COURSE SYLLABUS

Academic year 2024 - 2025

1. Programme Information

1.1. Instituția de învățământ superior	Lucian Blaga University of Sibiu
1.2. Facultatea	Faculty of Engineering
1.3. Departament	Department of Computer Science and Electrical and Electronics Engineering
1.4. Domeniul de studiu	Computer Science and Information Technology
1.5. Ciclul de studii	Master
1.6. Specializarea	EMBEDDED SYSTEMS

2. Course Information

2.1. Name of course	Advanced Computer Communications		Cod	ES.202.RO	
2.2. Course coordinator	prof. dr. ing. Remus BRAD				
2.3. Seminar/laboratory coordinator	prof. dr. ing. Remus BRAD				
2.4. Year of study[1]	1	**2.5.** Semester[2]	2	**2.6.** Evaluation form[3]	E
2.7. Course type[4]		O	**2.8.** The formative category of the course[5]		R

3. Estimated Total Time

3.1. Course Extension within the Curriculum – Number of Hours per Week

3.1.a. Lecture	3.1.b. Seminar	3.1.c. Laboratory	3.1.d. Project	3.1.e. Other	Total
2		2			**4**

3.2. Course Extension within the Curriculum – Total Number of Hours within the Curriculum

3.2.a. Lecture	3.2.b. Seminar	3.2.c. Laboratory	3.2.d. Project	3.2.e. Other	Total[6]
28		28			**56**

Time Distribution for Individual Study[7]	Nr. ore
Learning by using course materials, references and personal notes	10
Additional learning by using library facilities, electronic databases and on-site information	8
Preparing seminars / laboratories, homework, portfolios and essays	56
Tutorial activities[8]	10
Exams[9]	10
3.3. Total Individual Study Hours[10] (NOSI_{sem})	**94**
3.4. Total Hours in the Curriculum (NOAD_{sem})	**56**
3.5. Total Hours per Semester[11] (NOAD_{sem} + NOSI_{sem})	**150**
3.6. No. of Hours / ECTS	**25**
3.7. Number of credits[12]	**6**

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4. Prerequisites (if needed)

4.1. Courses that must be successfully completed first (from the curriculum)[13]	Computer Networks, Cybersecurity, Internet and Intranet
4.2. Competencies	

5. Conditions (where applicable)

5.1. For course/lectures[14]	Board, video projector, flipchart, specific teaching materials, online platforms
5.2. For practical activities (lab/sem/pr/app)[15]	Computing technology, software packages, online platforms

6. Specific competencies acquired[16]

		Number of credits assigned to the discipline	6	Credits distribution by competencies
6.1. Professional competencies	PC1	approve engineering design		1
	PC2	perform project management		1
	PC3	operate open source software		1
	PC4	disseminate results to the scientific community		1
6.2. Transversal competencies	TC1	apply knowledge of science, technology and engineering		1
	TC2	show initiative		1

7. Course objectives (resulted from developed competencies)

7.1. Main course objective	This is an advanced course in computer communication networks. The goal of the course is to provide a basic knowledge of the field of network management, understand the challenges of efficient network management, and the modern techniques. On completion of the course, students will be able to: Understand the fundamentals of next generation computer networks; Design solutions for ad-hoc, mobile and pervasive computing; Understand the principles of operation of network security monitoring; Understand the issues involved in deployment of Wireless LAN and 3G systems. The course will not use a single textbook but rather a set of research papers, and it will be a combination of lecture and discussion.
7.2. Specific course objectives	Knowledge and proper use of specific concepts of computer networks
Knowledge of communication protocols TCP / IP
Access to knowledge protocols
Understanding of network hardware elements
Functioning network level protocols, transport and application
Monitoring and configuring network devices
Configuring computer systems software
Troubleshoot network connections

