

DESCRIPTION OF THE COURSE

Name of the course Distributed systems and Computer Communications	Code: BCSCe45.3	Semester: 7
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW – 1 hour	Number of credits: 4

LECTURER:

Prof. PhD Grisha Spasov (FEA), tel.: 659 724, email: gvs@tu-plovdiv.bg
Technical University of Sofia, branch Plovdiv

COURSE STATUS IN THE CURRICULUM: Eligible for the students specialty “Computer Science and Engineering” of the Faculty of Computer Systems and Technologies of Technical University of Sofia – Bachelor degree.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students are expected to have knowledge for basic principles for creating distributed systems and client-server applications, together with the architecture of Middleware for distributed systems.

DESCRIPTION OF THE COURSE: The main topics concern: Introduction to distributed systems. Hardware and software aspect of the client-server model. Communication protocols of the application layer. Middleware protocols and distributed applications –RPV, RMI, MQS. Distributed processes – client-server, threads, code migration, software agents. Naming in distributed systems- DNS, X.500. Synchronization of distributed work. Co-ordination and replication of resources. Co-ordination models. Replication models. Security policy in distributed systems. Distributed file systems – NFS, AD. Web based distributed systems. Web services - SOA. Cloud computing - SaaS, PaaS, IaaS. Multimedia networking applications. Protocols for real-time interactive applications.

PREREQUISITES: From B.Sc. programme: Operating Systems, Computer Architectures, Programming Languages, Computer Networks.

TEACHING METHODS: Lectures, using slides and multimedia presentations, laboratory work, using demo-programs and case study.

METHOD OF ASSESSMENT: Written exam on the theory and defense of the case study. The final grade is constructed on the exam results (totally 60%), the case study (30%) and the laboratory work (10%).

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY: 1.George Coulouris, Jean Dollimore, Tim Kindberg, Gordon Blair, “DISTRIBUTED SYSTEMS, Concepts and Design”, Fifth Edition, Addison-Wesley, 2012, ISBN 10: 0-13-214301-1. 2.A. S. Tanenbaum and M. van Steen. "Distributed Systems: Principles and Paradigms," Second Edition, Prentice Hall, 2007, ISBN 0-13-239227-5. 3.Bill Wilder, “Cloud Architecture Patterns”, O'Reilly Media, 2012, Print ISBN: 978-1-4493-1977-9.

DESCRIPTION OF THE COURSE

Name of the course Software templates	Code: BCSCe48.1	Semester: 7
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW – 1 hours	Number of credits: 4

LECTURER:

Prof. PhD Daniela Daniela Gotseva (FCST) – tel.: 965 2383, email: dgoceva@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Optional for the students' specialty "Computer Science and Engineering" of the Faculty of Computer Systems and Technologies of Technical University of Sofia – Bachelor degree.

AIMS AND OBJECTIVES OF THE COURSE: The aim of the course is to explain the principles of Fuzzy Sets and Fuzzy Logic. The course begins with a brief introduction to algebra of fuzzy sets, and then presents the operations on them. The course was included on the theory of fuzzy logic and its application to programming languages, theory of control, and specialized devices. Students will gain knowledge and skills for application of fuzzy logic in development of software systems and solid conceptual and practical basis for analysis and design of systems, based on fuzzy control.

DESCRIPTION OF THE COURSE: The main topics concern: Introduction, Programming basics, Conditionals, Nested conditionals; logical operators, Iteration: for, while, Developing algorithms; nested loops, User-defined functions, Probabilities and Averages; vectors, Simulation, Discrete vs. continuous; linear interpolation, 2-d Arrays--matrix, Working with Images, Characters and strings, working with numeric/text data (file I/O), Structures and structure arrays, Objects and Classes, Class definition--properties & methods, overloading, Array of objects, constructor that handles variable number of args, Private vs. public, Inheritance, Recursion, Sorting and Searching, etc.

PREREQUISITES: Basic knowledge of C and C++ programming languages, and mathematics are needed.

TEACHING METHODS: Lectures, using slides, case studies, laboratory and course work, work in teams, and course work description preparation and defence.

METHOD OF ASSESSMENT: Exam project (80%), laboratories (20%).

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: 1. <http://dgotseva.com> – course materials. 2. *Charles F. Van Loan and K.-Y. Daisy Fan, Insight through Computing: A MATLAB Introduction to Computational Science and Engineering*, SIAM, 2010. 3. *Dr. Duane Hanselman, Mastering MATLAB*, Prentice Hall, 2011. 4. *Brian D. Hahn, Essential Matlab for Engineers and Scientists*, Academic Press, 2013.

