

SYLLABUS OPERATING SYSTEMS

1. Information on academic programme

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| 1.1. University | „1 Decembrie 1918” University of Alba Iulia |
| 1.2. Faculty | Faculty of Informatics and Engineering |
| 1.3. Department | Informatics . Mathematics and Electronics |
| 1.4. Field of Study | Computer Science |
| 1.5. Cycle of Study | Undergraduate |
| 1.6. Academic programme / Qualification | Computer Science /ESCO: 2512/ Software developers Analyst 251201 Computer System Programmer 251204 Computer System Engineer 251203 |

2. Information of Course Matter

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| 2.1. Course | | <i>Operating Systems</i> | | 2.2. Code | | CSE 110 | |
| 2.3. Course Leader | | | | Incze Arpad | | | |
| 2.4. Seminar Tutor | | | | Incze Arpad | | | |
| 2.5. Academic Year | I | 2.6. Semester | II | 2.7. Type of Evaluation (E – final exam/ CE - colloquy examination / CA -continuous assessment) | E | 2.8. Type of course (C– Compulsory, Op – optional, F - Facultative) | C |

3. Course Structure (Weekly number of hours)

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| 3.1. Weekly number of hours | 4 | 3.2. course | 2 | 3.3. seminar, laboratory | 2 |
| 3.4. Total number of hours in the curriculum | 56 | 3.5. course | 28 | 3.6. seminar, laboratory | 28 |
| Allocation of time: | | | | | Hours |
| Individual study of readers | | | | | 40 |
| Documentation (library) | | | | | 20 |
| Home assignments, Essays, Portfolios | | | | | 28 |
| Tutorials | | | | | - |
| Assessment (examinations) | | | | | 6 |
| Other activities..... | | | | | - |

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| 3.7 Total number of hours for individual study | 94 |
| 3.8 Total number of hours in the curriculum | 56 |
| 3.9 Total number of hours per semester | 150 |
| 3.10 Number of ECTS | 6 |

4. Prerequisites (*where applicable*)

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| 4.1. curriculum-based | <i>Previous courses:</i> Computer Systems Architecture |
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| 4.2. competence-based | <p>C2.1 The identification of appropriate methodologies for software systems development.</p> <p>C2.2 The identification and explanation of appropriate mechanisms for software systems specification.</p> <p>C2.3 The use of methodologies, specification mechanisms and development environments for the development of computer applications.</p> <p>C2.4. The use of appropriate criteria and methods for the evaluation of computer applications.</p> <p>C2.5. The development of dedicated computer projects.</p> |
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5. Requisites (where applicable)

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| 5.1. course-related | Room equipped with video projector |
| 5.2. seminar/laboratory-based | Computer laboratory with PCs installed with any Windows and Linux distribution |

6. Specific competences to be acquired (chosen by the course leader from the programme general competences grid)

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| Professional competences | <p>CP3 (3 ECTS) designs the IT system Defines the architecture, composition, components, modules, interfaces and data for the integrated IT systems (hardware, software and network) based on the system requirements and specifications.</p> <p>CP13 (3 ECTS) solves problems of ICT systems Identify possible component failures. Monitors, documents and communicates about incidents. It mobilizes appropriate resources with minimal disruption and uses appropriate diagnostic tools.</p> |
| Transversal competences | Not applicable |

7. Course objectives (as per the programme specific competences grid)

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| 7.1 General objectives of the course | <p>The „Operating Systems” course allows students to understand the base concepts regarding the different Operating Systems used on various computer system architectures.</p> <p>The course has two main objectives:</p> <ol style="list-style-type: none"> 1. It offers the theoretical foundation for the understanding of the base concepts regarding Operating Systems and their functioning. 2. The laboratory activities aim at developing abilities in accessing hardware and software resources of a computer system. <p>In accordance with the curriculum plan, the activities of this course are finalized by a written examination. The laboratory activities will also be graded.</p> <p>C2 Development and maintenance of computer applications</p> <p>C2.1 The identification of appropriate methodologies for software systems development.</p> <p>C2.2 The identification and explanation of appropriate mechanisms for software systems specification.</p> <p>C2.3 The use of methodologies, specification mechanisms and development environments for the development of computer applications.</p> <p>C2.4. The use of appropriate criteria and methods for the evaluation of computer applications.</p> <p>C2.5. The development of dedicated computer projects.</p> <p>C6 Design and administration of computer networks</p> <p>C6.1. The identification of base concepts and models for computer systems and computer networks.</p> <p>C6.2. The identification and explanation of base architectures for organizing and managing systems and networks.</p> <p>C6.3. The use of various techniques for installing, configuring and managing systems and networks.</p> <p>C6.4. The conducting of performance measurements for response times, resource consumption; establishing access rights.</p> <p>C6.5. The development of computer-network projects.</p> |
| 7.2 Specific objectives of the course | <p>Cognitive competences: acquiring fundamental knowledge regarding the main concepts of operating systems in general and of DOS, Windows and Linux in particular as well as acquiring the abilities to use these systems.</p> |