8. Content

8.1. Lectures[17]		Metode de predare[18]	Nr. ore
Curs 1	Reviews of packet switching	Lectures, case studies and discussions	2
Curs 2	Issues in TCP/IP. TCP/IP fundamentals review.	- " -	2
Curs 3	Bluetooth, 802.11, UMTS, 3G, GPRS and Edge Services	- " -	2
Curs 4	Access technologies: last mile, xDSL	- " -	2

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Curs 5	Multimedia over a Network. Streaming over Internet	- " -	2
Curs 6	IP network performance issues	- " -	2
Curs 7	Advanced IPv6 features, including transition	- " -	2
Curs 8	Models to support (WLAN) network roaming	- " -	2
Curs 9	Peer-to-Peer network architectures	- " -	2
Curs 10	Dynamic host configuration methods	- " -	2
Curs 11	Network security principles. Characteristics of the attacker.	- " -	2
Curs 12	Network security principles. Characteristics of the attacker (cont.)	- " -	2
Curs 13	Intrusion detection with Snort. Intrusion prevention.	- " -	2
Curs 14	Wireless Sensor Networks, Wireless Home Networks.	- " -	2
		Total ore curs:	**28**

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8.2. Practical activities

8.2.b. Laboratory		Metode de predare[19]	Nr. ore
Laborator 1	Internet Architecture: Original E2E Principle and Internet Design	Problem solving, case studies, exercises, demonstrations and discussions	2
Laborator 2	Internet Architecture: Original E2E Principle and Internet Design (cont.)	- " -	2
Laborator 3	Internet Architecture: NATs and what to do about them	- " -	2
Laborator 4	Internet Architecture: NATs and what to do about them (cont.)	- " -	2
Laborator 5	Internet Architecture: Tunnels	- " -	2
Laborator 6	Internet Architecture: Tunnels (cont.)	- " -	2
Laborator 7	QoS: Queuing	- " -	2
Laborator 8	QoS: Queuing (cont.)	- " -	2
Laborator 9	Network Measurement: Measuring the path	- " -	2
Laborator 10	Network Measurement: Measuring the path (cont.)	- " -	2
Laborator 11	Routing and Addressing: Host Identification and mobility	- " -	2
Laborator 12	Routing and Addressing: Host Identification and mobility (cont.)	- " -	2
Laborator 13	Multicast: Classic IP multicast	- " -	2
Laborator 14	Multicast: Classic IP multicast (cont.)	- " -	2
		Total ore laborator	28

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9. Bibliography

9.1. Recommended Bibliography	Tanenbaum A S, Computer Networks 4th Ed, Prentice Hall	
	* , CCNA: Ghid de studiu independent CCNA Basics, Editura BIC ALL, Bucureşti, ISBN 9735715066	
9.2. Additional Bibliography	Hagen S, IPv6 Essentials, O'Reilly	
	Bejtlich R, The Tao of Network Security Monitoring: Beyond Intrusion Detection, Addison-Wesley	
	Computer Networking: A Top-Down Approach Featuring the Internet, third edition, by James F. Kurose and Keith W. Ross, Addison Wesley, ISBN 0-321-22735-2	

10. Conjunction of the discipline's content with the expectations of the epistemic community, professional associations and significant employers of the specific study program[20]

Students will acquire research skills and synthesis abilities preparing them for the transition to a new stage of doctoral admission.
It is carried out through regular discussions in a formal and informal setting with the representatives of the profile companies.
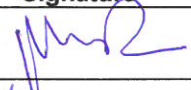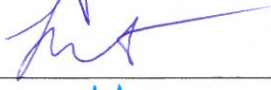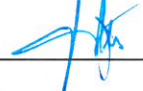
11. Evaluation

Activity Type	11.1 Evaluation Criteria	11.2 Evaluation Methods		11.3 Percentage in the Final Grade	Obs.[21]
11.4a Exam / Colloquy	• Theoretical and practical knowledge acquired (quantity, correctness, accuracy)	Tests during the semester[22]:	15%	100%	CPE
		Homework:	15%		
		Other activities[23]:	0%		
		Final evaluation:	70%		
11.5 Minimum performance standard[24] The final assessment will include written work consisting of (partial) grid tests and problems. • Knowledge, understanding and explaining the basics of evolutionary computing. • Constant interest to acquire discipline. • Partial fulfilment (50%) of homework, essays and tests given during the semester.					CPE

The Course Syllabus will encompass components adapted to persons with special educational needs (SEN – people with disabilities and people with high potential), depending on their type and degree, at the level of all curricular elements (skills, objectives, contents, teaching methods, alternative assessment), in order to ensure fair opportunities in the academic training of all students, paying close attention to individual learning needs.

