, and made explicit and understandable not only by humans but also by machines. This new Web thus ensures quick, accurate and enhanced web search among others when compared to the traditional Web. In this course, we will examine this exciting area by developing diverse semantic-aware applications.

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

1. Demonstrate familiarity with different paradigms of modeling and manipulating data with less semantics to those with semantics as to be understood by computing machines.
2. Apply concepts and technologies of Semantic Web to develop non-traditional applications which infer new knowledge out of already known data / knowledge.

Course content: Topics to cover include: Simple ontologies in RDF and RDF Schema; OWL ontologies; The extension of OWL: OWL 2; Queries on Semantic Web: SPARQL; Rules in Semantic Web: SWRL and RIF; Identifiers and hyper-links in Semantic Web; Exporting databases, XML, etc. into RDF/RDF Schema/ontologies; Linked Data; Beyond fundamentals: applications.

Methods of teaching: 45 hours of lectures + 30 hours of laboratory exercises. Approximately 80 hours of personal study and exercise including project work.

Grading System: Project assignment 3 x 20% = 60%, Final Exam 40 %

Literature:

- Foundations of Semantic Web Technologies. P. Hitzler, S. Rudolph and M. Krötzsch. Chapman & Hall, 2009.
- Semantic Web Programming. John Hebeler, Matthew Fisher, Ryan Blace, Andrew Perez-Lopez, Mike Dean. Wiley, 2009.
- A Semantic Web Primer (2nd edition). Grigoris Antoniou, Frank van Harmelen. The MIT Press, 2008.

Course title: Methodology of scientific research

Lecturer: Prof. Ass. Dr. Dhuratë Hyseni

Course status: Mandatory, Semester II, 6 ECTS

The goal: To introduce some key elements of research methodology to first time research students, how to apply new methods and to use different software tools.

Learning outcomes: At the end of this course, the students should be able to:

1. understand some basic concepts of research and its methodologies,
2. identify appropriate research topics,
3. select and define appropriate research problem and parameters,
4. prepare a project proposal (to undertake a project),
5. organize and conduct research (advanced project) in a more appropriate manner,
6. write a research report and thesis, write a research proposal (grants).

Course content: Overview of experimental and engineering methodological approaches to research; Basics of research design (e.g., hypothesis formulation); The research process: documenting research, sources of information, research funding, creativity and intellectual discovery; Guidelines and a framework for efficient development of research; legal and ethical issues; protecting and exploiting research; Intellectual Property rights; Managing the research project: supervision, planning and organization; problems and pitfalls; Presentation skills (written, oral); Use of relevant research tools (technology, experimental infrastructure, mathematical methods, etc.).

Methods of teaching: 45 hours of lectures + 30 hours of lab exercises. Approximately 75 hours of personal study including home/group project assignments.

Grading System: Classroom Assessment 10%, and two projects 90%,

Literature:

- Kothari B.L., "*Research Methodology: Tools and Techniques*", New Age International Publishers, 2009.
- Boot C. W., "*The Craft of Research*", University Of Chicago Press, 2008.

Course title: Systems Programming

Lecturer: Dr.sc. Idriz Smaili

Course status: Elective, Semester II, 6 ECTS

The goal: The objective of this course is to provide the students with the

knowledge needed for system programming. The issues addressed in this course are: thread/process manipulating, system i/o (input/output), memory management, file system, signals, mutexes, semaphores, pipes, sockets, etc. The open-source GNU development platform will be used on a Linux (Ubuntu/Debian) or Unix (open source Solaris) machine.

Learning outcomes: On completion of this course, students shall:

1. have knowledge about system programming,
2. have knowledge manipulating with threads/processes,
3. be able to apply an inter-task (thread/process) synchronization (semaphores or mutexes) or communication mechanism (pipes, named pipes, message queues, shared memory, sockets),
4. to manipulate with files and directories, and
5. to use sockets for network communication.

Content: This course among others will contain: i) programming language C: syntax, structures, pointers, argument processing, file operations, etc., ii) make and makefiles, iii) multitasking and the concept of tasks (process/thread), iv) signals, v) inter-process communication mechanisms: unnamed and named pipes, message queues, shared memory, vi) inter-process synchronization concepts: critical section, mutual exclusion, deadlock, starvation, vii) interprocess synchronization mechanisms: semaphores and mutex-es, viii) network programming using sockets.

Methods of teaching: 45 hours of lectures, 30 hours exercises. Approximately 80 hours of personal study and exercise including appointments.

Grading System: Classroom Assessment 0%, Appointments 35%, Final assessment 65%.

