**DESCRIPTION OF THE COURSE**

| Name of the course:<br><br>**Digital Circuits** | Code: **MpCST21** | Semester: 1 |
|---|---|---|
| Type of teaching:<br>Lectures, Laboratory work,<br>course work | Lesson per week:<br>Lectures – 2 hours,<br>LW – 2 hours | Number of credits: **5** |

**LECTURER**:
Ass. Prof. Ph.D. Atanas Kostadinov, Computer Systems and Technologies Department, Phone + 359 32 659 726, Technical University - Sofia, Plovdiv branch

**STATUS IN THE CURRICULUM:** A compulsory subject for the Computer Systems and Technologies students admitted to the bachelor program. Computer Systems and Technologies Department belongs to the Electronics and Automation Faculty (EAF). EAF is a part of the Technical University – Sofia, Plovdiv branch.

**MAIN GOALS**: The main goal of the above-mentioned subject is the receiving of a knowledge and applying of this knowledge for analyzing, modeling and design of any digital circuits and devices. Based on the learned material in this field the students are able to get new knowledge according their future job requirements. At the end of the course, the students will:

- know basic terms used in the digital design;
- learn working principles of various digital circuits;
- compare and to classify those circuits using different parameters and characteristics;

**COURSE DESCRIPTION**: The main topics covered in this course are the next: Different logic gates and their truth tables; Different counter types. Frequency dividers; Register and shift register – the main purposes and parameters. LFSR – Linear Feedback Shift Register; Transistor-transistor Logic (TTL) – characteristics and parameters. The basic TTL circuit; Different TTL logic components – expanders, with open collector, three state circuits; Advanced TTL logic - AS, ALS and FAST; CMOS logic – parameters and characteristics; Advanced CMOS logic; BiCMOS logic. Voltage translation between different types of logic; RC differentiator and integrator; Monostable multivibrator; Schmitt trigger; Oscillators. RC oscillators. Crystal clock oscillators; Digital-to-Analog Converters (DACs) – parameters and characteristics. Different types of DAC; Analog-to-Digital converters (ADCs) – parameters and characteristics. Different types of ADC; Reconfigurable logic – historical path.Contemporary programmable integrated circuits (ICs) used in the design process; Hardware desrition languages – VHDL, Verilog, SystemC. Programmable ICs produced by Xilinx and Altera.

**PREREQUISITIES:** The prerequisites subjects are Semiconductor Electronic Components and Analysis and Synthesis of Logic Circuits.

**TEACHING METHODS**: Lectures and laboratory exercises on the above-mentioned topics including some tasks which have to be executed by the students during labs as well as self assigned tasks.

**ASSESSMENT METHOD**: The final mark consists of two parts. One part is formed by the written exam (multiplied by 0.9). Another part is derived from laboratory exercises work (multiplied by 0.1).

Laboratory exercises part of the final mark is based on the knowledge demonstrated by the students during labs.

The written exam consists of 6 tasks connected to the analysis and synthesis of digital circuits. There is opportunity to be selected one or another task by the students during examination.

**TEACHING LANGUAGE:** Bulgarian.

**BIBLIOGRAPHY:**

1. Mihov G. Digital Design (in Bulgarian), TU-Sofia, 2010.
2. Spasov G., Petrova G., Kostadinov A.., Digital and microprocessor systems design (in Bulgarian), TU-Sofia, 2012.
3. Vahid F., Digital design, with RTL design, VHDL and Verilog, second edition, John Wiley & Sons, 2011.
4. Haris D., Haris S., Digital design and computer architecture, second edition, Morgan Kaufmann, 2013.
5. http://e-shell.tu-plovdiv.bg
6. http://tu-utc.com/Webpages/E_learning/TsifrovaShem/index.html
7. http://www.ddvahid.com

# DESCRIPTION OF THE COURSE

| | | |
|---|---|---|
| Name of the course:<br><br>**Programming languages** | Code: **MpCST22** | Semester: 1 |
| Type of teaching:<br>Lectures, Laboratory work,<br>course work | Lesson per week:<br>Lectures – 2 hours,<br>LW – 2 hours | Number of credits: **5** |

**LECTURER**:
Assoc. Prof. PhD Ivaylo Atanassov (FEA) – tel.: 659 729, email: ivo_atan@tu-plovdiv.bg , Technical University of Sofia, branch Plovdiv

**COURSE STATUS IN THE CURRICULUM:** Mandatory course for students in Computer Systems and Technologies, B.Sc. programme of the Faculty of Electronics and Automatics, Technical University of Sofia, branch Plovdiv..