DESCRIPTION OF THE COURSE

Name of the course Intelligent Systems	Code: BCSCe48.1	Semester: 7
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW – 1 hour	Number of credits: 4

LECTURER:

Assoc. Prof. Dr. Roumen Trifonov (FCST), tel.: 965 24338 email: r_trifonov@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory subject for the students from specialty Computer Science and Engineering, Bachelor degree, Faculty of Computer Systems and Technologies.

AIMS AND OBJECTIVES OF THE COURSE: The discipline introduces students in problems of Artificial intelligence. It is basic for this science area and deals with computer methods for problem solving, models of intelligence, and models of knowledge representation (logical models, set models, production models, frame models and respective problem solving methodology).

At the end of the course the students are expected to be able to use methods of Artificial intelligence, to have basic knowledge on simulation software for Artificial intelligence problems, and use it in solving of engineering problems.

DESCRIPTION OF THE COURSE: The main topics concern: 1. Artificial intelligence – an introduction. 2. Methods for problem solving. 3. Models of intelligence. 4. Logical models of knowledge description. 5. Set models of knowledge description. 6. Production models. 7. Frame models. 8. Methods for searching. 9. Expert systems. 10. Neuron nets.

PREREQUISITES: Discrete structures, analyses and synthesis of logical circuits, logical programming.

TEACHING METHODS: Lectures using slides and laboratory works with protocols description preparation and defence.

METHOD OF ASSESSMENT: Two-hour writing exam at end of the semester (80%) and laboratories (20%).

INSTRUCTION LANGUAGE: BULGARIAN

BIBLIOGRAPHY: Nilsson, N. Principles of Artificial Intelligence, Tioga, Palo Alto, California, 2009; Будакова Д., Трифонов Р., Даковски Л., Ръководство по компютърен интелект, ТУ-София 2014

DESCRIPTION OF THE COURSE

Name of the course Computer Integrated Manufacturing	Code: BCSCe48.2	Semester: 7
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW – 1 hour	Number of credits: 4

LECTURERS:

Prof. Ph.D. Todor Neshkov (FME) – tel.965 2764
Assos. Prof. Dobrin Dotzev (FME) – tel.965 2140
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory course for the students of speciality Computer and Software Engineering in the bachelor programme of the Faculty of Computer Systems and Technologies.

AIMS AND OBJECTIVES OF THE COURSE: . To introduce the basic models and typical strategies of CIM taking place in industrial plants and in the production automation.

DESCRIPTION OF THE COURSE: . The main topics concern: Computer Integrated Manufacturing (CIM) classification, control objectives, configurations, models and strategies; Fundamentals of CAD/CAM,CAPP and MRP -I,MRP-II,MRP-III, Multimedia Technologies in CIM, Information flow and Shop Floor Control in IM, Factory of the Future, CIM Hardware and software systems and examples, Intelligent manufacturing, Virtual and e-Manufacturing, Knowledge based systems.

PREREQUISITES: . Basic knowledge in the fields of regulation and control devices and control systems for automated complexes obtained in the B.Sc. degree course.

TEACHING METHODS: Lectures, using slides, case studies, tutorial and laboratory work from laboratory manual, work in teams, protocols preparation and defence, preparing of the special report in the field of CIM.

METHOD OF ASSESSMENT: Exam during the exam session with duration one academic hour, students give written answers to .special test.. Final mark is calculated based on the written exam (.90%), laboratory work (.10.%),

INSTRUCTION LANGUAGE: Bulgarian/English

BIBLIOGRAPHY: Neshkov,T. Intelligent Manufacturing Systems, Heron press, Sofia, 2014, Neshkov,T. Intfrduction to speciality MECHATRONIC SYSTEM, Sofia, 2013, Mitchell, F., CIM Sysstems. An Introduction To Computer Integrated Manufacturing, Prentice Hall International Inc., 1991. Groover, M., Automation, Production Systems And CIM, Prentice Hall International Inc., 2011, Groover, M., E. Zimmers, CAD/CAM Computer Aided Design And Manufacturing, Prentice Hall International Inc., 2010,Neshkov, T., S. Jordanova et all. Process Control and Production Automation, TU-Sofia,2007.