Literature:

- Keith Haviland, Dina Grey and Ben Salama, "Unix Systems Programming – Second Edition", ISBN-10=0-201-87758-9, 1999/2012
- Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language – Second Edition", ISBN-10=0-13-110362-9, 1988

Course title: Nature-Inspired Algorithms

Lecturer: Prof. Asoc. Dr. Kadri Sylejmani
Course status: Elective, Semester II, 6 ECTS

Course goal: Course provides in depth knowledge about major algorithms that are inspired from nature

Learning outcomes: On successful completion of the course, students will be able to:

1. Model various complex optimisation problems;
2. Use techniques from evolutionary algorithms,
3. Use techniques from swarm algorithms,
4. Use techniques from physical algorithms;
5. Hybridize various optimisation techniques;
6. Perform systematic tests of the optimisation techniques.

Course content: Evolutionary algorithms (Genetic algorithms); Swarm Algorithms (Bees Algorithm, Ant Colony Optimization); Physical Algorithms (Extremal Optimization, Harmony Search, Cultural Algorithm, Memetic Algorithm); Hybridization of different approaches presented above.

Methods of teaching: 45 hours of lectures + 30 hours of laboratory exercises. Approximately 80 hours of personal study and exercise including homework.

Grading System:

Attendance 10%, Practical project 30 %, Final Exam 60 %

Literature:

- Essentials of Metaheuristics (2013), Sean Luke, Lulu
- Brownlee, Jason, Clever Algorithms: Nature Inspired Programming Recipes, First Edition. LuLu. January 2011, ISBN: 978-1-4467-8506-5
- Michalewicz, Z., and Fogel, D. B., How to Solve It: Modern Heuristics, Springer, 1995
- Latest related papers that utilize the presented optimization techniques.

Course title: Internet of Things

Lecturer: Prof. Ass. Dr. Artan Mazrekaj

Course status: Elective, Semester II, 6 ECTS

The goal: The purpose of the course is to equip students with fundamental knowledge of Internet of Things (IoT). Familiarizing with interdisciplinary systems including applications from customer electronics devices (e.g. medical devices, camera systems, sensors) that actually enable interaction between human and things.

Learning outcomes: On successful completion of the course, students will be able to:

1. To understand and deeply analyze the systems on the Internet of Things, based on applications, architecture, and other technologies.
2. To model the key components to set up a system on the Internet of Things.
3. To apply knowledge and skills over protocols and each layer of the Internet of Things stack.
4. Assess the role of bid data, cloud computing, and data analytics on a typical Internet of Things system.
5. To model problems in the Internet of Things ecosystem based on programming prototypes so that these systems to implement in the industry and to determine the future trends.

Course content: The key concepts of the internet of Things. Architecture and Infrastructure on the Internet of Things ecosystem. Sensor devices and components. Layers, stack, protocols, and performance parameters of the Internet of Things. Data knowledge and internet of Things data. Distributed data analytics on the Internet of Things.

Methods of teaching: Lectures, laboratory exercises/simulations. Personal study by students and independent project work.

Grading System: Presence 10%, Projects 40 %, Final Exam 50 %

Literature:

- Rajkumar Buyya, Amir Vahid Dastjerdi (edited by) ”Internet of Things: Principles and Paradigms
    a. ELSEVIER, 2016.

- Adrian McEwen, Hakim Cassimally “Designing the Internet of Things”, John Wiley & Sons, 2013.

Course title: Analysis of networks

Lecturer: Dr. sc. Adnan Maxhuni

Course status: Elective, Semester II, 6 ECTS

The goal: Modeling and analysis of networks of data in all their diversity, from social networks to market trends or trends in academia, or communities in nature to mention few, will be covered by this course.

Learning outcomes. Upon completion of this course, the student shall be able to:

1. Define and solve, as well as analyse and identify a linked network/graph structure and behaviour for a certain problem domain.
2. Analyze and learn from the dynamics of a graph/network at the level of both nodes and links.
3. Get acquinted with the specifics of several domain graph/ network structures and behaviours, and know how to bring theory to leverage the usage of that domain.

Course content: Graph analysis. Strong and weak Ties. Link analyis and Web search (PageRank, Hits). Network construction, inference, and ceconvolution. Motifs and graphlets. Community detection: spectral clustering. Link prediction. Graph representation learning. Cascading behavior in networks. Influence maximization & outbreak detection. Power laws and rich-get-richer phenomena. The small world phenomena. Network centrality. Provenance. Message passing and node classification. Network evolution. Knowledge graphs and metapaths. Graph convolutional networks. Online social networks. Global graph metrics (Components, Cliques).