**AIMS AND OBJECTIVES OF THE COURSE:** The discipline aims at making students aware and acquire systematical knowledge in the field of the programming languages, as general and specific elements of the particular languages are being revealed, as well as implementation of different paradigms and features laid down in the basis of the up-to-date programming languages.

**DESCRIPTION OF THE COURSE:** Methods for realization of the programming languages, types of data, their variety and internal presentation have been reviewed in the beginning of the course. After that, it has been dwelt on the language tools for declaration of data, control structures and kinds of expressions in different languages. Various kinds of programme structures: block, modular & packet, object, class and component ones, models of the memory, subroutines and modes for parameter transmission are the core of the course. The specific features in parallel programming have been considered in the next several topics. Examples in Pascal, C, C++, Java, Ada, Modula-2, Fortran, Prolog, Lisp, Асемблер and HTML have been illustrated during the course. The laboratory exercises and workshops are targeted towards accumulation of knowledge in the programming language Java.
**PREREQUISITES:** PCU-I, PCU-II, Data structures, Discreet structures, Analysis and synthesis of algorithms .
**TEACHING METHODS**: Lectures and tutorials.
**METHOD OF ASSESSMENT**:. The overall grade is an aggregation of the two tests grades (80%) and the defense grade of a particular problem solution (20%).

**INSTRUCTION LANGUAGE:** Bulgarian.
**BIBLIOGRAPHY:**
1. Плачков Ив., “Програмни езици и програмни системи – Инженерен подход”, Унисофт, Пловдив, 1998; 2. Плачков Ив., “Ръководство по програмни езици – Програмиране на езика Java”, Унисофт, Пловдив, 1999;
3. Kathy Sierra, Bert Bates, “Java2 Sun cartified programmer & developer.Study guide”
4. Саймън Робърдс, Филир Хелър, “Java2 Пълно ръководство за сертифициране”

**DESCRIPTION OF THE COURSE**

| | | |
|---|---|---|
| Name of the course<br>**Organization of Computers** | Code: **MpCST23** | Semester: **1** |
| Type of teaching:<br>Lectures and<br>Laboratory work | Lessons per week:<br>L – 2 hours;<br>LW – 2 hour | Number of credits: **5** |

**LECTURER**: Prof. PhD Grisha Spasov tel.: 659 724,

E-mail: : gvs@tu-plovdiv.bg, Technical University of Sofia, branch Plovdiv

**COURSE STATUS IN THE CURRICULUM**: Compulsory subject for full-time students in the major of "Computer Systems and Technologies" of the Faculty of Electronics and Automation, Technical University of Sofia, branch Plovdiv,. B.Sc. program.

**AIMS AND OBJECTIVES OF THE COURSE:** The purpose of the course is to provide students with knowledge of the structure, organization and architecture of a computer system and its data processing as a process.

**DESCRIPTION OF THE COURSE:** The main topics concern: Structure, organization and architecture of a computer system. Von Neumann Architecture. Computer Classification. Technical and Economical Characteristics of Computers. Mathematical, Logical and engineering bases of computer organization. Computer processing, description system – PMS. Program control. Data set and command set . Computer operation structures. Binary Adders. Computer control structures Automats. Computer memory. Computer processors. Central Control Unit. Arithmetical Logical Unit. CISC and RISC. Scalar and Pipelined Processors with Prinstans and Harwards architecture. Coprocessors. Input-output of data in computers.

**PREREQUISITES:** Analysis and design of logic circuits, Operating Systems.

**TEACHING METHODS**: Lectures, using slides and multimedia presentations, laboratory work, using demo-programs, protocols preparation and defense.

