# UNIVERSITY OF ECONOMICS - VARNA

## FACULTY OF INFORMATICS

### DEPARTMENT OF INFORMATICS

**Adopted by the FC (record № 9/24.04.2024)**
**Adopted by the DC (record № 10/16.04.2024)**

**ACCEPTED BY:**
**Dean:**
**(Prof. Vladimir Sulov, PhD)**

# SYLLABUS

**SUBJECT: COMPUTER SYSTEMS**

**DEGREE PROGRAMME: Computer Science; MASTER`S DEGREE**

**YEAR OF STUDY: 5 for other field graduates; SEMESTER: 10 for other field graduates**

**TOTAL STUDENT WORKLOAD: 360 hours; incl. curricular 60 hours**

**CREDITS: 12**

**DISTRIBUTION OF STUDENT WORKLOAD ACCORDING TO THE CURRICULUM**

| *TYPE OF STUDY HOURS* | **WORKLOAD, hours** | **TEACHING HOURS PER WEEK, hours** |
|---|---|---|
| CURRICULAR:<br>incl.<br>• LECTURES<br>• SEMINARS / LAB. EXERCISES | <br><br>30<br>30 | <br><br>2<br>2 |
| EXTRACURRICULAR | 300 | - |

**Prepared by:**

**1. ……..**
**(Assoc. Prof. Ivan Kuyumdzhiev, PhD)**

**2. ……**
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**Head of department of Informatics: ……**
**(Prof. Julian Vasilev , PhD)**

## I. ANNOTATION

*The subject "Computer Systems" provides the necessary knowledge and understanding of the functional and structural organization of modern computer systems. The practical aspects related to the principle of operation of the main devices and their characteristics are part of the suggested knowledge. In a practical aspect, knowledge is provided for configuring and testing computer systems, as well as for installing, configuring, and maintaining operating systems, specifically through a selected operating system current at the time of studying the discipline.*

*Expected result: formation of knowledge for evaluation, selection, and modernization of computer configurations; about the role of operating systems, their architecture, and basic mechanisms. Based on this knowledge and through practical work in the classes of the discipline, skills are created to be applied in the administration of computer systems, and the detection and elimination of problems in their work.*

*In the course of training, the following key competencies are applied and developed, according to the recommendation of the Council of the European Union dated May 22, 2018, namely:*

*• Mathematical competence and competence in exact sciences, technologies, and engineering - group 3. Ability to solve multi-criteria tasks, to use and apply models and concepts. The administration of computer systems requires the acquisition of complex knowledge and the acquisition of skills to deal with critical problems arising from hardware and/or software malfunctions. Students should be able to apply in practice decision models for troubleshooting critical errors in the operation of computer systems;*

*• Digital competence - group 4. Ability to choose and apply specialized software for computer system administration, for developing scripts for automating daily, frequently repeated tasks;*

*• Personal competence - group 5. Ability to apply a variety of communication approaches and tools that are adapted to the context of interaction. Acquiring skills to solve real-life problems, to plan tasks, to organize one's work and to deal with conflicts.*

## II. THEMATIC CONTENT

| № | TITLE OF UNIT AND SUBTOPICS | NUMBER OF HOURS | | |
|---|---|---|---|---|
| | | L | S | L.E. |
| **Theme 1. Organization of the computer system.** | | **2** | **2** | |
| 1.1. | Functional and structural organization of the computer. | 1 | 1 | |
| 1.2. | Development of bus architecture. Types of buses. Standards. | 1 | 1 | |
| **Theme 2. Processor and Memory Subsystem.** | | **6** | **6** | |
| 2.1. | Processor. Key features. Multi-core processors. | 2 | 2 | |
| 2.2. | System memory - hierarchy and classification. Synchronous dynamic memory - generations, basic features, modules. | 2 | 2 | |
| 2.3. | Types of external memory - basic features and types of interfaces for connecting to the computer system. | 2 | 2 | |
| **Theme 3. Expansion Cards.** | | **2** | **2** | |
| 3.1. | Types of expansion cards. Basic interfaces. | 1 | 1 | |
| 3.2. | Video card – implementation methods and key features. Multigraphic systems. Video interfaces. | 1 | 1 | |
| **Theme 4. Configuring computer systems.** | | **4** | **4** | |
| 4.1. | Motherboards - key features, ports, connectors. | 2 | 2 | |
| 4.2. | Cases and power supply - key features, standards. | 1 | 1 | |
| 4.3. | Selection and configuration of a computer system. Requirements. | 1 | 1 | |
| **Theme 5. General features of the Operating Systems.** | | **4** | **-** | |
| 5.1. | Purpose and main functions of the operating system. Classification. | 2 | - | |