Filling Date: 09.09.2024

Department Acceptance Date: 16.09.2024

	Academic Rank, Title, First Name, Last Name	Signature
Course Teacher	Prof. Remus BRAD, PhD	
Study Program Coordinator	Prof. Arpad GELLERT, PhD	
Head of Department	Assoc. Prof. Radu George CREȚULESCU, PhD	

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Dean	Prof. Maria VINȚAN, PhD	

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[1] *1-4 for bachelor, 1-2 for master*
[2] *1-8 for bachelor, 1-3 for master*
[3] *Exam, colloquium or VP A/R - from the curriculum*
[4] *Course type: R = Compulsory course; E = Elective course; O = Optional course*
[5] *Formative category: S = Specialty; F = Fundamental; C = Complementary; I = Fully assisted; P = Partially assisted; N = Unassisted*
[6] *Este egal cu 14 săptămâni x numărul de ore de la punctul 3.1 (similar pentru 3.2.a.b.c.)*
[7] *The following lines refer to individual study; the total is completed at point 3.37.*
[8] *Between 7 and 14 hours*
[9] *Between 2 and 6 hours*
[10] *The sum of the values from the previous lines, which refer to individual study.*
[11] *The sum (3.5.) between the number of hours of direct teaching activity (NOAD) and the number of hours of individual study (NOSI) must be equal to the number of credits assigned to the discipline (point 3.7) x no. hours per credit (3.6.)*
[12] *The credit number is computed according to the following formula, being rounded to whole neighbouring values (either by subtraction or addition*

$$No.\,credits = \frac{NOCpSpD \times C_C + NOApSpD \times C_A}{TOCpSdP \times C_C + TOApSdP \times C_A} \times 30 \; credits$$

Where:
- NOCpSpD = Number of lecture hours / week / discipline for which the credits are calculated
- NOApSpD = Number of application hours (sem./lab./pro.) / week / discipline for which the credits are calculated
- TOCpSdP = Total number of course hours / week in the Curriculum
- TOApSdP = Total number of application hours (sem./lab./pro.) / week in the Curriculum
- C_C/C_A = Course coefficients / applications calculated according to the table

Coefficients	Course	Applications (S/L/P)
Bachelor	2	1
Master	2,5	1,5
Bachelor - foreign language	2,5	1,25

[13] *The courses that should have been previously completed or equivalent will be mentioned*
[14] *Board, video projector, flipchart, specific teaching materials, online platforms, etc.*
[15] *Computing technology, software packages, experimental stands, online platforms, etc.*
[16] *Competences from the Grids related to the description of the study program, adapted to the specifics of the discipline*
[17] *Titluri de capitole și paragrafe*
[18] *Expunere, prelegere, prezentare la tablă a problematicii studiate, utilizare videoproiector, discuții cu studenții (pentru fiecare capitol, dacă este cazul)*
[19] *Demonstrație practică, exercițiu, experiment*
[20] *The relationship with other disciplines, the usefulness of the discipline on the labour market*
[21] *CPE – Conditions Exam Participation; nCPE – Does Not Condition Exam Participation; CEF - Conditions Final Evaluation; N/A – not applicable*
[22] *The number of tests and the weeks in which they will be taken will be specified*
[23] *Scientific circles, professional competitions, etc.*
[24] *The minimum performance standard in the competence grid of the study program is customized to the specifics of the discipline, if applicable*

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