**METHOD OF ASSESSMENT:** Written exam with test on the theory and written work on problems. The final grade is constructed on the exam results (totally 80%) and the protocols from the laboratory work (20%).

**INSTRUCTION LANGUAGE:** Bulgarian.

**BIBLIOGRAPHY:**

1. William Stallings, "Computer Organization and Architecture. Designing for Performance", Eighth Edition. Pearson Prentice Hall, 2010, ISBN: 978-0-13-607373-4.

2. Andrew S. Tanenbaum and Todd Austin, " Structured Computer Organization" 6th Edition, Pearson Education, 2012, ISBN: 978-0132916523.

3.David A. Patterson, John L. Hennessy, "Computer Organization and Design", Elsevier, 2012, ISBN: 978-0-12-374750-1.

# DESCRIPTION OF THE COURSE

| | | |
|---|---|---|
| Name of the course:<br>**Databases** | Code: **MpCST24** | Semester:1 |
| Classes:<br>Lectures,<br>Laboratory work | Lessons per week:<br>L – 2 hours,<br>E – 2 hours | Credits: **5** |

**LECTURER:**

Assoc. Prof. PhD Ivaylo Atanassov (FEA) – tel.: 659 729, email: ivo_atan@tu-plovdiv.bg , Technical University of Sofia, branch Plovdiv

**COURSE STATUS IN THE CURRICULUM:** Mandatory discipline for "Computer systems and technologies", faculty of "Electronics and automatics", Technical University – Sofia, branch Plovdiv, bachelor degree

**AIMS AND OBJECTIVES OF THE COURSE**: The "Databases" course aims to give students the basics of database systems – structure and functioning. The main topics of studying are relational algebra, data presentation with entity – relationship model, with relational model, data manipulation and definition with SQL.

**DESCRIPTION OF THE COURSE**: Main topics: Database systems basics and principles – independency and separation of program and data. Entity – relationship model. Relational model – notion of attribute, domain, null, record, relation. Scheme and relation instance. Relational calculus. SQL – principles of the SQL standard. Language structure. Data manipulation and definition.

**PREREQUISITES:** Discrete structures, Synthesis and analysis of algorithms, Operating systems

**TEACHING METHODS**: Lectures, exercises on the main topics, solving assignments related to the operating systems.

**METHOD OF ASSESSMENT**: The final mark is composed from the: students participation in the exercises, the examination test

**INSTRUCTION LANGUAGE:** Bulgarian

**BIBLIOGRAPHY:**

1. Elmasri, R., Fundamentals of Database Systems, 6th Ed, Addison-Wesley, 2010
2. Date, C., An Introduction to Database Systems, 8th Ed, Addison-Wesley, 2003
3. Silberschatz, A., H. Korth, S. Sudarshan, Database System Concepts, McGraw-Hill, 2010
4. Kline, K., B.hunt, D. Kline, SQL in a Nutshell, O'Reilly, 2008

**DESCRIPTION OF THE COURSE**

| | | |
|---|---|---|
| Name of the course<br>**Computer Networks** | Code: **MpCST25** | Semester: 1 |
| Type of teaching:<br>Lectures and laboratory work | Lessons per week:<br>L – 2 hours; LW – 2 hour | Number of credits: **5** |

**LECTURER**:

Πrof. Grisha Spasov PhD (FEA), tel.: 659 724, email: gvs@tu-plovdiv.bg

Technical University of Sofia, branch Plovdiv

**COURSE STATUS IN THE CURRICULUM**: Compulsory for the students specialty "Computer Systems and Technologies" B.Sc. programme of the Faculty of Electronics and Automatics, Technical University of Sofia, branch Plovdiv.

**AIMS AND OBJECTIVES OF THE COURSE:** At the end of the course the students are expected to have knowledge for Open Systems' Architecture – ISO OSI model, Global network – Internet and TCP/IP client-server applications.

