

SYLLABUS

1. Data about the program of study

1.1 Institution	Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Electronics, Telecommunications and information Technology
1.3 Department	Communications
1.4 Field of study	Electronic Engineering, Telecommunications and Information Technologies
1.5 Cycle of study	Bachelor of Science
1.6 Program of study / Qualification	Telecommunications Technologies and Systems/ Engineer Applied Electronics/Engineer
1.7 Form of education	Full time
1.8 Subject code	TST-E41.00/EA-E110.00

2. Data about the subject

2.1 Subject name	Computer Networks						
2.2 Subject area	Theoretical area, Methodological area, Analytic area						
2.3 Course responsible	Assoc. Professor Daniel Zinca, Ph.D, daniel.zinca@com.utcluj.ro						
2.4 Teacher in charge with seminar / laboratory / project	Assoc. Professor Daniel Zinca, Ph.D, daniel.zinca@com.utcluj.ro						
2.5 Year of study	III	2.6 Semester	6	2.7 Assessment	Verification	2.8 Subject category	DS/DI

3. Estimated total time

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 seminar / laboratory	2
3.4 To Total hours in the curriculum	44	of which: 3.5 course	28	3.6 seminar / laboratory	28
Distribution of time					hours
Manual, lecture material and notes, bibliography					20
Supplementary study in the library, online specialized platforms and in the field					6
Preparation for seminars / laboratories, homework, reports, portfolios and essays					10
Tutoring					3
Exams and tests					5
Other activities:					0
3.7 Total hours of individual study	44				
3.8 Total hours per semester	100				
3.9 Number of credit points	4				

4. Pre-requisites (where appropriate)

4.1 curriculum	Information Theory and Coding
4.2 competence	Main communications techniques

5. Requirements (where appropriate)

5.1. for the course	
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5.2. for the seminars / laboratories / projects	
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6. Specific competences

Professional competences	<p>C4. Design, implementation and operation of data, voice, video and multimedia services. This is based on the understanding and the application of fundamental concepts in telecommunications and transmission of information</p> <p>C4.3 Explanation and interpretation of the main requirements and specific approach techniques for data, voice, video, multimedia transmissions</p> <p>C4.4 Use of the main specific parameters in evaluations based on the concept of quality of service in communications</p> <p>C4.5 Development of simple communications services</p> <p>C5. Selecting, installing, configuring and operating fixed or mobile telecommunications equipment. Equipping a site with usual telecommunications networks</p> <p>C5.1 Defining the principles of the main technologies for fixed and mobile telecommunications, through various transmission media</p> <p>C5.2 Explanation and interpretation of the technologies and of fundamental protocols for integrated fixed and mobile communications systems</p> <p>C5.3 Installation, configuration and exploiting of communications networks</p> <p>C5.4 Use of evaluation techniques and diagnostics for communications systems and equipment</p> <p>C5.5 Endowment with communications means of a location with a small/ medium degree of complexity</p> <p>C6. Solving specific problems of the broadband communications networks: propagation in different environment, circuits and equipment for high frequencies (microwaves and optical).</p> <p>C6.2 Explaining the specific methods for implementation of the communications techniques</p>
Cross competences	N / A

7. Discipline objectives (as results from the key competences gained)

7.1 General objective	Development of competencies for usage, administration and design of Computer Networks
7.2 Specific objectives	<ol style="list-style-type: none"> 1. Understanding of basic computer networking concepts 2. Development of skills and abilities related to usage of computer networks 3. Development of skills and abilities related to administration of computer networks

8. Contents

8.1 Lecture (syllabus)	Teaching methods	Notes
1. Course description. The OSI Reference Model. Introduction to Computer Networks	Presentation, heuristic conversation, exemplification, problem	Usage of .ppt presentation, projector, blackboard
2. Networking devices. Computer networks characteristics.		
3. WANs. Serial communications. The physical and data link layers.		
4. The Point-to-Point Protocol		

5. Universal Serial Bus.	presentation, teaching exercise, case study, formative evaluation			
6. Structured cabling systems. Standards. Design.				
7. Local Area Networks. The MAC and LLC sublayers. The IEEE 802.2LLC standard.				
8. The IEEE 802.3/Ethernet family of standards.				
9. The IEEE 802.3u/Fast Ethernet, IEEE 802.3z/802.3ab GigabitEthernet standards.				
10. The IEEE 802.3ae/10Gigabit Ethernet standard				
11. The IEEE 802.11 WLAN Standards. Physical Layer options .The MAC sublayer.				
12. IEEE and Wi-Fi alliance standards for WLAN security.				
13. Performance improvement in LANs.				
14. Introduction to network security. Preparation for the second verification.				
Bibliography				
1. D. Zinca, Retele de calculatoare. Editura Risoprint, Cluj-Napoca 2006				
2. V. Dobrota, Retele digitale in telecomunicatii. Volumul III: OSI si TCP/IP. Editia a II-a, Editura Mediamira, Cluj-Napoca 2003				
3. A.S. Tanenbaum, D.J. Wetherall, Computer Networks. Fifth Edition, Prentice Hall 2010				
8.2 Seminar / laboratory / project	Teaching methods	Notes		
1. Introduction. The OSI Reference Model	Didactic and experimental proof, didactic exercise, team work	Use of laboratory instrumentation, experimental boards, computers, magnetic board		
2. Monitoring of networking devices: hubs, switches.				
3. The ITU V.24 serial interface. Applications.				
4. The PPP implementation.				
5. The USB interface				
6. Structured cabling systems project				
7. Wireshark packet analyzer. Applications				
8. The IEEE 802.3 Network Interface Card.				
9. Fast Ethernet/Gigabit Ethernet devices				
10. Switch configuration. VLAN configuration in switches				
11. WLAN AP and NIC configuration				
12. Configuration of WLAN Security				
13. Security configuration in routers using CCP.				
14. Lab recovery and finalization of laboratory activity				
Bibliography				
1. C.M. Vancea, D. Zinca, Retele de Calculatoare, Indrumator de laborator. Editura UTPress, 2011				

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The discipline content and the acquired skills are in agreement with the expectations of the professional organizations and the employers in the field, where the students carry out the internship stages and/or occupy a job (in the field of Computer Networking, Data Communications, Computer Network Administrator) and the expectations of the national organization for quality assurance (ARACIS).

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	The level of acquired theoretical knowledge and practical skills	2 evaluation tests (answers to theoretical questions)	67%

10.5 Seminar/ Laboratory	The level of acquired knowledge and abilities	2 evaluation tests (answers to practical questions)	33%
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10.6 Minimum standard of performance

Qualitative level:

Minimal knowledge:

- ✓ Knowledge of the main concepts in computer networking.
- ✓ Knowledge of the main standards on the Data Link layer for computer networks.

Minimal competencies:

- ✓ To enumerate the main characteristics of computer networks
- ✓ To be able to choose the proper LAN standard based on requirements
- ✓ To be able to design a Local Area Network on the physical and data link layers

Quantitative level:

- ✓ Passing all laboratory works
- ✓ The final grade is computed: $0.5 * \text{Exam_grade} + 0.5 * \text{Laboratory_grade}$

Date of filling in:	Responsible	Title Surname NAME	Signature
20.06.2023	Course	Associate Professor Daniel ZINCA, Ph.D	
	Applications	Associate Professor Daniel ZINCA, Ph.D	

Date of approval in the Council of the Communications Department 11.07.2023	Head of Communications Department Prof. Virgil DOBROTA, Ph.D.
Date of approval in the Council of the Faculty of Electronics, Telecommunications and Information Technology 12.07.2023	Dean Prof. Ovidiu POP, Ph.D.