Methods of teaching: 45 hours of lectures + 30 hours of laboratory exercises. Approximately 80 hours of personal study and exercise including project work.

Grading System: Project assignment 3 x 20% = 60%. Final Exam 40 %.

Literature:

- Networks, Crowds, and Markets: Reasoning About a Highly Connected World by David Easley and Jon Kleinberg.
- Mining of Massive Datasets (2nd Edition). Jure Leskovec, Anand Rajaraman, Jeff Ullman. Cambridge University Press. 2014.

Course title: Image processing

Lecturer: Dr.sc. Adnan Maxhuni

Course status: Elective, Semester II, 6 ECTS

The goal: The goal is to provide the students with the basic knowledge of digital image processing, computer vision and image understanding so that they will be able to work extract information from images and videos and understand the relevant scientific literature. The lecture provides a set of methods and algorithms, which can be applied and tested on real imagery in the practical course.

Learning outcomes: On completion of this course, students will:

1. understand the core technologies in image processing and computer vision,
2. process information out of images and videos,
3. archive and retrieve images,
4. compress images,
5. do image analysis for application like industrial inspection, robotics and similar applications.
6. Be able to read and understand the state-of-the-art literature and work in teams.

Course content: Image analysis techniques from image acquisition to complex scene interpretation, including: human visual system, image formation, image preprocessing, mathematical morphology, image segmentation, color image analysis, texture analysis, object recognition, data structures for image analysis, radiometric and geometric transformations, image data compression, 3d image processing, and scene understanding.

Methods of teaching: 45 hours of lectures + 30 hours of tutorials exercises. 80 hours of personal study and home exercises (5 * 30 h = 150 h).

Grading System: Classroom Assessment 5%, Home works and projects 35%, Final assessment 60 %

Literature:

- R. Szeliski. Computer Vision, Springer 2011.
- M. Sonka, V. Hlavac, R. Boyle: Image Processing, Analysis and Machine Vision (2nd Edition), PWS Publishing, 1999P.
- State-of-the-art papers

Course title: Parallel Architectures and Programming Models
Lecturer: Prof. Ass. Dr. Valon Raça
Course status Mandatory, Semester III, 6 ECTS

The goal: The aim of this course is to introduce students to advanced concepts of parallel architectures and programming models.

Learning outcomes: On successful completion of the course, students are capable of:

1. Discussing the classical principles of computer architectures and design
2. Explaining major hardware-level and software-level optimization strategies in parallel systems
3. Implementing these concepts to develop efficient applications and algorithms for parallel systems
4. Analyzing performance issues in different parallel architectures.

Course content: This course presents main concepts of the design of Parallel Computer Architectures and Programming Models. It consists of four parts:

1. Fundamentals of parallel systems design includes concepts about classification, trends, principles and design of the parallel architectures and memory hierarchy design.
2. Instruction-Level Parallelism focuses in exploitation of instruction-level parallelism for high performance processors, including scalar execution, branch prediction, speculation and dynamic scheduling.
3. Thread-Level Parallelism focuses in multicore processors exploring symmetric architectures and shared memory, including organizational and performance principles.
4. Data-Level Parallelism focuses in manycore architectures and includes concepts on programming data-parallel applications, non-conventional processing devices such as: GPUs, FPGAs, APUs. Programming with OpenCL in GPUs and other accelerators is discussed in detail. This part also includes vector architectures and SIMD.

Methods of teaching: 45 hours of lectures and 30 hours of laboratory exercises. 75 hours of independent work including assignments and projects.

Grading System: Attendance mandatory in lectures, laboratory, tests and assignments. Seminar Paper: 10%, Individual assignments (total: 40%), Assignment 1: 20%, Assignment 2: 20%, Final Exam: 50%

Literature:

- John L. Hennessy and David A. Patterson, Computer Architecture: A Quantitative Approach – Sixth Edition, 2017.
- Ruud van der Pas, Eric Stotzer and Christian Terboven, Using OpenMP—The Next Step: Affinity, Accelerators, Tasking, and SIMD, 2017
- David Kirk and Wen-mei Hwu, Programming Massively Parallel Processors: A Hands-on Approach – Second Edition, 2013.
- David Kaeli, Perhaad Mistry, Dana Schaa, Dong Ping Zhang, Heterogeneous Computing with OpenCL 2.0 – Third Edition, 2015.

