**SYLLABUS**

**FI 106 OPERATING SYSTEMS**

## 1. Information on academic programme

| | |
|---|---|
| 1.1. University | **„1 Decembrie 1918" University of Alba Iulia** |
| 1.2. Faculty | **Faculty of Exact Sciences and Engineering** |
| 1.3. Department | **Exact Sciences and Engineering Department** |
| 1.4. Field of Study | **Computer Science** |
| 1.5. Cycle of Study | **Undergraduate** |
| 1.6. Academic programme / Qualification | **Computer Science** |

## 2. Information of Course Matter

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2.1. **Course** | *Operating Systems* | | | 2.2. **Code** | | CSE 110 | |
| 2.3. **Course Leader** | | Incze Arpad | | | | | |
| 2.4. **Seminar Tutor** | | Incze Arpad | | | | | |
| 2.5. Academic Year | **II** | 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)

| | | | | | |
|---|---|---|---|---|---|
| 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……. | **-** |

| | |
|---|---|
| 3.7 Total number of hours for individual study | 94 |
| 3.9 Total number of hours per semester | 150 |
| 3.10 Number of ECTS | 6 |

4. Prerequisites (*where applicable*)

| | |
|---|---|
| 4.1. curriculum-based | Previous courses:<br>Computer Systems Architecture |
| 4.2. competence-based | C2.1 The identification of appropriate methodologies for software systems development.<br>C2.2 The identification and explanation of appropriate mechanisms for software systems specification.<br>C2.3 The use of methodologies, specification mechanisms and development environments for the development of computer applications. |

| | |
|---|---|
| | C2.4. The use of appropriate criteria and methods for the evaluation of computer applications.<br>*C2.5. The development of dedicated computer projects.* |

5. **Requisites** (*where applicable*)

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

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

| | |
|---|---|
| Professional competences | C3 The use of computer tools in an interdisciplinary context<br>C6 Design and management of computer networks |
| Transversal competences | *Not applicable* |

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

| | |
|---|---|
| 7.1 General objectives of the course | *The „Operating Systems" course alows students to understand the base concepts regarding the different Operating Systems used on various computer system architectures.*<br>*The course has two main objectives:*<br>1. *It offers the theoretical foundation for the understanding of the base concepts regarding Operating Systems and their functioning.*<br>2. *The laboratory activities aim at developing abilities in accesing hardware and software resources of a computer system.*<br>*In accordance with the curriculum plan, the activities of this course are finalized by a written examination. The laboratory activities will also be graded.*<br>***C2 Development and maintenance of computer applications***<br>*C2.1 The identification of appropriate methodologies for software systems development.*<br>*C2.2 The identification and explanation of appropriate mechanisms for software systems specification.*<br>*C2.3 The use of methodologies, specification mechanisms and development environments for the development of computer applications.*<br>*C2.4. The use of appropriate criteria and methods for the evaluation of computer applications.*<br>*C2.5. The development of dedicated computer projects.*<br>***C6 Proiectarea si administrarea reţelelor de calculatoare***<br>*C6.1. The identification of base concepts and models for computer systems and computer networks.*<br>*C6.2. The identification and explanation of base architectures for organizing and managing systems and networks.*<br>*C6.3. The use of various techniques for installing, configuring and managing systems and networks.*<br>*C6.4. The conducting of performance measurements for response times, resource consumption; establishing access rights.*<br>*C6.5. The development of computer-network projects.* |
| 7.2 Specific objectives of the course | *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.*<br>*Technical / professional competences: the correct use of operating systems, knowledge of specific instructions and features, using assembly language to call SO functions.*<br>*Affective competences: developing the capacity to undestand the operating systems currently used in various application-settings.* |

8. Course contents

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

| | | |
|---|---|---|
| *Particularities*<br>*Calling system functions*<br>*File mamnagement*<br>*User management*<br>*Services* | ***exemplification*** | |
| **9 Networking in windows** | | |
| **10 The Windows command line** | | |
| **11 Hardware and software diagnostics tools** | | |
| **12 Threads. Concepts. Multithreading** | | |

| **Seminars-laboratories** | **Teaching methods** | |
|---|---|---|
| 1. Installing and configuring a virtual machine under windows (needed for linux)<br>2. Instalation and configuration of Linux<br>3. Basic shell commands<br>4. File handling in linux<br>5. Text handling in linux<br>6. System information and Processes<br>7. Networking in linux<br>8. User administration under linux<br>9. Installing and configuring Windows<br>10. Users and rights in Windows<br>11. File and network management under windows<br>12. Tools for OS diagnostics and maitanance<br>13. Project | ***Project-work, computer-based activities, laboratory activities*** | |

**References**

Andrew S. Tanenbaum, *Modern Operating Systems (3rd Edition).* Prentice Hall, 2007.
Matthias Kalle Dalheimer, Matt Welsh. Running Linux (5$^{th}$ *Edition)*. 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 | *Final evaluation* | *Written paper* | 50% |
| | - | - | - |
| 10.5 Seminar/laboratory | *Continuous assessment* | *Laboratory activities portfolio* | 50% |
| | - | | - |
| 10.6 Minimum performance standard: A laboratory grade of minimum **5** | | | |

Submission date _____ Course leader signature _____ Seminar tutor signature _____

Date of approval by Department members Department director signature