

SYLLABUS

NETWORK SECURITY AND ADMINISTRATION

University year 2025-2026

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	Computer Science
1.5. Study cycle	Master
1.6. Study programme/Qualification	Cyber Security
1.7. Form of education	Full time

2. Information regarding the discipline

2.1. Name of the discipline		Network Security and Administration					Discipline code		MME8196
2.2. Course coordinator					Lect. Dr. Radu DRAGOȘ				
2.3. Seminar coordinator					Lect. Dr. Radu DRAGOȘ				
2.4. Year of study	1	2.5. Semester	2	2.6. Type of evaluation	E	2.7. Discipline regime		Optional	

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/project	2
3.4. Total hours in the curriculum	56	of which: 3.5 course	28	3.6 seminar/laboratory/project	28
Time allotment for individual study (ID) and self-study activities (SA)					hours
Learning using manual, course support, bibliography, course notes (SA)					32
Additional documentation (in libraries, on electronic platforms, field documentation)					36
Preparation for seminars/labs, homework, papers, portfolios and essays					36
Tutorship					5
Evaluations					10
Other activities:					
3.7. Total individual study hours	119				
3.8. Total hours per semester	175				
3.9. Number of ECTS credits	7				

4. Prerequisites (if necessary)

4.1. curriculum	
4.2. competencies	

5. Conditions (if necessary)

5.1. for the course	
5.2. for the seminar /lab activities	

6.1. Specific competencies acquired ¹

Professional/essential competencies	<ul style="list-style-type: none">• Knowledge of all security aspects that can impact the processes and IT&C assets of an organization• Acquiring a solid theoretical foundation in communication through unsafe medium, as well as the use of secure communication protocols on the Internet
Transversal competencies	<ul style="list-style-type: none">• Professional communication skills; concise and precise description, both oral and written, of professional results• Good English communication skills

6.2. Learning outcomes

Knowledge	The student knows: which are the best security mechanisms that can be implemented on the Internet, graduate knows the most commonly used mathematical cryptographic algorithms as well as the most important protocols in the TCP / IP stack that implement these algorithms
Skills	The student is able to identify possible security issues in software systems, to design and implement security verification tools
Responsibility and autonomy:	The student has the ability to understands the basic concepts of system and network administration as well as the security aspects related to this process, assumes responsibility for the product of his / her work, requests feedback and uses it constructively

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

7.1 General objective of the discipline	<ul style="list-style-type: none">• Know and understand fundamental concepts of system administration as well as the security aspects related to this process;• Know and understand fundamental concepts of network administration as well as the security aspects related to this process.
7.2 Specific objective of the discipline	<ul style="list-style-type: none">• At the end of the course, students• know the main concepts and principles of installing major operating systems• know the main concepts and principles of configuring major operating systems• are able to install and configure networking services on major operating systems• are able to install and configure main networking equipment devices

¹ One can choose either competences or learning outcomes, or both. If only one option is chosen, the row related to the other option will be deleted, and the kept one will be numbered 6.

8. Content

8.1 Course	Teaching methods	Remarks
1.Introduction to Sysadmin and NetworkAdmin, Concepts, motivation, objectives, real life examples	Interactive exposure Explanation Conversation	
2.Virtualization sollutions <ul style="list-style-type: none"> • Oracle VirtualBox • WMware • HyperV 	Interactive exposure Explanation Conversation	
3.Installing an operating system <ul style="list-style-type: none"> • Linux • BSD • Microsoft Windows Server 	Interactive exposure Explanation Conversation	
4.Configure networking for an operating system Linux/BSD/Windows Server	Interactive exposure Explanation Conversation	
5.DHCP configuration Linux/BSD/Windows Server Static/dynamic bindings and lease times	Interactive exposure Explanation Conversation	
6.DNS configuration Linux/BSD/Windows Server DNS zones, delegation, master/slave, dynamic updates, recursion	Interactive exposure Explanation Conversation	
7.HTTP configuration Linux/BSD/Windows Server Name based Virtual Hosting	Interactive exposure Explanation Conversation	
8.MAIL+MX configuration Linux/BSD/Windows Server Mail retrieval POP3/IMAP/Webmail	Interactive exposure Explanation Conversation	
9.NetworkSecurity (firewall) configuration Linux/BSD/Windows Server <ul style="list-style-type: none"> • intrusion prevention • intrusion detection • penetration testing • service isolation 	Interactive exposure Explanation Conversation	
10.Networking appliances configuration	Interactive exposure Explanation Conversation	
11. Dedicated Internet services appliances MX and AntiSpam Firewalls Network packet annalyzers	Interactive exposure Explanation Conversation	
12-14 Security Certificates	Interactive exposure Explanation Conversation	
Bibliography 1. Computer Networks, Andrew S. Tanenbaum & David J. Wetherall 2. Computer Networks: A Systems Approach, Larry L. Peterson & Bruce S. Davie 3. The Internet and Its Protocols: A Comparative Approach, Adrian Farrel		
8.2 Seminar / laboratory	Teaching methods	Remarks
Bibliography 1. Computer Networks, Andrew S. Tanenbaum & David J. Wetherall 2. Computer Networks: A Systems Approach, Larry L. Peterson & Bruce S. Davie 3. The Internet and Its Protocols: A Comparative Approach, Adrian Farrel		

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

- The content of the course covers the most important aspects necessary for a system administrator

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of final grade
10.4 Course		Exam	50
10.5 Seminar/laboratory		Practical exam	50
10.6 Minimum standard of performance			
<ul style="list-style-type: none">• At least grade 5 for the project and practical exam			

11. Labels ODD (Sustainable Development Goals)²

Not applicable.

Date:
15.04.2025

Signature of course coordinator

Lect Dr. Radu DRAGOS

Signature of seminar coordinator

Lect Dr. Radu DRAGOS

Date of approval:

Signature of the head of department

Assoc.prof.phd. Adrian STERCA

² Keep only the labels that, according to the [Procedure for applying ODD labels in the academic process](#), suit the discipline and delete the others, including the general one for *Sustainable Development* – if not applicable. If no label describes the discipline, delete them all and write „*Not applicable.*”.