Course title: Resource Management in Cloud Computing

Lecturer: Prof. Ass. Dr. Artan Mazrekaj
Course status: Elective, Semester III, 6 ECTS

The goal: The purpose of the course is to equip students with fundamental knowledge of cloud computing resource management and planning. Knowing with platforms and application classification on the cloud. Deepening knowledge in the dialectics of relations between cloud computing and Big Data. Modeling problems that lead to more efficient management of cloud resources.

Learning outcomes: On successful completion of the course, students will be able to:

1. To understand and deeply analyze cloud models, such as Infrastructure as Service-IaaS. Platform as Service - PaaS and Software as Service - SaaS, with the major focus on IaaS.
2. To design the architecture's functionality of a data center.
3. To model the virtualization architecture, and understanding the functionality of the virtual machines.
4. To build load balancing and task scheduling strategies.
5. To build the strategy for live virtual machine migration.
6. To combine different strategies for resource utilization.

Course content: The key aspects of the Cloud Computing. Cloud computing and bid data relations. Resource modelling in the cloud. Strategies and algorithms for load balancing. Task scheduling. Resource utilization in the cloud. Energy-efficiency in the data centers. Case studies with different frameworks. Using of simulators, etc.

Methods of teaching: Lectures, laboratory exercises/simulations. Personal study by students and independent project work.

Grading System: Presence 10%, Projects 40 %, Final Exam 50 %

Literature:

- Wenhong Tian, Yong Zhao "Optimized Cloud Resource Management and Scheduling: Theories and Practices", ELSEVIER, 2015.
- Han_Zhao, Xiaolin_Li "Resource Management in Utility and Cloud Computing", Springer, 2013.

Course title: Natural Language Processing

Lecturer: Prof. Dr. Lule Ahmedi, Prof. Asoc. Dr. Kadri Sylejmani

Course status: Elective, Semester III, 6 ECTS

The goal: This course provides a theoretical understanding and practical skills of NLP.

Learning outcomes: At the end of this course, students will:

1. Gain solid knowledge of NLP techniques for the analysis of texts.
2. Be able to design, implement, and evaluate NLP techniques and apply them to practical problems.
3. Be able to search and use the relevant literature within the area of NLP, etc.

Course content: Topics include: Text segmentation and normalization, Text classification and clustering, Language modelling with n-gram models, Part-of-speech tagging, syntactic analysis using syntactic and dependency parsing, Semantic analysis using semantic vectors with an emphasis on word embeddings. Additional possible topics: Information extraction and topic modeling.

Methods of teaching: 45 hours of lectures + 30 hours of laboratory exercises. Approximately 80 hours of personal study and exercise including project work.

Grading System: Active attendance 10%, Project Report 30%, Final Exam 60 %.

Literature:

- Speech and Language Processing (online book) by D. Jurafsky and J. Martin. Third edition draft, September 2018. on-line at https://web.stanford.edu/~jurafsky/slp3/ed3book.pdf
- Linguistic Fundamentals for Natural Language Processing: 100 Essentials from Morphology and Syntax by E. Bender. Morgan & Claypool, 2013.
- Foundations of Statistical Natural Language Processing by C. Manning and H. Schutze. MIT Press. Cambridge, MA: May 1999.

Course title: Internship Innovation Project

Lecturer: Prof. Asoc. Dr. Kadri Sylejmani

Course status: Mandatory, Semester III, 6 ECTS

Course goal: The students acquire experience in implementing innovative projects in the field of computer and software engineering by becoming part of professional/research projects that are developed in the industry/academia, or by participating in various competitions in the envisioned study and research area.

Learning outcomes: Upon completion of this course, the students would be able to:

- Develop ideas and projects that have the potential to change the ongoing trends in a niche segment of the computer and software engineering industry
- Have an in depth understanding of the industry trends and make research on how to challenge them with innovative ideas
- Learn conceptual procedures to find new values from a narrow segment of industry
- Identify, develop, and assess opportunities for new business ideas that are accompanied by innovative business models
- Develop skill for moving ideas into action with an ever-increasing pace
- Get in depth experience in developing novel products through iterative testing and development
- Develop skills for project management, client relationship, product development, team management, work in multidisciplinary teams and remotely dispersed development teams

Course Content: The specific content for this course depends on the form that the student choses to complete the innovative project, which can be done in of the three variants presented below:

- Placement in industry (company/institution),
- Becoming part of a research/professional project within the faculty or abroad, or
- Participating in a local or international competition in the field of computer and software engineering (e.g., Kaggle, PACE, TopCoder, Innocentive, Tunedit, ffjm.org, optil.io, recomputation.org, Google Hash Code Challenge, IBM Ponder This Challenge, ROADEF Challenge, DIMACS Implementation Challenge, etc.)