DESCRIPTION OF THE COURSE

Name of the course Fundamentals for Internet Programming	Code: BCSCe49	Semester: 7
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW – 2 hour	Number of credits: 5

LECTURER:

Prof. Ognyan Nakov Nakov Ph.D. (FCST), tel.: 965 3513, email: nakov@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory course for the students of specialty Computer Science and Engineering in the bachelor programme of the Faculty of Computer Systems and Technologies.

AIMS AND OBJECTIVES OF THE COURSE: Detailed outlook of the course's content: DHTML; script languages: JavaScript/JScript; Dynamic HTML (cascade stylesheets (CSS)); object model and collections; script and events; filters and transitions; data binding; structured graphics; implementation of Active X controls; multimedia effects; ASP (Active Server Pages) technology, basics and comparison with PHP; XML(Extensible Markup Language).

DESCRIPTION OF THE COURSE: The course introduces in modern technologies in Internet programming: JavaScript/ Jscript script language; Dynamic HTML (cascade stylesheets (CSS)); object model and collections; script guiding events; filters and transitions; data binding; structured graphics; implementation of Active X controls; multimedia effects; ASP (Active Server Pages) technology, basics and comparison with PHP; XML(Extensible Markup Language). In practice students get familiar and work with the following products apart from the given above: IE 6; InterDev 6; FrontPage; Paint Shop Pro; Web Servers - IIS, PWS.

PREREQUISITES: Basic programming knowledge.

TEACHING METHODS: Lectures in multimedia; web site with full materials of the course; laboratory work (based on instructions) and course work description preparation and defence.

METHOD OF ASSESSMENT: Exam during the exam session with duration two academic hours, students give written answers to questions from the subject.

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: Наков, О. и др., "Технологии за програмиране в Интернет", Изд на ТУ – София, 2011; Esposito, Dino. *Programming Microsoft ASP. NET MVC*. O'Reilly Media, Inc., 2011; Nixon, Robin. *Learning PHP, MySQL, JavaScript, and CSS: A Step-by-Step Guide to Creating Dynamic Websites*. " O'Reilly Media, Inc.", 2012; Duckett, Jon. *HTML and CSS: Design and Build Websites*. John Wiley & Sons, 2011; McFarland, David Sawyer. *Javascript & jQuery: the missing manual*. " O'Reilly Media, Inc.", 2011; McFarland, David Sawyer. *CSS3: The Missing Manual*. " O'Reilly Media, Inc.", 2012; Freeman, Eric, and Elisabeth Robson. *Head First HTML5 Programming: Building Web Apps with Javascript*. " O'Reilly Media, Inc.", 2011; Purewal, Semmy. *Learning Web App Development*. " O'Reilly Media, Inc.", 2014; Шурман Е., Dynamic HTML в действие, СофтПрес, 2000; WEB Database Development - .NET edition, Microsoft Press, 2002; Sceppa David, Programming ADO, Microsoft Press, 2001; Хоумър А., Професионално програмиране с Active Server Pages, СофтПрес, 2001; Microsoft Corp., SQL Server administration, certification course

DESCRIPTION OF THE COURSE

Name of the course Artificial Intelligence	Code: BCSCe50	Semester: 7
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW – 2 hours	Number of credits: 5

LECTURER: Assoc. Prof. Dr. Roumen Trifonov (FCST), tel.: 965 2838 email: r_trifonov@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Optional for the students of specialty Computer Science in the bachelor programme of the Faculty of Computer Systems and Technologies.

AIMS AND OBJECTIVES OF THE COURSE: Understanding the essential principles of intelligent behaviour, corresponding computational algorithms, and ideas for building practical applications of intelligent behavior systems. Getting working knowledge and skills in knowledge representation, reasoning, and architectures to design simple intelligent agents for diagnostic, decision support and control systems.

DESCRIPTION OF THE COURSE: This is an introductory course. The field of Artificial Intelligence (AI) is presented as unified field from the perspective of rational behaviour. Both approaches to AI - the symbolic (logical) and the behavioural (numerical) are presented as complementary (not contradictory). The main covered topics include: Intelligent agents, environments and behaviours. Principle of rationality, rational reasoning and rational acting. Formal logic methods for knowledge representation and reasoning in intelligent systems. Problem solving by searching – informed and heuristic search methods. Acting rationally – planning and learning. AI and Robotics – intelligent connection of perception to action. Outputs: other special disciplines and diploma project.