**DESCRIPTION OF THE COURSE:** The main topics concern: Open Systems' Architectures – ISO OSI model. Structure and functions of OSI layers. Communication media. Methods of data transfer. Hardware aspects of data transfer – standard interfaces. Communication protocols. Data transfer control. Data link layer. LAN – topology. Media access control. IEEE 802.X standard. WLAN – IEEE 802.11. Network layer. Protocols. Architecture of Internet. TCP/IP protocol stack. Internet applications. File transfer –FTP, e-mail, WWW. Network operation systems. Client-server architecture – applications. Intranet, Extranet. VLAN. Network Operating Systems. Network administration. Network management - SNMP.

**PREREQUISITES:** Microprocessor technique, Microprocessor Systems, Operating Systems, Computer Architectures, Programming Languages.

**TEACHING METHODS**: Lectures, using slides and multimedia presentations, laboratory work, using demo-programs, protocols preparation and defence.

**METHOD OF ASSESSMENT:** Written exam with test on the theory and written work on problems. The final grade is constructed on the exam results (totally 80%) and the protocols from the laboratory work(20%).

**INSTRUCTION LANGUAGE:** Bulgarian.

**BIBLIOGRAPHY:** 1. Гриша Спасов, Николай Каканаков, Митко Шопов, "Ръководство за лабораторни упражнения по Компютърни мрежи", ТУ София, 2011, ISBN: 978-964-438-790-7. 2. James F. Kurose, Keith W. Ross, "Computer Networking. A Top-Down Approach Featuring the Internet", Fifth edition, Pearson, 2010, ISBN-13: 978-0- 13-607967-5. 3. Andrew S. Tanenbaum , David J. Wetherall , "Computer Networks", 5th Edition, Prentice Hall, 2010, ISBN-10: 0132126958. 4. William Stallings, "Data and Computer Communications" ,10th Edition, Prentice Hall, 2013, ISBN-10: 0133506487.

# DESCRIPTION OF THE COURSE

| | | |
|---|---|---|
| Name of the course:<br><br>**Programming and usage of computers** | Code: **MpCST26** | Semester: 1 |
| Type of teaching:<br>Lectures, Laboratory work, course work | Lesson per week:<br>L – 2 hours,<br>LW – 2 hours | Number of credits: **5** |

**LECTURER**:
Assoc. Prof. PhD Velko Ilchev (FEA) – tel.: 0895587475, email: iltchev@tu-plovdiv.bg , Technical University of Sofia, branch Plovdiv

**COURSE STATUS IN THE CURRICULUM:** Mandatory course for students in Computer Systems and Technologies, Faculty of Electronics and Automatics, Technical University of Sofia, branch Plovdiv.

**AIMS AND OBJECTIVES OF THE COURSE:** is for students to learn and be able to apply the approaches, methods and technical means, and the fundamental principles of the object-oriented approach of programming.

**DESCRIPTION OF THE COURSE:** Main topics: The Java platform. The Java virtual machine. Structure of Java program. Expressions and operations. Variables in Java: declarations and initialization. Control flow statements: branches – types, characteristics and implementation; loops – type, characteristics and implementation. Objects in Java: a class declaration, class members, methods, constructors, predefined methods, access modifiers, static variables and methods; objects – instances of a class, type conversion fro classes. Arrays, Strings. Exceptions. Graphical user interface in Java. Packages and compiled units: Java API. I/O streams. Java collections.

**PREREQUISITES:** PCU-I, PCU-II.

**TEACHING METHODS**: Lectures and tutorials.

**METHOD OF ASSESSMENT**: Two control tests during the semester consisting in solving of problems. The first test has a ratio of 0.4 and the second – 0.6 in the final assessment. If the student fails on a control tests – he/she must go to written exam in the supplementary session..

**INSTRUCTION LANGUAGE:** Bulgarian.

**BIBLIOGRAPHY::** 1. Thinking in Java, 4th, Bruce Eckel, Prentice Hall, 2006. 2. Java 2 Ръководство на програмиста, Хърбърт :илдт, София прес, 2007. 3 . The Java TM tutorials java.sun.com..