| | | | | |
|---|---|---|---|---|
| 5.2. | Basic concepts - multitasking, system and user mode, command language, application programming interface, etc. | 2 | - | |
| **Theme 6. Operating System Architecture and Basic Mechanisms.** | | **7** | - | |
| 6.1. | Basic architecture and models for operating systems. | 5 | - | |
| 6.2. | Events management (interruptions and exceptions), synchronization, local procedure callings, etc. | 2 | - | |
| **Theme 7. Operating System Administration.** | | - | **4** | |
| 7.1. | Installing an operating system. Virtualization. | - | 2 | |
| 7.2. | Setup and maintenance tools. | - | 2 | |
| **Theme 8. Configuring an Operating system** | | **2** | **8** | |
| 8.1. | Basic configuration files, and configuration of the work environment. | 1 | 2 | |
| 8.2. | Shell - basic commands. | 1 | 2 | |
| 8.3. | Device management and file systems. | - | 2 | |
| 8.4. | User accounts and groups. | - | 2 | |
| **Theme 9. Fundamentals of Script Development** | | **3** | **4** | |
| 9.1. | Script syntax - variables, conditional and cyclic structures, functions. | 2 | 2 | |
| 9.2. | Scripts for administration of daily system tasks. | 1 | 2 | |
| | **Total:** | **30** | **30** | |

## III. FORMS OF CONTROL:

| № | TYPE AND FORM OF CONTROL | Number | extracurricular, hours |
|---|---|---|---|
| | | | |
| **1.** | **Midterm control** | | |
| 1.1. | Test | 1 | 50 |
| 1.2. | Practical Test | 2 | 100 |
| | **Total midterm control:** | **3** | **150** |
| **2.** | **Final term control** | | |
| 2.1. | Examination (test) | 1 | 150 |
| | **Total final term control:** | **1** | **150** |
| | **Total for all types of control:** | **4** | **300** |

## IV. LITERATURE

**REQUIRED (BASIC) LITERATURE:**

1. Online lectures (http://e-learn.ue-varna.bg)
2. Lindsay, A. (2019). Linux: 2019 NEW Easy User Manual to Learn the Linux Operating System and Linux Command Line. Independently published.
3. Shotts, W. (2019). The Linux Command Line, 2nd Edition: A Complete Introduction. No Starch Press

**RECOMMENDED (ADDITIONAL) LITERATURE:**

1. Ayden, N. Linux: A Complete Guide to Learn Linux Commands, Linux Operating System and Shell Scripting Step-by-Step. Crawford Press, 2021.
2. Marsh, N. Linux, Unix, and BSD Command Line Cross-Reference (Second Edition): A Fat Free Pocket Guide for *nix Commands (Fat-Free Technology Guides). Fat Free Publishing, 2023

3. Meyers, M. (2019). CompTIA A+ Certification All-in-One Exam Guide. 10th Edition (Exams 220-1001 & 220-1002). McGraw Hill.
4. Quentin, D. and Buhagiar, J. (2022). CompTIA A+ Complete Study Guide: Core 1 Exam 220-1101 and Core 2 Exam 220-1102. 5th Edition. Sybex.