PREREQUISITES: Mathematics I, II, III, Programming and Computer I, II Application, Logic Modelling and Programming.

TEACHING METHODS: The basic didactic approach is “understands trough implementation”. Lectures using multimedia presentations, slides, set of prototype computer programme handouts, laboratory and homework, work in teams and discussions. The laboratory and course work is provided with the supporting programming language Prolog.

METHOD OF ASSESSMENT: One three-hours final exam (50%), plus laboratories (40%) plus class attendance, accuracy, etc. (10%).

INSTRUCTION LANGUAGE: Bulgarian

BIBLIOGRAPHY: 1. S. Russel. P. Norvig. Artificial Intelgelence. Prentice Hall, 2010. 2.. The Cambridge Handbook of Artificial Intelligence, ISBN: 9780521871426, 2014. 3. R. Scott. Artificial Intelligence with Visual Prolog. Prolog Development Center A/S, 2010. 4. Д. П. Димитров, Д. Н. Никовски. Изкуствен интелект. Изд. на ТУ - София, 1999. 5. <http://aitopics.org/> Internet's largest collection of information about AI, 2014. 6. R. Vasilev, D. Dimitrov. Software for perceptual anchoring in autonomous mobile robot.. Control Systems © 2012 Institute of Systems Engineering and Robotics ISSN 1310 – 8255R. 7. Siegwart and I. Nourbakhsh, Introduction to Autonomous Mobile Robots. MIT Press, 2004. 8. M. R. Genesereth, N. J. Nilsson. Logical Foundations of Artificial Intelligence. Morgan Kaufman Publ. Inc., 1987.

DESCRIPTION OF THE COURSE

Name of the course Metaheuristics	Code: BCSCe51	Semester: 7
Type of teaching: Lectures, laboratory work	Lessons per week: L – 2 hours; LW – 2 hours	Number of credits: 5

LECTURER:

Prof. PhD M. Lazarova, email: milaz@tu-sofia.bg,
Assoc. Prof. PhD A. Aleksieva-Petrova, email: aaleksieva@tu-sofia.bg,
Assoc. Prof. G. Zapryanov (FCST) – tel.: 965 2524, email: gczap@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory course for the students of specialty “Computer Science and Engineering” in the bachelor programme of the Faculty of Computer Systems and Technologies.

AIMS AND OBJECTIVES OF THE COURSE: The aim of this course is to introduce students to the general theory of Metaheuristic and the features in the design of parallel implementations for solving specific classes of combinatorial problems. At the end of the course the students are expected to know and be able to apply the concepts, taxonomy, principles, specifics and possibilities for practical implementation of metaheuristic algorithms for development of various applications that require solving hard optimization problems.

DESCRIPTION OF THE COURSE: The main topics concern: Metaheuristics concepts; Taxonomy ; Concepts of evolutionary computations; Genetic algorithms; Meta-genetic algorithms; Simulated annealing; Algorithm Metropolis; Local search using memory structures; Tabu-search; Variable Neighborhood Search (VNS); Local search; Iterative local search; Greedy Randomized Adaptive Search Procedure (GRASP); Ant Colony Optimization; Memetic algorithms. Upon completion of the course students will know the concepts, principles, models and paradigms of metaheuristic and design of the software for their implementation; be able to do a comparative analysis and assess the advantages and disadvantages between alternative solutions; be able to create effective program implementation, profiling, assessment and analysis of the performance of metaheuristic algorithms.

PREREQUISITES: Knowledge of Programming Languages, Programming Environments, Algorithms Synthesis and Analyses, Parallel Programming.

TEACHING METHODS: Lectures using video - presentation with beamer , laboratory works aimed at study, implementation and analyses of sample problems and case studies; course work aimed at implementation and analyses of solving certain problem by given metaheuristic algorithm.

METHOD OF ASSESSMENT: Exam during the exam session with duration two academic hours, students give written answers to 3 compulsory and 5 optional questions, problems or tasks (60%), laboratory works (25%), course work (15%).