# DESCRIPTION OF THE COURSE

| | | |
|---|---|---|
| Name of the course<br>**Discrete Structures** | Code: **MpCST27** | Semester: 2 |
| Type of teaching:<br>Lectures, tutorials and laboratory work | Lessons per week:<br>L – 2 hours; T – 1 hour; LW – 1 hour | Number of credits: **5** |

**LECTURER**:
Prof. PhD Veselka Boeva (FEA), tel.: 659 723, email: vboeva@tu-plovdiv.bg, Technical University of Sofia, branch Plovdiv

**COURSE STATUS IN THE CURRICULUM**: Compulsory for second year students in Computer Systems and Technologies, B.Sc. programme of the Faculty of Electronics and Automatics, Technical University of Sofia, branch Plovdiv.

**AIMS AND OBJECTIVES OF THE COURSE:** The aim of the discipline is familiarizing the students with the basic concepts of discrete mathematics. The topics are related to the acquisition of knowledge and practical skills for application of discrete structures in the construction of algorithms and solving of tasks in the field of computer sciences.

**DESCRIPTION OF THE COURSE:** Main topics: Sets – main notions and operations. List and n-tuples. Cartesion product. Proof techniques – mathematical induction, proofs by contradiction, direct proofs. Combinatorics – permutations, combinations, variations. Relations and functions. Propositional and predicate logic. Graphs – main notions, representations, searching strategies. Trees – main notions. Minimal spanning tree. Boolean algebras and combinatorial circuits. Boolean functions. Automata, grammars and languages.

**PREREQUISITES:** Mathematics I, II and III, Programming and Computer Applications I, II and III.

**TEACHING METHODS**: Lectures, information visualization by a laptop and a multimedia projector, demo-programs and problem solving of particular tasks.

**METHOD OF ASSESSMENT:** Written test, including theory questions and solving of particular problems.

**INSTRUCTION LANGUAGE:** Bulgarian.

**BIBLIOGRAPHY:**
1. V. Koltun, *Discrete Structures*, Computer Science Department, Stanford University,Winter 2008; 2. H. Fell and J.A. Aslam, *Discrete Structures*, College of Computer and Information Science, Northeastern University, Boston, Massachusetts, 2009; 3. Кр. Манев, *Увод в дискретната математика*, Четвърто издание, КЛМН, София, 2006; 4. R. Johnsonbaugh, *Discrete Mathematics*, Prentice Hall Int., Saddle River, New Jersey, Fourth Edition, 1997; 5. Й. Денев, Р. Павлов, Я. Деметрович, *Дискретна математика*, Наука и изкуство, София, 1984; 6. Б. Болобаш, *Теория на графите*, Наука и изкуство, София, 1989; 7. Center for Discrete Mathematics & Theorethical Computer Science: http://dimacs.rutgers.edu/

**DESCRIPTION OF THE COURSE**

| | | |
|---|---|---|
| Name of the course<br>**Synthesis and Analysis of Algorithms** | Code: **MpCST28** | Semester: 2 |
| Type of teaching:<br>Lectures and laboratory work | Lessons per week:<br>L – 2 hours; LW – 2 hours | Number of credits: **6** |

**LECTURER**:
Prof. PhD Veselka Boeva (FEA), tel.: 659 723, email: vboeva@tu-plovdiv.bg, Technical University of Sofia, branch Plovdiv

**COURSE STATUS IN THE CURRICULUM**: Compulsory for second year students in Computer Systems and Technologies, B.Sc. programme of the Faculty of Electronics and Automatics, Technical University of Sofia, branch Plovdiv.

**AIMS AND OBJECTIVES OF THE COURSE:** To provide knowledge about algorithm design and analysis, to develop skills in programming and application of the basic algorithms.
**DESCRIPTION OF THE COURSE:** Main topics: Algorithm: main notions. Classification of algorithms. Elementary data structures: array, linked list, stack and queue algorithms. Analysis of algorithms. Methods for algorithm design: recursion, divide-and-conquer, dynamic programming. Elementary and advanced sorting methods. Searching algorithms. Tree and graph algorithms. Theory of algorithms. Heuristic, parallel and stochastic algorithms. Arithmetic algorithms. Algorithm verification.
**PREREQUISITES:** Mathematics I, II and III, Discrete Structures, Programming and Computer Applications I, II and III.
**TEACHING METHODS**: Lectures, information visualization by a laptop and a multimedia projector, demo-programs and problem solving of particular tasks, course project.
**METHOD OF ASSESSMENT:** Written test, including theory questions and solving of a particular problem. The overall grade is an aggregation of the test grade (80%) and the course project defence grade (20%).

