

syllabus

1. Information regarding the programme

1.1 Higher education institution	Babeş-Bolyai University
1.2 Faculty	Faculty of Mathematics and Computer Science
1.3 Department	Department of Computer Science
1.4 Field of study	Mathematics
1.5 Study cycle	Bachelor
1.6 Study programme / Qualification	Mathematics and Computer Science - English

2. Information regarding the discipline

2.1 Name of the discipline (en) (ro)	Operating Systems Sisteme de Operare						
2.2 Course coordinator	Conf. Dr. Sanda-Maria Dragoş						
2.3 Seminar coordinator	Conf. Dr. Sanda-Maria Dragoş						
2.4 Year of study	2	2.5 Semester	4	2.6. Type of evaluation	E	2.7 Type of discipline	Mand.

3. Total estimated time (hours/semester of didactic activities)

3.1 Hours per week	4	Of which: 3.2 course	2	3.3 seminar/laboratory	2
3.4 Total hours in the curriculum	56	Of which: 3.5 course	28	3.6 seminar/laboratory	28
Time allotment:					ore
Learning using manual, course support, bibliography, course notes					20
Additional documentation (in libraries, on electronic platforms, field documentation)					10
Preparation for seminars/labs, homework, papers, portfolios and essays					20
Tutorship					3
Evaluations					14
Other activities:					
3.7 Total individual study hours	69				
3.8 Total hours per semester	125				
3.9 Number of ECTS credits	5				

4. Prerequisites (if necessary)

4.1 curriculum	
4.2 competencies	<ul style="list-style-type: none"> • Basic programming skills in C standard.

5. Conditions (if necessary)

5.1 for the course	<ul style="list-style-type: none"> • A lecture class with video projector.
5.2 for the seminar /lab activities	<ul style="list-style-type: none"> • Laboratory with computers connected to the Internet and operating systems UNIX/ LINUX –like or access to an UNIX/LINUX server.

6. Specific competencies acquired

<p>Professional competencies</p>	<ul style="list-style-type: none"> • Identify basic concepts and models for computer systems. • Identify and explain the basic architecture for the organization and management systems. • Use techniques for installation, configuration and systems management.
<p>Transversal competencies</p>	<ul style="list-style-type: none"> • Applying organized and efficient work rules, the responsible attitudes of the teaching-scientific, for harnessing creative potential, the principles and rules of professional ethics. • The use of effective learning methods and techniques, information, research and capacity to exploit the knowledge to adapt to a dynamic society and communication in Romanian and in an international language.

7. Objectives of the discipline (outcome of the acquired competencies)

<p>7.1 General objective of the discipline</p>	<ul style="list-style-type: none"> • Uptake of the learner the main concepts underlying operating systems.
<p>7.2 Specific objective of the discipline</p>	<ul style="list-style-type: none"> • Acquiring main facilities offered by the UNIX operating system. • Acquiring skills in Shell programming and processing text files under UNIX. • Management of multitasking applications using UNIX processes.

8. Content

8.1 Course	Teaching methods	Remarks
<p>1-3 Unix OS: external interfaces</p> <ul style="list-style-type: none"> - The general structure of an operating system - Regular expressions to specify files; generic specification - Filters; general principles: sort, awk, sed, grep - Unix Shells: sh, csh, ksh, bash; overview - Useful Shell commands and external processes management - Shell programming; - The structure of directories in Unix system - The mount-ing concept - Symbolic and hard links 	<p>Exposure: description, explanation, examples, discussion of case studies</p>	
<p>4-7 Unix operating system: system calls, internal structures</p> <ul style="list-style-type: none"> - Files and processes under Unix - I / O using handle: open, close, lseek, read, write, after, dup2 - File Protection - Processes in Unix; process structure - Calls process management system: fork, wait, exit, exec * - Communications between processes: pipe, popen, 	<p>Exposure: description, explanation, examples, discussion of case studies</p>	