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY:

1. Lecture Presentations – Metaheuristics course, <http://cs.tu-sofia.bg/>
2. P. Borovska, Synthesis and analysis of parallel algorithms, TU-Sofia, 2011 г.
3. Michel Gendreau and Jean-Yves Potvin, Handbook of Metaheuristics, ISBN: 978-1461426905, book 2012
4. Метаевристика <http://www.metaheuristics.net/>
5. Обектно-ориентирана работна рамка за метаевристика METSlib Trac
<http://code.100allora.it/metslib>
6. Списък на NP-пълни проблеми: http://en.wikipedia.org/wiki/List_of_NP-complete_problems

DESCRIPTION OF THE COURSE

Name of the course: Management of IT projects	Code: BCSCe52	Semester: 7
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW – 2 hour	Number of credits: 5

LECTURER:

Prof. Ognian Nakov Ph.D. (FCST), – tel.: 965 3513, email: nakov@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for the students of specialty Computer Science and Engineering in the bachelor programme of the Faculty of Computer Systems and Technologies.

AIMS AND OBJECTIVES OF THE COURSE: The course introduces a complex and multifaceted process of managing information technology projects, including issues on the one hand with the functional design of the system and the activities associated with seemingly side, but very important for the ultimate success circumstances, such as determining the mental compatibility between members of development team, ensuring the protection of the entire system and other breakthroughs. The subject application is targeted by most of the topics discussed are related to examples from the practice of other local and foreign companies.

DESCRIPTION OF THE COURSE: Basic concepts and strategies for building information systems, technologies for the rapid creation of projects (Rapid Application Development - RAD); Manage IT projects and evaluating the management of risk in IT projects, modeling and planning process of management of IT projects. Evaluation of psychological factors in the process of forming the team, automation of the process of development, management and evaluation of IT projects; Threats to security of IT systems to major attacks and ways to overcome them.

PREREQUISITES: Basic knowledge in operation systems, universal program languages, software engineering, such as and knowledge about special features, structure and functionality of computer devices and system.

TEACHING METHODS: Lectures in multimedia variant; developed web site with all lecture and practical materials of the course; practical work in laboratory. Published tutorial for every laboratory theme.

METHOD OF ASSESSMENT: Written examination with developed individual program.

INSTRUCTION LANGUAGE: English.

BIBLIOGRAPHY: Boehm B., Rapide Application Development (RAD) Strategies, USC, Intel Presentation., Chonkroun M., Developpement rapide d'applications (RAD), Techniques de l'ingenieur, 2010., Farlan M. C., Rapide Application Development with Mozilla, Prentice Hall, 2003., Haag Stephen, Maeve Cummings, Management Information Systems, McGraw-Hill & Pittsburg State University, 2010., Hugnes J., Leblanc B., Marley Ch., RAD, une methode pour deleopper plus vit, 2011., , Harvard Business Review on Managing Projects, Harvard Business School Press, 2009, M. Solomon, Project Management Professional, Fourth Edition, Pearson 2009, Ian Sommerville, Software Engineering, Addison-Wesley Publishing Company, 9th edition, 2010, Heagney J., Fundamentals of project Management, Fourth Edition, 2011, Andrew P. Sage, Systems Engineering and Management, Principles and Practices, Second Edition, 2011, Barker S., Cole R., Brilliant Project Management, Pearson Educated Limited, 2011, M. Solomon, D. Garvin, M. Roberto, Harvard Business Review on Managing Projects, Harvard Business School Press, 2009, PMP Project Management Professional Study Guide, Fourth Edition, 2013, Eric Verzuh, The Fast Forward MBA in Project Management(Portable MBA series) Wiley Fourth edition, 2011, Susan Land, Douglas Smith, John Walz, Lean Six Sigma Software Process Definition, Version IEEE 2011

DESCRIPTION OF THE COURSE

Name of the course: Virtual Reality	Code: BCSCe54	Semester: 8
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW – 2 hours	Number of credits: 4

LECTURER:

Prof. Ph.D. Eng. Stoyan Maleshkov (FCST) – tel.: 965 2052, email: maleshkov@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for students of the specialty Computer Science and Engineering taught in English language, Bachelor of Engineering Programme.

AIMS AND OBJECTIVES OF THE COURSE: The basic objectives of the course are to study the methods of modelling and editing of geometric objects with complex shape and hierarchical structure and mastering the principles and techniques of visualization with specialized computer systems. Fundamental knowledge and abilities for solving specific problems with the use of advanced software products are developed.

DESCRIPTION OF THE COURSE: At the end of the course the students will be acquainted with the principles and methods for building-up and for visualization of geometric models in virtual reality systems, will develop knowledge and abilities for describing and applying advanced materials, lights and cameras in virtual reality systems, will have knowledge of interaction techniques with virtual worlds in web environment and will gain practical skills in designing and implementing applications for controlling the visualization and the interaction with the used in virtual reality systems.