**INSTRUCTION LANGUAGE:** Bulgarian.
**BIBLIOGRAPHY:**
1. Robert Sedgewick, Kevin Wayne, *Algorithms*, 4th ed., Pearson Education, Inc. 2011; 2. В. Боева и Д. Петрова. *Ръководство за лабораторни упражнения: Алгоритми и структури от данни*, Издателство на Технически университет-София, 2012; 3. Робърт Седжуик, *Алгоритми на C*, Софтпрес, 2003; 4. Преслав Наков, Панайот Добриков, *Програмиране=++Алгоритми*, СофтПрес, 2005; 5. Стойчо Стойчев, *Синтез и анализ на алгоритми*, Издателство "БПС", 2003; 6. T. Cormen, *Introduction to Algorithms*, Second Edition, MIT Press, 2009; 7. T. Cormen, C. Leiserson, R. Rivest, C. Stein, *Introduction to Algorithms*, Second Edition, The MIT Press, Cambridge, Massachusetts London, England, 2001; 8. Robert Sedgewick, *Algorithms in C*, Princeton University, Addison-Wesley Publishing Company, Inc., USA, 1990.

**DESCRIPTION OF THE COURSE**

| | | |
|---|---|---|
| Name of the course<br>**Computer architecture** | Code: **MpCST29** | Semester: **2** |
| Type of teaching:<br>Lectures, laboratory work | Lessons per week:<br>L – **2** hours; LW – **2** hour | Number of credits: **5** |

**LECTURER**:

Ass. Prof. Ph.D. Maria Marinova (FEA), Dept. CST – tel.: 659 727,
Technical University of Sofia, branch Plovdiv,
e-mail: m_marinova@tu-plovdiv.bg

**COURSE STATUS IN THE CURRICULUM**: Compulsory course for the students in BSc program in Computer systems and technologies.

**AIMS AND OBJECTIVES OF THE COURSE:** The aim of the course is to create knowledge about *Computer Architectures*: what is computer architecture and learn about basic components of modern processor architectures; out-of-order issue and execution in superscalar and multi-core processors; heterogeneous architectures and CUDA architecture.

**DESCRIPTION OF THE COURSE:** Computing model and architecture; „hot spots“ in processors; cache memory – functions of mapping, cache coherent protocols, placement polices, logical and physical caches; virtual organization – work with cache system; superscalar processors – instruction level parallelism, instruction dependencies, issue polices, organization of register files; ROB; architectures with thread-level parallelism; historical view of different project for non-traditional architectures (multiscalar, pre-execution, speculative execution, slip-stream, PIM); multi-core architectures, simultaneous multithreading vs hyper threading; *datapath* of execution of instructions of ARM processors; types of branch instructions, different branch predictors; heterogeneous processors with GPUs and TPUs.

**PREREQUISITES:** Good fundamental knowledge in the course: Computer Organization.

**TEACHING METHODS**: Lectures and laboratory work. For laboratory exercises we use simulation tools SimpleScalar, Sniper and SMPCache.

**METHOD OF ASSESSMENT:** Final mark is form like takes value of mark of test (70%) and laboratory work (30%).

**INSTRUCTION LANGUAGE:** Bulgarian

**BIBLIOGRAPHY:**

J. Hennessay, D. Patterson, Computer Architecture. A Quantum Approach, 6th edition,2017.

D. Patterson, J. Hennessay, Computer Organization and Design. The Hardware/Software Interface, RISC-V edition 2017

W. Stallings, Computer Organization and Architecture, Design for Performance. 10th edition. 2015.

L. Null, J. Lobur, The Essentials of Computer Organization and Architecture, 2010

D. Harris, S. Harris, Digital Design and Computer Architecture, Second Edition. 2013

J. Shen, M. Hipasti, Modern Processor Deign. Fundamentals of superscalar Processors. 2005

SimpleScalar: http://www.simplescalar.com/

Sniper simulator:http://snipersim.org/w/The_Sniper_Multi-Core_Simulator

SMPCache : http://arco.unex.es/smpcache/

ARM: https://www.arm.com/support

# DESCRIPTION OF THE COURSE

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|---|---|---|
| Name of the course:<br><br>**Programming environments** | Code: **MpCST30** | Semester: 2 |
| Type of teaching:<br>Lectures, Laboratory work, course work | Lesson per week:<br>L – 2 hours,<br>LW – 2 hours | Number of credits: **5** |