FIFO - POSIX Threads		
8-9 Filesystems - General management issues disk and file systems - Planning disk access - The internal structure of the disk and DOS file system; FAT - The internal structure of the disk and file system Windows NT & 2000; NTFS mechanism, MFT file - The internal structure of the disk and Unix file system; i-node mechanism	Exposure: description, explanation, examples, discussion of case studies	
10-14 General Theory of operating systems - Types of computers and operating systems. Classifications - I/O Channel, multiple buffers. Multiprogramming. - General structure and functions of an operating system - The concept of process: specification, competition, semaphores, deadlock - Process Scheduling - Problems with memory management - Planning exchange between the internal memory and secondary	Exposure: description, explanation, examples, discussion of case studies	
Bibliography In English:		
<ol style="list-style-type: none"> 1. Albing, C., Vossen, J.P., Newhman, C., bash Cookbook: Solutions and Examples for bash Users, O'Reilly, USA, 2007. 2. Kernighan, B.W., Dennis, R.M., The C Programming Language, Prentice Hall, Massachusetts, 2012. 3. Stallings, W., Operating Systems: Internals and Design Principles, Pearson Education Limited, Essex, 2015. 4. Raymond, E.S., The Art of UNIX Programming, Addison-Wesley, Pearson Education Limited, USA, 2004. 5. Tanenbaum, A., Herbert, B., Modern Operating Systems, Pearson Education Limited, Essex, 2015. 		
In Romanian:		
<ol style="list-style-type: none"> 6. Boian, F., Vancea, A., Boian, R., Bufnea, D., Sterca, A., Cobarzan, C., Cojocar, D., Sisteme de operare, Ed. Risoprint, Cluj-Napoca, 2006. 		
8.2 Seminar / laboratory	Teaching methods	Remarks
1-2. Unix commands for working with files	Dialogue, debate, case studies, examples, proofs	
3. Shell 1	Dialogue, debate, case studies, examples, proofs	
4. sed and grep utilities	Dialogue, debate, case studies, examples, proofs	

5. awk utility	Dialogue, debate, case studies, examples, proofs	
6. shell Programs	Dialogue, debate, case studies, examples, proofs	
7-8. C programs; working with Unix files	Dialogue, debate, case studies, examples, proofs	
9. UNIX Processes	Dialogue, debate, case studies, examples, proofs	
10. Communications between Unix processes: pipe	Dialogue, debate, case studies, examples, proofs	
11. Communications between Unix processes: FIFO	Dialogue, debate, case studies, examples, proofs	
12. Unix-Threads	Dialogue, debate, case studies, examples, proof	
13. Closing lab activities	Dialogue, debate, case studies, examples, proof	
14. Practical exam	Dialogue, debate, case studies, examples, proof	
Bibliography		
In English:		
<ol style="list-style-type: none"> 1. Albing, C., Vossen, J.P., Newhman, C., bash Cookbook: Solutions and Examples for bash Users, O'Reilly, USA, 2007. 2. Kernighan, B.W., Dennis, R.M., The C Programming Language, Prentice Hall, Massachusetts, 2012. 3. Raymond, E.S., The Art of UNIX Programming, Addison-Wesley, Pearson Education Limited, USA, 2004. 		
In Romanian:		
<ol style="list-style-type: none"> 4. Boian, F., Vancea, A., Boian, R., Bufnea, D., Sterca, A., Cobarzan, C., Cojocar, D., Sisteme de operare, Ed. Risoprint, Cluj-Napoca, 2006. 		

9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations and representative employers within the field of the program

- This course exists in the curriculum in all major universities in Romania and abroad
- This course provides the basic knowledge that any administrator or developer must possess.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	- know the basic principle of the domain	Final exam	40%
10.5 Seminar/lab activities	- application of these concepts in solving problems	Lab assignments	20%
	- writing shells and creating Unix processes	Practical exam	40%
10.6 Minimum performance standards			
<ul style="list-style-type: none"> At least grade 5 (from a scale of 1 to 10) at the written exam, final project and laboratory work. 			

Date

05.05.2017

Signature of course coordinator

Conf. Dr. Sanda-Maria Dragoş

Signature of seminar coordinator

Conf. Dr. Sanda-Maria Dragoş

Date of approval

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Signature of the head of department

Univ. Prof. Dr. Andreica Anca