After choosing one of the forms of the internship, the student discusses the specific innovative project with the coordinator (person in charge) of the internship at the faculty, and, with the coordinator’s approval the student can start to work on the topic that is jointly agreed. To facilitate the program of the internship innovation, the roles and responsibilities of all involved parties are as in the following:

- **The faculty** has the role of supporting the student to find some suitable company/institution/research project/ongoing competition for completing the internship. Furthermore, the faculty, through the internship coordinator of the study program, will ensure that the student's placement in the company (if selected to do so) is based on mutual agreement and the work is completed in an innovative topic.
- **The company/institution** will ensure that the master student gets properly accommodated within the work environment of the company and provides professional guidance for the student through teamwork and knowledge exchange. In addition, the company will make sure that the project assigned to the student is innovative, but also doable and achievable.
- **The student** will obey the terms included in the internship innovation contract and will seek to take the advantage of the internship placement for gaining the relevant work experience in innovative projects. At the end of the internship, the student will prepare a research seminar paper, where she/he will elaborate the engineering and innovative problems that are solved while in the internship.

Methods of teaching: 150 of work hours to be accumulated in one of three forms: (1) placement in industry (company/institution), (2) work in a research/professional project in the faculty or abroad, or (3) participation in a local or international competition in the field of computer and software engineering.

Grading System: Research seminar paper for the innovative work 40%, Presentation and defense 60%. TOTAL: 100%.

Course title: e-Governance

Lecturer: Prof. Dr. Isak Shabani

Course status: Elective, Semester III, 6 ECTS

The goal: Introducing the e-Governance concepts, Interoperability, design and architecture of the communication system over the Internet, Fundamentals of the public administration, process modelling and legal infrastructure.

Learning outcomes: After completing this course (course), the student will be able:

1. explain fundamentals of electronic governance, gain a policy and organizational perspective on Information Technology and its relationship to strategic planning,
2. gain a basic understanding of new technologies including the Internet, Intranets, Extranets, and Electronic Commerce and how they impact government operations and structure,
3. study the changing models of government service delivery,
4. Critically evaluate e-government projects,
5. Identify ethical dimensions of information policy.

Course content: Introduction, definitions and business needs for e-Governance. Organization of Governments. Framework and models of e-Government, Model: G2G-Government to Government, G2C-Government to Citizens, G2E-Government to Employees, G2B-Government to Businesses. ICT Implementation in Government and e e-Government Technologies. e-Government at the international, national, regional and local level. e-Government in public-private partnerships. Open Government. e-Government and Big data. Mobile e-Government in the Cloud. e-Government in Education. e-Services, e-Support, e-Collaboration, e-Community e-Procurement, e-Contracts, e-Elections, e-Democracy, e-Business and e-Commerce. Strategy for changing management through e-Governance. The future and future scenarios of e-Governance.

Methods of teaching: 45 hours of lectures + 30 hours of laboratory exercises. Approximately 80 hours of personal study and exercise including homework.

Grading System: Attendance 10%, Practical project 30 %, Final Exam 60 %

Literature:

- Mark J.Barrenechea & P. Thomas Jenkins, (2014), e-Government or Out of Government,
- Andreas Meier, (2012), eDemocracy & eGovernment - Stages of a Democratic Knowledge Society
- Mayer-Schèonberger, V., & Lazer., D. (2007). Governance and information technology:
    - from electronic government to information government. Cambridge, Mass.: MIT Press.
- Pavlichev, A., & Garson, G. D. (2004). Digital government : principles and best
    - practices. Hershey, PA: Idea Group Pub

Course Title: Embedded System Programming

Lecturer: Dr.sc. Astrit Ademaj

Course status: Elective, Semester III, 6 ECTS

The goals: The participants shall receive an introduction in the field of Embedded System Programming and detailed know-how in the implementation and programming of centralized and distributed embedded computer systems. Course participant will gain knowledge on the specific of the embedded systems programming in C language and will realize the differences between the programming of the embedded systems and desktop PC systems.

Learning outcomes: On completion of this course, students shall be able to:

1. shall be able to program embedded system in C programming language,
2. to perform low-level programming by using timers, UART communication, General Purpose I/O and A/D,
3. get the backgrounds on the embedded system design, development and testing,
4. to get known with the details of the AVR ATMega 128 microcontroller,
5. programming a well-designed and reusable embedded software components,
6. learn how to read the Microcontroller data sheets to find the functionality needed in order to implement the given SW task.