**LECTURER**:
Assoc. Prof. PhD Velko Ilchev (FEA) – tel.: 0895587475, email: iltchev@tu-plovdiv.bg , Technical University of Sofia, branch Plovdiv

**COURSE STATUS IN THE CURRICULUM:** Elective course for students in Computer Systems and Technologies, B.Sc. programme of the Faculty of Electronics and Automatics, Technical University of Sofia, branch Plovdiv.

**AIMS AND OBJECTIVES OF THE COURSE:** The students will gain learning as regards: the process of building of the Windows based applications, using of MFC library and its classes. The students are introduced to MS VC++ 6.0 integrated development environment and its ability of building different kinds of Windows based applications.

**DESCRIPTION OF THE COURSE:** Main topics: Windows programming model. Integrated development environment VC++, MFC library and base classes description. Overview of Win32 API. Message handling – messages, message queue, message loop. Document/view architecture – SDI and MDI applications. Device context and visual representation of data objects. Modal and modaless dialog boxes. Common dialog boxes. Common Windows controls. ActiveX controls. Multi-threaded programming – kernel threads, user threads, synchronization.

**PREREQUISITES:** PCU-I, PCU-II, Data structures, Analysis and synthesis of algorithms, Programming languages.

**TEACHING METHODS**: Lectures and tutorials.

**METHOD OF ASSESSMENT**: Written tests during the semester consisting in solving of problems. The overall grade is an aggregation of the test grades (80%) and the defense grade of a particular problem solution (20%).

**INSTRUCTION LANGUAGE:** Bulgarian.

**BIBLIOGRAPHY::** 1. Круглински Д.,”VC++6.0 Поглед отвътре”; 2. Плачков Ив., “Програмни езици и програмни системи – Инженерен подход”, Унисофт, Пловдив, 1998; 3. Petzold Charles., ”Programming Windows, Fifth Edition”; 4. Prosise J., ”Programming Windows with MFC, Second Edition”.

# DESCRIPTION OF THE COURSE

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|---|---|---|
| Name of the course<br>**Analysis and Design of Logic Circuits** | Code: **MpCST31** | Semester: **2** |
| Type of teaching:<br>Lectures, laboratory work | Lessons per week:<br>L – **2** hours; LW – **2** hour | Number of credits: **5** |

**LECTURER**:

Assistant Prof. Ph.D. Valentin Mollov (FEA), Dept. CST – tel.: 659 728,
Technical University of Sofia, branch Plovdiv,
e-mail: vmollov@tu-plovdiv.bg

**COURSE STATUS IN THE CURRICULUM**: Compulsory course for the students in BSc program in Computer systems and technologies.

**AIMS AND OBJECTIVES OF THE COURSE:** The aim of the course is to establish sound knowledge in computer hardware fundamentals.

**DESCRIPTION OF THE COURSE:**

The course comprises theoretical fundamentals of computer hardware such as Boolean algebra and Automata theory, as well as all practical aspects of digital circuits design and analysis. A number of lectures and laboratory exercises are devoted to design moderately complex circuits built from gates and basic logic elements (decoders, coders, multiplexers, etc.). The second part of the course deals with sequential circuits design and studying flip-flops, registers and counters. Contemporary methods and tools for logic simulation and verification are considered at the end of the course.

**PREREQUISITES:** Good knowledge in Mathematics.

**TEACHING METHODS**: Lectures and laboratory workshops.

**METHOD OF ASSESSMENT:** Knowledge assessment includes the following components - two tests during the semester (30%) and written exam (70%).