PREREQUISITES: Mathematics, Software Engineering, Analysis and Design of Algorithms, Computer Graphics.

TEACHING METHODS: Lectures, given using digital projector and laboratory work with individual assignments developed in team.

METHOD OF ASSESSMENT: Two hours exam at the end of the semester and assessment of the individual assignment developed in team in the framework of the laboratory work.

INSTRUCTION LANGUAGE: English.

BIBLIOGRAPHY: 1. Lecture Notes; 2. Grigore Burdea, Philippe Coiffet: Virtual Reality Technology, Second Edition, John Wiley & Sons, 2003; 3. Sherman, W. R., A. Craig, Understanding Virtual Reality: Interface, Application, and Design, The Morgan Kaufmann Series in Computer Graphics, 2002; 4. by Craig, A., W. R. Sherman, J. D. Will, Developing Virtual Reality Applications: Foundations of Effective Design, Morgan Kaufmann, 2009; 5. Alan B. Craig, Understanding Augmented Reality: Concepts and Applications, Morgan Kaufmann, 2013; 6. Manocha, D., P. Calamia, M, C. Lin, L. Savioja, N. Tsingos, Interactive Sound Rendering, SIGGRAPH 2009, SIGGRAPH Course Notes, 2009. (<http://gamma.cs.unc.edu/SOUND09/>); 7. Otaduy, M., T. Igarashi, J. J. LaViola, Jr., Interaction: interfaces, algorithms, and applications, SIGGRAPH 2009, SIGGRAPH Course Notes, 2009; 8. Hughes, Andries van Dam, Morgan McGuire, David F. Sklar. Computer Graphics: Principle and Practice, 3-rd Edition, Addison Wesley, 2013; 9. Functionality Description of the 3D Studio Max package (Harper, J., Mastering Autodesk 3ds Max 2013, Sybex, 2012.)

DESCRIPTION OF THE COURSE

Name of the course Multimedia Systems	Code: BCSCe55	Semester: 8
Type of teaching: Lectures and Laboratory work	Lessons per week: L – 2 hours, LW – 2 hours	Number of credits: 4

LECTURER:

Prof. Ph.D. Milena Lazarova (FCST), tel. 965-3285, email: milaz@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Optional course for the “bachelor” degree students in specialty “Computer science and engineering” in Faculty “Computer systems and technologies”, TU-Sofia.

AIMS AND OBJECTIVES OF THE COURSE: The course aims to introduce students to the approaches, methods and tools for the creation and processing of various types of media information, including images, sound and video.

DESCRIPTION OF THE COURSE: The main topics concern: overview of computer multimedia – introduction, definitions, classification; of multimedia computer system structure; devices for input of multimedia information; devices for output of multimedia content; multimedia projects – development principles; stages of creating a multimedia product; presentation of multimedia information – images, audio and video data; images – file formats, vector and raster images, compression, means for processing graphics images; audio information – file formats, compression; means for audio processing; video data – file formats, compression; means for video processing; synchronization of multimedia flows.

PREREQUISITES: Mathematics; Computer Periphery; Programming Languages and Programming Environments.

TEACHING METHODS: Lectures, using slides, case studies, demo programs and multimedia presentations, course works assignments

METHOD OF ASSESSMENT: final exam.

INSTRUCTION LANGUAGE: Bulgarian.

BIBLIOGRAPHY: Savage M., K. Vogel, An Introduction to Digital Multimedia, Jones & Bartlett Publishers, 2013; Campbell R., Ch. Martin, B. Fabos, Media Essentials: A Brief Introduction, Bedford/St. Martin's, 2012; Adobe Creative Team, Adobe Flash Professional CS6 Classroom in a Book, Adobe Press, 2013; Osborn J., AGI Creative Team, Adobe Flash Professional CS6 Digital Classroom, Wiley, 2012; Roberts-Breslin J., Making Media: Foundations of Sound and Image Production, Focal Press, 2011; Rogers Y., H. Sharp, Jenny Preece Interaction Design: Beyond Human - Computer Interaction, Wiley, 2011; Musburger R., Single-Camera Video Production, Focal Press, 2010; Alten S., Recording and Producing Audio for Media, Cengage Learning, 2011; Owens J., G. Millerson, Video Production Handbook, Focal Press, 2011; Ulrich K., Flash Professional CS6: Visual QuickStart Guide, Peachpit Press, 2012; Labriola M., J. Tapper, Adobe Flex 4.5 Fundamentals: Training from the Source, Adobe Press, 2011.