Table of Course content: Lectures: Introduction to embedded systems, input/output, sensors and actuators, Compiling, loading, Bit operations, Worst Case Execution Time (WCET), Clock and Timers. The exercise part will be directly programming in the embedded target board in C language, by reading sensor values and setting actuators: Lab environment compiling and loading, input/output, read/write register operations, Timer programming, Communication using UART, WCET measurements, A/D converters.

Teaching methodology: 45 hours of lectures and 30 hours of laboratory exercises. 80 hours independent work including project work and assignments.

Assessment: Testing and assignments. Assessment Criteria: 25% of total marks from 2 assignments and 75% of total marks from exam

- Minimum requirements: over 49% of points from two assignments / projects as over 49% of exam points - 6 (six)
- 50% - 59% of total points, 6 (six)
- 60% - 69% of total points, 7 (seven)
- 70% - 79% of the total points, 8 (eight)
- 80% - 89% of the total points, 9 (nine)
- 90% - 100% of the total points , 10 (ten)

Literature:

- Michael Barr, Programming embedded systems in C and C ++, 1999, ISBN-10: 1565923545

Course title: Seminar in Data Science

Lecturer: Prof. Dr. Lule Ahmedi

Course status: Elective, Semester III, 6 ECTS

The goal: To offer the students the opportunity to explore an actual research topic in the field of Data Science under the guidance and supervision of the instructor, and discuss it and a range of related topics within the seminar.

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

1. Elaborate research questions of the corresponding field by using the up-to-date literature.
2. Acquire knowledge on selected range of actual research topics.
3. Gain experience on the presentation techniques and on how to write a report.

Course content: Topics will be covered to provide an in-depth knowledge of the given special sub- field of Data Science. The instructor provides seminar topics on the field of Data Science depending on his/her current research interests, and conform to the trends in that field. These topics would usually envision the thesis subjects from the field of Data Science to be offered in the fourth semester. Topics vary from semester to semester. Enrollment limits are set by the instructor, as well as the pre-requisites set at discretion of instructor.

Methods of teaching: The course consists of: the kick-off meeting with students interested for the field at the beginning of the semester and distribution of each one topic per student, provide students with the literature required, supervision of the students throughout the whole semester, student presentation sessions at the end of the semester, and deliverable of the written reports which shall summarize the student's work on the topic he/she elaborated.

Grading System: Research report on a certain selected narrow topic 40%. Software development / experiments 40%. Presentation and demo 20%.

Literature:

- A comprehensive list of actual resources, i.e., book chapters, research papers, and/or Web resources on each topic of the seminar.
- A list of tools/systems to support the development of the seminar work.

Course title: Seminar in Cyber Security

Lecturer: Prof. Dr. Blerim Rexha

Course status: Elective, Semester III, 6 ECTS

The goal: To offer the students the opportunity to explore an actual research topic in the field of Cyber Security under the guidance and supervision of the instructor, replicate the results and testing environment, discuss the results with the published ones and other research related papers.

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

1. Elaborate research questions of the field of Cyber Security by using the up-to-date literature,
2. Acquire knowledge on selected range of actual research topics,
3. Expand his critical and creative thinking about the Cyber Security field,
4. Gain experience on the presentation techniques and on how to draft a final report.

Course content: Topics will be covered to provide an in-depth knowledge of the given special sub- field of Cyber Security. The instructor provides seminar topics on the field of Cyber Security depending on his/her current research interests and conform to the trends in the field. At least two research papers shall be analyzed, and this might lay out the foundation for master thesis.

Methods of teaching: The course consists of: the kick-off meeting with students interested for the field at the beginning of the semester and distribution of each one topic per student, provide students with the literature required, supervision of the students throughout the whole semester, student presentation sessions at the end of the semester, and deliverable of the written reports which shall summarize the student's work on the topic he/she elaborated.

Grading System: Research report on a certain selected narrow topic 40%. Software development / experiments 40%. Presentation and demo 20%.

Literature:

- A comprehensive list of actual resources, i.e., book chapters, research papers, and/or web resources on each topic of the seminar.
- A list of tools/systems to support the development of the seminar work.

Course Title: Real Time Systems (Master, elective, Sem. III, 6 ECTS)
Lecturer: Dr.sc. Astrit Ademaj
Course status: Elective, Semester III, 6 ECTS

The goal: The participants shall receive an introduction of the problems in the field of real-time systems. They will gain knowledge about specification, design, development and testing of distributed real-time systems.

Learning outcomes: On completion of this course, students shall be able to:

1. Know the principle of operation, design and development of Real-Time Systems,
2. principle of dependability attributes,
3. real-time communication networks basics design paradigms,
4. know-how on the fault-tolerant real-time system, (5) Clock synchronization mechanisms and principle of operation, (6) real-time operating systems and task-scheduling.