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| | <p>Technical / professional competences: the correct use of operating systems, knowledge of specific instructions and features, using assembly language to call SO functions.</p> <p>Affective competencies: developing the capacity to understand the operating systems currently used in various application-settings.</p> |
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8. Course contents

| 8.1 Course (learning units) | Teaching methods | Remarks |
|--|---|---------|
| 1. Operating systems Introduction Functions Components PC operating systems Definitions, context, history Overview of operating systems Types of Operating Systems UNIX, Linux, OS X, Windows Responsibilities and functionalities Execution environments. Virtualization | <i>Lecture, conversation, exemplification</i> | 2 |
| 2. Tools used for creating OS Monoprogramming Multiprogramming (Multitasking) The Spooling System The Time-Sharing System Multiprocessing Hard disk and memory management | <i>Lecture, conversation, exemplification</i> | 2 |
| 3. File systems Definitions. Characteristics Storage media. Types of file systems Hierarchical organization. File types. Device abstraction Permissions and ownership File system layout. File attributes | <i>Lecture, conversation, exemplification</i> | 2 |
| 4. Processes 1. Concepts 2. Processes. Process states. Scheduling 3. Process groups. Process attributes. Inheritance | <i>Lecture, conversation, exemplification</i> | 2 |
| 5 Linux operating system The Linux environment Installation and configuration File access File management | <i>Lecture, conversation, exemplification</i> | 4 hours |
| 6 Linux operating system Users and rights. Authentication and authorization. User spaces Users, administrators and power users User interfaces | <i>Lecture, conversation, exemplification</i> | 2 |
| 7 The command-line interface Purpose and benefits The UNIX/LINUX command line Shell scripting. Regular expressions | <i>Lecture, conversation, exemplification</i> | 2 |
| 8 The WINDOWS operating system | <i>Lecture, conversation,</i> | 4 hours |

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| <i>Particularities</i> <i>Calling system functions</i> <i>File management</i> <i>User management</i> <i>Services</i> | <i>exemplification</i> | |
| 9 Networking in windows | | 2 |
| 10 The Windows command line | | 2 |
| 11 Hardware and software diagnostics tools | | 2 |
| 12 Threads. Concepts. Multithreading | | 2 |
| Seminars-laboratories | Teaching methods | |
| 1. Installing and configuring a virtual machine under windows (needed for linux) | <i>Project-work, computer-based activities, laboratory activities</i> | 2 |
| 2. Installation and configuration of Linux | | 2 |
| 3. Basic shell commands | | 2 |
| 4. File handling in linux | | 2 |
| 5. Text handling in linux | | 2 |
| 6. System information and Processes | | 2 |
| 7. Networking in linux | | 2 |
| 8. User administration under linux | | 2 |
| 9. Installing and configuring Windows | | 2 |
| 10. Users and rights in Windows | | 2 |
| 11. File and network management under windows | | 2 |
| 12. Tools for OS diagnostics and maintenance | | 2 |
| 13. Project | | 2 |
| References | | |
| 1. Andrew S. Tanenbaum, <i>Modern Operating Systems (3rd Edition)</i> . Prentice Hall, 2007. | | |
| 2. Matthias Kalle Dalheimer, Matt Welsh. <i>Running Linux (5th Edition)</i> . O'Reilly, 2005. | | |

9. Corroboration of course contents with the expectations of the epistemic community's significant representatives, professional associations and employers in the field of the academic programme

1. *Periodic discussions with main employers*

10. Assessment

| Activity | 10.1 Evaluation criteria | 10.2 Evaluation methods | 10.3 Percentage of final grade |
|---|------------------------------|--|--------------------------------|
| 10.4 Course | <i>Final evaluation</i> | <i>Multiple choice test</i> | 60% |
| | - | - | - |
| 10.5 Seminar/laboratory | <i>Continuous assessment</i> | <i>Laboratory activities portfolio</i> | 40% |
| | - | | - |
| 10.6 Minimum performance standard: A grade of minimum 5 | | | |

Submission date

Course leader signature

Seminar tutor signature

Date of approval by Department members

Department director signature

Date of approval by Faculty council

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