DESCRIPTION OF THE COURSE

Name of the course Image processing	Code: BCSCe56	Semester: 8
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours; LW– 2 hours	Number of credits: 4

LECTURER:

Prof. Ph.D. M. Lazarova (FCST) – tel.: 965 3139, email: milaz@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Compulsory for the students of specialty Computer Science and Engineering in the bachelor programme of the Faculty of Computer Systems and Technologies.

AIMS AND OBJECTIVES OF THE COURSE: At the end of the course the students are expected to know and be able to implement fundamental algorithms and methods for image processing as well to use their knowledge in order to apply them in different real life problems.

DESCRIPTION OF THE COURSE: The main topics concern: Characteristics of digital images; Structures for description, presentation and analysis digital images; Pixel based operations with images; Geometric operation with images. Methods for image interpolation; Linear operations with images. Convolution and correlation; Selective image processing; Discrete transformations in frequency domain; Non-linear operations with images. Image restoration and reconstruction; Morphological operation with images; Image compression.

PREREQUISITES: Mathematics, Algorithms synthesis and analyses, Computer graphics.

TEACHING METHODS: Lectures using video-presentation with beamer, laboratory works for development, experiments, analyses and discussion on given examples and problems.

METHOD OF ASSESSMENT: Exam during the exam session with duration two academic hours, students give written answers to questions, problems or tasks (80%), laboratory works (20%).

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: Course web site: cs.tu-sofia.bg/enmoodle/course/view.php?id=67; Gonzales R., R. Woods, Digital Image Processing, Prentice-Hall, 2008; Petrou M., C. Petrou, Image Processing: The Fundamentals Wiley, 2010; Gonzalez R., R. Woods, S. Eddins, Digital Image Processing Using MATLAB, Gatesmark Publishing, 2009; Burger W., M. Burge, Principles of Digital Image Processing: Fundamental Techniques, Springer, 2011; Burger W., M. Burge, Digital Image Processing: An Algorithmic Introduction using Java, Springer, 2012; Burger W., M. Burge, Principles of Digital Image Processing: Advanced Methods, Springer, 2013; Solomon C., T. Breckon, Fundamentals of Digital Image Processing: A Practical Approach with Examples in Matlab, Wiley, 2011; Parker J. R., Algorithms for Image Processing and Computer Vision, Wiley, 2010; Nixon M., Feature Extraction & Image Processing for Computer Vision, Academic Press, 2010; Marques O., Practical Image and Video Processing Using MATLAB, Wiley-IEEE Press, 2011; Russ J., The Image Processing Handbook, CRC Press, 2011; Burger W., M. Burge, Principles of Digital Image Processing: Core Algorithms, Springer, 2009.

DESCRIPTION OF THE COURSE

Name of the course: Information Systems	Code: BCSCe57	Semester: 8
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours, LW – 1 hour	Number of credits: 4

LECTURER:

Prof. PhD Roumen Trifonov (FCST), tel.: 965 2838, e-mail: r_trifonov@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Obligatory subject „Information Systems” for the students of specialty Computer Science and Engineering in the bachelor programme of the Faculty of Computer Systems and Technologies at TU-Sofia.

AIMS AND OBJECTIVES OF THE COURSE: The aim of the course is to acquaint students with the theory and practice for design and development of information systems and Data Bases and with new trends in the domain. This will help them in future to professionally to know and apply the basic methods for development of information model and languages for model presentation; phases and methods for design and development of information systems, different information system architectures;

DESCRIPTION OF THE COURSE: The course discusses the problems concerning Information model, Description levels of information models, Basic conceptual models – Hierarchical model, Network model, Rational model, Object-Oriented model; Design of Data Bases, description languages of conceptual data model - E-R, ORM, UML; Phases of design – Survey of the current statement, Data modelling, Business rules, Functional constraints, Processing, External models, Model verification; Architectures of information systems, Client-Server, Three-layered architecture, WEB-based application; Contemporary Data Bases, Distributed Data Bases, Data Warehouses; Data Analysis. The laboratory work helps to better rationalization of lecture material and contribute to formation of practical skills.

PREREQUISITES: Basic knowledge in Programming and Data Bases.