Course content: The course if organized as lecture (talk). The description of the lecture part is given as follows: Introduction to real-time systems. Real-time Environment, Real-time entities and images, distributed real-time solutions, Concept of time in computer systems. Clock Synchronization, Real Time Systems Modeling, Real Time Communication, Input/Output, Real Time Operating Systems, Real Time Scheduling, Fault Tolerance. Basic Definitions and Reliability Aspects, System Design, Validation.

Grading System: Written or oral test. Rating system: 100% final rating

Literature:

- Hermann Kopetz, Real-Time Systems, ISBN: 0-7923-9894-7, Kluwer Academic Publishers, 1997.

Course title: Seminar in Algorithms and Data Structures
Lecturer: Prof. Ass. Dr. Avni Rexhepi
Course status: Elective, Semester III, 6 ECTS

The goal: To offer the students the opportunity to explore an actual research topic in the field of algorithms and data structures under the guidance and supervision of the instructor, and discuss it and a range of related topics within the seminar.

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

1. Elaborate research questions of the corresponding field by using the up-to-date literature.
2. Acquire knowledge on selected range of actual research topics.
3. Gain experience on the presentation techniques and on how to write a report.

Course content: Topics will be covered to provide an in-depth knowledge of the given special sub- field of algorithms and data structures.

The instructor provides seminar topics on the field of algorithms and data structures depending on his/her current research interests, and conform to the trends in that field. These topics would usually envision the thesis subjects from the field of algorithms and data structures. Topics vary from semester to semester. Enrollment limits are set by the instructor, as well as the pre-requisites set at discretion of instructor.

Methods of teaching: The course consists of: the kick-off meeting with students interested in the field at the beginning of the semester and distribution of each one topic per student, provide students with the literature required, supervision of the students throughout the whole semester, student presentation sessions at the end of the semester, and deliverable of the written reports which shall summarize the student's work on the topic he/she elaborated.

Grading System: Presentation 30%, Research report 25%, Software 25% (if no software developed as part of the seminar, points considered in the research report), Active participation 20%.

Literature:

- A comprehensive list of actual resources, i.e., book chapters, research papers, and/or Web resources on each topic of the seminar.
- A list of tools/systems to support the development of the seminar work.

Course title: Big Data Analytics

Lecturer: Prof. Dr. Lule Ahmedi

Course status: Elective, Semester III, 6 ECTS

The goal: This course main goal is to familiarize the students with the main models and techniques of analysis and learning through Big Data.

Learning outcomes: Upon completion of this course, the student shall be able to:

1. Gain solid knowledge in analysis and machine learning of Big Data including stream data.
2. Be able to design, implement, and perform evaluation of machine learning systems on Big Data.
3. Get acquinted and be able to work with special applications of Big Data analysis such as recommendation systems, document classification, PageRank.

Course content: Topics include: Machine Learning over large datasets (Spark ML). Stochastic Gradient Descent. Mini-Batch Gradient Descent. Stochastic Gradient Descent Convergence. Online Learning. Map Reduce dhe data parallelism. Stream data (Spark Streaming). Recommendatio systems. Clustering big data. Google web search (PageRank, taxation). Computing similar documents in big data. Optimal hardware for analytics in Big Data (Intel & Power chips, GPU, FPGA). Future challenges of Big Data (Linked Big Data, graphs, graphical models, spatio-temporal analytics). Main analytic tools like R and Python.

Methods of teaching: 45 hours of lectures + 30 hours of laboratory exercises. Approximately 80 hours of personal study and exercise including project work.

Grading System: Project assignment 3 x 20% = 60%. Final Exam 40 %.

Literature:

- Mining of Massive Datasets. Anand Rajaraman, Jeffrey D. Ullman, Cambridge University Press, 2011.

Course title: Intelligent Multimedia Systems

Lecturer: Prof. Dr. Lule Ahmedi

Course status: Elective, Semester III, 6 ECTS

The goal: The aim of this course is to provide advance knowledge on intelligent multimedia systems and their practical applicability.

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

1. To understand the basic concepts of Intelligent Multiemedia Systems such as multimedia formats, enabling technologies and algorithms for intelligent web.
2. To plan and develop instances of intelligent mulktimedia systems based on state-of-the-art research and development.
3. To be able to implement an intelligent multimedia application using algorithms, web technologies and multimedia.

