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	39.

2. Data about the subject

2.1 Subject name	*Computer networks*				
2.2 Course responsible/lecturer	Prof. dr. eng. Vasile Dădârlat – vasile.dadarlat@cs.utcluj.ro				
2.3 Teachers in charge of seminars/ laboratory/ project	Assoc.prof. dr. eng. Peculea Adrian – Adrian.Peculea@cs.utcluj.ro Lect. dr. eng. Iancu Bogdan – Bogdan.Iancu@cs.utcluj.ro				
2.4 Year of study	III	2.5 Semester	2	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*				DD
	DI – Impusă, DOp – opțională, DFac – facultativă				DI

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	7
(b) Supplementary study in the library, online and in the field	3
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays	7
(d) Tutoring	
(e) Exams and tests	2
(f) Other activities:	

3.4 Total hours of individual study (suma (3.3(a)…3.3(f)))	19	
3.5 Total hours per semester (3.2+3.4)	75	
3.6 Number of credit points	3	

4. Pre-requisites (where appropriate)

4.1 Curriculum	
4.2 Competence	Basic knowledge in programming languages (C, Java) Computer architecture, Operating systems

5. Requirements (where appropriate)

5.1. For the course	N/A
5.2. For the applications	Classroom, PC with internet access

6. Specific competence

6.1 Professional competences	**C2:** Designing hardware, software and communication components **C2.1:** Describing the structure and functioning of computational, communication and software components and systems **C2.2:** Explaining the role, interaction and functioning of hardware, software and communication components **C2.3:** Building the hardware and software components of some computing systems using algorithms, design methods, protocols, languages, data

	structures, and technologies
	C2.4: Evaluating the functional and non-functional characteristics of the computing systems using specific metrics
	C2.5: Implementing hardware, software and communication systems
6.2 Cross competences	N/A

7. Discipline objective (as results from the _key competences gained_)

7.1 General objective	Teamwork, working with partial and contradicting specifications
7.2 Specific objectives	Each student able to design LAN's software & hardware architecture

8. Contents

8.1 Lectures	Hours	Teaching methods	Notes
Introduction. Concepts, network types, characteristics, evolution, standards	2	Oral Presentations using multimedia means Q & A Interactive teaching Online: collaborative platforms (Teams, Moodle, Skype, etc)	
ISO-OSI Reference model and Internet's TCP/IP protocol stack. OSI abstract model presentation, description of protocol functions for every layer. General presentation for TCP/IP protocol stack	2		
Data transmission techniques. Data transmission concepts, analog and digital transmission techniques, coding, communication channels	2		
Types of computer networks. Architectures, evolution, topologies, physical parameters	2		
Physical level. Transmission media, characteristics, performances, connectors, structured cabling system	2		
Medium access control. Medium access techniques for local (wired and wireless) and wide area networks	2		
Data Link level. Functions, problems, protocols, case study: HDLC	2		
Local Area Computer Networks. Fundamentals, architectures, evolution	2		
Local Area Computer Networks. Systems, performances	2		
Computer Networks Interconnection. Devices for network interconnection; presentation of bridges, switches and routers	2		
Internet access. IP (+ ICMP), IPv6 (+IGMP) protocols. Address resolution protocol. Routing protocols	2		
Transport level protocols. TCP protocol; congestion control. TCP and UDP sockets	2		
General introduction to Internet applications. File transfer. Electronic mail, multimedia transmissions, network management	2		
General introduction to Internet applications. Security issues	2		

Bibliography

1. V.Dadarlat, E.Cebuc - Reţele Locale de Calculatoare - de la cablare la interconectare, Editura Albastra (Microinformatica), Cluj, 2006, ISBN 973-650-161-2
2. W. Stallings, _Data and Computer Communications_; Prentice Hall , 2004-2014
3. A. Tanenbaum – _Computer Networks,_ Prentice Hall, 2005- 2010 (A. S. Tanenbaum, _Reţele de Calcultoare_; Agora Press)

8.2 Applications – Seminars/Laboratory/Project	Hours	Teaching methods	Notes
Cooper based transmission media and UTP cabling	2	Practical exercises Brief presentation of possible solutions Self testing programmes Online: collaborative platforms (Teams, Moodle, etc)	
Optical fibers and components	2		
Structured Cabling	2		
Medium Access Methods	2		
Connectivity to Network: IPv4 subnets and basic router configuration	2		
Connectivity to Network: DHCP and IPv4 static routing	2		
Connectivity to Network: IPv6 introduction and static routing	2		
Transport layer: TCP/UDP and Network Programming using Socket	2		

VLAN and inter-VLAN routing	2		
Wireless LAN	2		
Spanning-tree protocol	2		
Port link aggregation: Etherchannel	2		
Wireshark – network analysis	2		
Lab evaluation (test)	2		

Bibliography
Notes & lab notes available at: ftp.utcluj.ro 1. V.Dadarlat, E.Cebuc - Reţele Locale de Calculatoare - de la cablare la interconectare, Editura Albastra (Microinformatica), Cluj, 2006, ISBN 973-650-161-2 2. W. Stallings, *Data and Computer Communications*; Prentice Hall , 2004-2014 3. A. Tanenbaum – *Computer Networks,* Prentice Hall, 2005- 2010 (A. S. Tanenbaum, *Reţele de Calcultoare*; Agora Press) 4. https://moodle.cs.utcluj.ro/

*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 kept state of the art by using latest protocols and devices available on the market.

10. Evaluation

Activity type	Assessment criteria	Assessment methods	Weight in the final grade
Course	Interactivity and initial preparation, intermediary and final written examinations	Written exam using online platforms https://moodle.cs.utcluj.ro/	60%
Seminar			
Laboratory	Quality of practical work, participation	Written test using online platforms https://moodle.cs.utcluj.ro/	40%
Project			
Minimum standard of performance: Grade calculus: 40% laboratory + 60% final exam Conditions for participating in the final exam: Laboratory ≥ 5 Conditions for promotion: grade ≥ 5			

Date of filling in:	Titulari	Titlu Prenume NUME	Semnătura
	Course	Prof. dr. eng. Vasile Dădârlat	
	Applications	Assoc.prof. dr. eng. Peculea Adrian	
		Lect. dr. eng. Iancu Bogdan	

Date of approval in the department	Head of department Prof.dr.ing. Rodica Potolea
Date of approval in the Faculty Council	Dean Prof.dr.ing. Liviu Miclea