TEACHING METHODS: Lectures (with slides, multimedia projector) and additional text materials; laboratory work (based on instructions) with computer.

METHOD OF ASSESSMENT: written examination at the end of the semester.

INSTRUCTION LANGUAGE: English.

BIBLIOGRAPHY: 1. Jan Speelpenning, Data Modeling and Relational Database Design, ORACLE Edition, 2011 2. <http://troels.arvin.dk/db/rdbms/links/>;

DESCRIPTON OF THE COUSE

Name of the course: Marketing in High Technologies	Code: BCSCe58.1	Semester: 8
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours, LW – 1 hour	Number of credits: 5

LECTURER:

Assoc. Prof. Ivaylo Simeonov, tel.: 02/965 33 63 , email: ivosim@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Elective managerial course for the students of bachelor degree of "Computer Science and Engineering" specialty from the Faculty of Computer Systems and Technologies at TU-Sofia.

AIMS AND OBJECTIVES OF THE COURSE: Upon completion of the course students will gain knowledge about the nature and role of marketing in high-technologies management, competitiveness and the successful activity and growth of firm. The goal of "Marketing in High Technologies" course is to form in students marketing oriented way of thinking.

DESCRIPTION OF THE COURSE: The course introduces students to basic issues of marketing policy and practice, main problems of marketing of high technologies, methods and techniques needed to the marketing activity in firms. Among some of the main topics covered in the course are: Markets and marketing systems. Marketing management. Marketing concepts. Marketing mix. Market segmentation. Contemporary tendencies in the development of high technologies and models for their management. Strategic marketing planning. Information systems in marketing. Research and development. Closed and open innovations. Role of marketing. Marketing communications. Functions of advertisement and types of advertisement. Competitiveness and competitive advantage.

PREREQUISTES: Basic knowledge in Economics, Management, Quantitative methods and Statistics, Informatics, Computer Systems and other.

TEACHING METHOODS: Lectures, supported by multimedia and tutorials during which case studies and practical tasks are analyzed and solved.

METHOD OF ASSESSMENT: Written exam at the end of the semester, which constitutes 70% of the final mark and performance during tutorials and lectures, which constitutes the other 30%.

INSTRUCTION LANGUADGE: English

BIBLIOGRAPHY: 1) Davidow, W. H. Marketing High Technology. An Insiders View. The Free Press. 1986; 2) Kotler, Ph. Marketing Management. Prentice-Hall International Editions. 2009; 3) Mohr, J., Sengupta, S. and Slater, S. Marketing of High-Technology Products and Innovations. Second Edition. Pearson Education. Pearson Prentice Hall. 2005; 4) Porter, M. Competitive Strategy: Techniques for Analyzing Industries and Competitors. Free Press. 2004. 5) Principles of marketing, Kotler Ph., Armstrong G.

DESCRIPTION OF THE COURSE

Name of the course Business Economics	Code: BCSC58-2	Semester: 8
Type of teaching: Lectures and laboratory work	Lessons per week: L – 2 hours, LW – 1 hour	Number of credits: 4

LECTURER:

Prof. Dr Ognyan Andreev (Faculty of Management), tel.: 965 2672, email: oandre@tu-sofia.bg
Technical University of Sofia

COURSE STATUS IN THE CURRICULUM: Optional Managerial course for the students of specialty Computer Science and Engineering in the bachelor programme of the Faculty of Computer Systems and Technologies.

AIMS AND OBJECTIVES OF THE COURSE: Teaching in the discipline of Economy provides the students with knowledge on the functioning of enterprises under market conditions. This enables fast and competent solving of problems related to economy of management of business organizations.

DESCRIPTION OF THE COURSE: The teaching course provides basic The firm – the main economical subject in the business activity, Function of the firm in the market condition, Business policy of the firm, Resources of the firm, Production outcomes and working capacity, Expense and prices of the production, Placement of the production, Incomes, Finance and financial analysis

PREREQUISITES: Technological Practice, Mathematics & Statistics.

TEACHING METHODS: Lectures, using laptop and multimedia projector, case studies, seminars and team work.

METHOD OF ASSESSMENT: Final Exam in the end of semester (80%), students' work and performance during the semester (20%).

INSTRUCTION LANGUAGE: English

BIBLIOGRAPHY: Rickett Martin, Economics of Business Enterprise, Eduard Elgar Publishing, Davenport, H., The Economics of Enterprise, New York, 2009;