Course content: Intelligent Multimedia Systems consists of 3 parts:

1. Enabling technologies: includes foundational such as modern web technologies, multimedia formats, data formats, web services and other technologies required for thintelligent multimedia systems.
2. Web mashups and archotectures: focuses on ability of combining multiple data streams into a unified application architecture.
3. Algorithms for Intelligent Web: includes understanding and application of different algorithms for personalisation and reccomendation of multimedia on the web.

Methods of teaching: 45 hours of lectures and 30 hours of laboratory exercises. 80 hours of independent work including assignments and projects.

Grading System: Attendance mandatory in lectures, laboratory, tests and assignments. Grading is based on continual assessment through assignments and projects. There are two mandatory individual assignments as well as a group project of no more than 3 persons.

Minimal requirements and assessment criteria:

One out of two assignments positively assessed with more than 49% of points as well as positively assessed project work – 6 (six)

Tow out of two assignmnets and a final project positively assessed, grade depends on the collected points: (45 – 59%, 6 (six); 60% - 69%, 7 (seven); 70% – 79%, 8 (eight); 80% – 89%, 9 (nine); 90% – 100%, 10 (ten).

Literature:

- Burg, J. (2009 *The Science of Digital Media*. Prentice Hall. Latest Edition. 250 (512) pages.
- Pautasso C., Sánchez-Figuerona F., Systä K., Rodrigez J. M M. (2018) Current trends in Web Engineering, Springer, Selected papers. 200 (298) pages)
- McIlwraith D. G., Marmanis H., Babenko D. (2016, second edition) Algorithms of the intelligent Web. Manning. 200 (223) pages.

Course title: Human Resource Management

Lecturer: Prof. Ass. Dr. Bahri Prebreza

Course status: Elective, Semester III, 6 ECTS

Course goal: This course introduces concepts related to the human resource management that includes recruitment, selection, and maintenance of a qualified, motivated, and productive workforce.

Learning outcomes: On successful completion of the course, students will be able to:

1. Identify concepts for equal employment opportunities;
2. Plan human resource needs and make job analysis,
3. Apply best practices for recruitment and staff selection,
4. Make employee orienteering and development;
5. Prepare plans for rewards and payments;
6. Formulate regulations for employee rights and discipline;
7. Use permeance management systems.

Course content: Equal Employment Opportunity. Human Resource Planning and Job Analysis. Recruiting. Foundations of Selection. Socializing, Orienting, and Developing Employees. Managing Careers. Establishing Rewards and Pay Plans. Employee Benefits. Employee Rights and Discipline. Establishing the Performance Management System. Ensuring a Safe and Healthy Work Environment. Understanding Labour Relations and Collective Bargaining.

Methods of teaching: 45 hours of lectures + 30 hours of numerical exercises. Approximately 80 hours of personal study and exercise including homework.

Grading System: Attendance and classroom activity 10%, Practical assignments 30 %, Final Exam 60 %

Literature:

- DeCenzo, D. A., Robbins, S. P., & Verhulst, S. L. (2013). Fundamentals of Human Resource Management. 11th Edition. Wiley. ISBN: 978-0-470-91012-2
- Human Resources Management, by P Gerber, P Nel and P van Dyk. (Latest Ed.): Southern Book Publishers.

Course title: Strategic Management

Lecturer: Prof. Ass. Dr. Bahri Prebreza

Course status: Elective, Semester III, 6 ECTS

Course goal: This course introduces the key concepts about strategic management in various organisations, including companies and their respective working processes.

Learning outcomes: On successful completion of the course, students will be able to:

1. Formulate the mission of organisations/companies;
2. Study and predict the outside environment of the companies/organisations,
3. Analyse the inner environment of an organisation/company,
4. Define objectives and identify alternative strategic solutions;
5. Make decisions about alternative strategic solutions;
6. Implement strategies;
7. Administer strategies.

Course content: The philosophy and mission of an institution/company. Studding and predicting the surrounding environment of an institution/company. Analysis of the inner environment of an institution/company. Formulating objectives and identifying alternative strategic solutions. Implementation of strategies. Administration of strategies.

Methods of teaching: 45 hours of lectures + 30 hours of numerical exercises. Approximately 80 hours of personal study and exercise including homework.

Grading System: Attendance and classroom activity 10%, Practical assignments 30 %, Final Exam 60 %

Literature:

- Vasilika Kume, Manaxhimi strategjik Teori, koncepte, zbatime (2010), Tiranë
- Hitt, M., Ireland, R. and Hoskisson, R. [H.I.H]. 2010. Strategic Management: Competitiveness and Globalization - Concepts, Cincinnati, OH: Southwestern College Publishing. 9th edition.