SYLLABUS

1. Data about the program of study

1.1 Institution	The Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Automation and Computer Science
1.3 Department	Computer Science
1.4 Field of study	Computer Science and Information Technology
1.5 Cycle of study	Bachelor of Science
1.6 Program of study/Qualification	Computer science / Engineer
1.7 Form of education	Full time
1.8 Subject code	46.20

2. Data about the subject

2.1 Subject name	*Computer Network Design*					
2.2 Course responsible / lecturer	Assoc. prof. dr. eng. Emil-Ioan Cebuc - Emil.Cebuc@cs.utcluj.ro					
2.3 Teachers in charge of seminars / Laboratory / project	Assoc. prof. dr. eng. Bogdan Iancu - Bogdan.Iancu@cs.utcluj.ro					
2.4 Year of study	IV	2.5 Semester	7	2.6 Type of assessment (E - exam, C - colloquium, V - verification)		E
2.7 Subject category	*DF – fundamentală, DD – în domeniu, DS – de specialitate, DC – complementară*					DS
	DI – Impusă, DOp – opțională, DFac – facultativă					DOp

3. Estimated total time

3.1 Number of hours per week	4	of which:	Course	2	Seminars		Laboratory	2	Project	
3.2 Number of hours per semester	56	of which:	Course	28	Seminars		Laboratory	28	Project	

3.3 Individual study:	
(a) Manual, lecture material and notes, bibliography	25
(b) Supplementary study in the library, online and in the field	25
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays	12
(d) Tutoring	4
(e) Exams and tests	3
(f) Other activities:	0

3.4 Total hours of individual study (suma (3.3(a)…3.3(f)))	69
3.5 Total hours per semester (3.2+3.4)	125
3.6 Number of credit points	5

4. Pre-requisites (where appropriate)

4.1 Curriculum	Local Area Networks, 7-th semester
4.2 Competence	LAN protocols, LAN structure, LAN services

5. Requirements (where appropriate)

5.1. For the course	Projector, Blackboard, lecture room
5.2. For the applications	PC with Linux/Windows OS, Switches, routers, hardware tools, cable tester

6. Specific competence

6.1 Professional competences	• **C3.4 -** Comparatively and experimentally evaluation of the alternative solutions for performance optimization • **C3.5 -** Developing and implementing information system solutions for concrete problems **C5** - Designing, managing the lifetime cycle, integrating and ensuring the integrity of hardware, software and communication systems (2 credits) • **C5.1** - Specifying the relevant criteria regarding the lifetime cycle, quality, security and the computing system's interaction with the environment and the human operator • **C5.2** - Using interdisciplinary knowledge for adapting the computing system to the specific requirements of the application field • **C5.3** - Using fundamental principles and methods for ensuring the security, the safety and ease of exploitation of the computing systems • **C5.4** - Proper utilization of the quality, safety and security standards in the field of information processing • **C5.5** - Creating a project including the problem's identification and analysis, its design and development, also proving an understanding of the basic quality requirements
6.2 Cross competences	N/A

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

7.1 General objective	Knowledge and understanding of networking techniques, protocols and services
7.2 Specific objectives	Able to design simple network protocol at different OSI layer, able to configure networking devices at basic level

8. Contents

8.1 Lectures	Hours	Teaching methods	Notes
Introduction	2	Lecture, using PowerPoint presentation	
ISO-OSI an TCP/IP Reference models + Layered structure, analogies and differences	2		
Physical Layer + layer functions	2		
Data link Layer + layer function, HDLC protocol	2		
Network Layer + layer function and routing, IPv4 and IPv6	2		
Transport Layer + connection oriented and connection less protocols	2		
Upper Layers + session, presentation and application layers	2		
Multiplexing + FDM, TDM, statistical TDM	2		
Packet and circuit switching, virtual circuits + Analogies, differences and switches	2		
Flow control and congestion control + Stop and Wait, sliding window, token bucket	2		
Distributed network services like E-mail, DNS, etc.	2		
Network security + Threats and their avoidance	2		
Cryptographic systems+ symmetrical and asymmetrical systems	2		
Computer Network management + management application structure	2		
Bibliography			
1. A. S. Tanenbaum, Computer Networks; 2. W. Stallings; Data and Computer Communications; Prentice Hall 2000			
8.2 Applications – Seminars/Laboratory/Project	Hours	Teaching methods	Notes
Introduction, review	2	Individual and team work	
Sub netting and Super netting	2		

Application layer protocols	2	Interactive tutoring Learn by example
Virtual LAN's VLAN, Trunking	2	
Static routing Ipv4, IPv6	2	
Dynamic routing	2	
Easy IP: DHCP,NAT	2	
DNS	2	
Network Security	2	
Network Inspector	2	
Wireless	2	
VoIP	2	
Chalenge Lab	2	
Lab colloquium	2	

Bibliography

1. E. Cebuc et all, Computer Network Design Lab Guide, Editura UT Press 2005
2. Presentations can be found at: ftp.utcluj.ro/pub/users/cemil/prc

Se vor preciza, după caz: tematica seminariilor, lucrările de laborator, tematica și etapele proiectului.

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

Course content is according to leading textbooks, lab content is inspired from CCNA industry certification level.

10. Evaluation

Activity type	Assessment criteria	Assessment methods	Weight in the final grade
Course	Understands and explains network protocols, designs simple network Basic knowledge of network security and management.	F2F or Online exam on moodle Admittance is conditioned by successful lab colloquium	40% Theory 30% Problem
Seminar			
Laboratory	Is able to configure networking devices at basic level	Lab colloquium f2f or online on moodle	30%
Project			

Minimum standard of performance:
Understands protocol stacks, flow and congestion control, network security and management issues. Configures switches and routers.
Grade calculus: 30% lab + 70% final exam
Conditions for participating in the lab colloquium: all labs have been attended and fulfilled Conditions for participating in the final exam: Lab colloquium ≥ 5
Conditions for promotion: final exam ≥ 5

Date of filling in: 07.06.2024	Teachers	Title First name Last name	Signature
	Course	Assoc.prof.dr.eng. Emil Cebuc	
	Applications	Assoc.prof.dr.eng. Bogdan Iancu	

Date of approval in the department   Head of department,
20.02.2024   Prof.dr.eng. Rodica Potolea

Date of approval in the Faculty Council   Dean,
22.02.2024   Prof.dr.eng. Mihaela Dînşoreanu