**INSTRUCTION LANGUAGE:** Bulgarian

**BIBLIOGRAPHY:**

1. Иванов С., Петкова Ю., Анализ и синтез на логически схеми, ТУ - Варна, 2009 г.
(Ivanov S., Petkova J., Analysis and Design of Logic Circuits, TU – Varna, 2009).
2. Михов Г., Цифрова схемотехника, ТУ – София, 2005 г.
(Michov G., Digital Circuits design, TU-Sofia, 2005).
3. Балканджиев Л., Пандов Е., Анализ и синтез на логически схеми, ТУ - София, 2003 г.
(Balkandzhiev L., Pandov E., Analysis and Design of Logic Circuits, TU - Sofia, 2003).
4. Иванов С., Петкова Ю. и др., Ръководство по анализ и синтез на логически схеми, Варна, 2005
(Ivanov S., Petkova J., Tutorial on Analysis and Design of Logic Circuits, TU - Varna, 2005).
5. Alan Clements, The principles of Computer Hardware, Oxford University Press, 2006.
6. www.scribd.com/doc/135290251/Анализ-и-синтез-на-логически-схеми
7. www.unicheats.net/tu/379/
8. www.asic-world.com/verilog/veritut.html
9. www.vol.verilog.com/
10. www.euler.ecs.umass.edu/ece232/pdf/03-verilog-11.pdf
11. www.cseweb.ucsd.edu/classes/wi14/cse140L-a/modelsim_tut.pdf

# DESCRIPTION OF THE COURSE

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| Name of the course<br>**Operating systems** | Code: **MpCST32** | Semester: 2 |
| Type of teaching:<br>Lectures<br>Laboratory work | Lessons per week:<br>L – 2 hours<br>LW – 2 hours | Credits: **5** |

**LECTURER:**

Assoc. Prof. PhD Ivaylo Atanassov (FEA) – tel.: 659 729, email: ivo_atan@tu-plovdiv.bg , Technical University of Sofia, branch Plovdiv

**COURSE STATUS IN THE CURRICULUM:** Mandatory discipline for "Computer systems and technologies", faculty of "Electronics and automatics", Technical University – Sofia, branch Plovdiv, bachelor degree

**AIMS AND OBJECTIVES OF THE COURSE**: The "Operating systems" course aims to give students the basics of operating systems – structure and functioning. The main topics of studying are processes and threads, scheduling algorithms, memory management, file systems. At the end of the course the students should be able to create, manage and synchronize threads and processes, be aware of virtual memory management – replacement and allocation algorithms, working with the file systems APIs.

**DESCRIPTION OF THE COURSE**: Main topics: Operating systems – structure and modules. Processes and threads – basic terms. Working with processes and threads. Scheduling. Synchronization and synchronization primitives. Memory management – memory hierarchy. Virtula memory with paging – page table, page fault, page replacement algorithms. Virtual memory with segmentation and segmentation with paging. File systems – structure, main modules. File allocation methods, directory management, file system APIs.

**PREREQUISITES:** Programming of computers – part I, II, III, Discrete structures, Synthesis and analysis of algorithms.

**TEACHING METHODS**: Lectures, exercises on the main topics, solving assignments related to the operating systems.

**METHOD OF ASSESSMENT**: The final mark is composed from the: students participation in the exercises, the examination test

**INSTRUCTION LANGUAGE:** Bulgarian

**BIBLIOGRAPHY:**

1. Tanenbaum, A., Modern Operating Systems, 3rd Ed, Prentice Hall, 2007
2. Silberschatz, A., P. Galvin, G. Gagne, Operating Systems Concepts, 9th Ed, John Wiley & Sons, 2012
3. Stallings, W., Operating Systems: Internals and Design Principles, 7th Ed, Prentice Hall, 2011
4. Sedgewick, R., K. Wayne, Algorithms, 4th Ed., 2011
5. Arpaci-Dusseau, R., A. Arpaci-Dusseau, Operating Systems: Three Easy Pieces, University of Wisconsin, 2013
6. Love, R., Linux Kernel Development, 3rd Edition, Addison-Wesley, 2010