

SYLLABUS

1. Program information

1.1 Higher education 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 Study program / Qualification	Telecommunications Technologies and Systems/ Engineer
1.7 Form of education	IF – full-time education

2. Course information

2.1 Course title	Web Technologies and Databases	Course code	TST-E35.00
2.2 Course coordinator	Assoc. Prof. Cosmin STRILEȚCHI, Ph.D. - Cosmin.Striletschi@com.utcluj.ro		
2.3 Seminar/ laboratory coordinator	Assoc. Prof. Cosmin STRILEȚCHI, Ph.D. - Cosmin.Striletschi@com.utcluj.ro Assist. Eusebiu JECAN, Ph.D. - Eusebiu.Jecan@com.utcluj.ro		
2.4 Year of study	3	2.5 Semester	5
		2.6 Type of assessment	E
2.7 Course status	Formative category		DS
	Optionality		DOB

3. Estimated total time

3.1 Hours per week	4	of which:	3.2 Lecture	2	3.3 Seminar	-	3.3 Laboratory	2	3.3 Project	-	3.3 Practical training	-
3.4 Hours per semester	56	of which:	3.5 Lecture	28	3.6 Seminar	-	3.6 Laboratory	28	3.6 Project	-	3.3 Practical training	-
3.7 Time distribution (hours per semester) for individual study and assessment:												
(a) Assessment											3	
(b) Study using textbook, course materials, bibliography, and notes											35	
(c) Additional documentation in the library, on specialized electronic platforms, and in the field											10	
(d) Preparation for seminars/laboratories, assignments, reports, portfolios and essays											18	
(e) Tutoring											3	
(f) Other activities											-	
3.8 Total hours of individual study and assessment (sum of (3.7(a))...3.7(f))								69				
3.9 Total hours per semester (3.4+3.8)								125				
3.10 Number of credits								5				

4. Prerequisites (where applicable)

4.1 curriculum	Computer Programming and Programming Languages 1, Computer Programming and Programming Languages 2
4.2 competencies	Object oriented programming in C++ and Java.

5. Requirements (where applicable)

5.1. for the development of the lecture	Cluj-Napoca, Teams, Helios (our own on-line platform)
5.2. for the development of the seminar/ laboratory/ project	Cluj-Napoca, Dorobantilor 71-73, Laboratory 212; Teams, Helios (our own on-line platform)

6. Specific competencies acquired

Professional competencies	C3. Base knowledge, concepts and methods referring the computational systems architecture, microprocessors, microcontrollers, languages and programming techniques C3.3 Solving practical problems that involve data structures and algorithms, programming and microcontrollers or microprocessors usage C3.4 Developing programs in a generic / specific programming language starting from specifications and finishing with execution, debugging, results interpretation C3.5 Developing projects that involve hardware and software components C4. Conceiving, implementing and operating data, voice, video and multimedia services based on understanding and applying fundamental communications and data transmission concepts C4.3 Solving practical problems using multimedia techniques C5. Selecting, installing, configuring and using mobile or fixed telecommunications equipments; equipping specific locations with telecommunications networks; C5.2 Understanding and interpreting the fundamental protocols and technologies for integrated mobile or fixed communications systems
Transversal competence	N/A

7. Expected learning outcomes

Knowledge	K5. The student/graduate describes, identifies, summarizes elementary concepts and methods regarding the architecture of computer systems, microcontrollers, programming languages and techniques and their application in concrete problems
-----------	--

Skills	S17. The student/graduate evaluates, based on specific performance criteria, the type of computing system, its architecture and the way of use necessary for an efficient solution of concrete problems. S18. The student/graduate specifies requirements, develops programs in general-purpose programming languages (C, etc.) and/or object-oriented (C++, Java, etc.), executes, debugs and interprets the results of the programs developed to solve a concrete problem. S19. Modify the scope of an information and communications technology (ICT) system by adding or reallocating additional ICT system components, such as network components, servers, or storage media to meet capacity demands.
Responsibility and autonomy	R10. The student/ graduate has honorable, responsible, and ethical behavior, in accordance with the law to ensure the reputation of the profession.

8. Course objectives (based on the grid of specific competencies acquired)

8.1 General objective of the course	Developing practical skills for designing and implementing distributed web applications and databases
8.2 Specific objectives	1. Acquiring basic theoretical and practical knowledge related to database design, administration and the software environments that permit these operations 2. Learning and understanding the infrastructure of a distributed system that runs web applications 3. Learning the practical skills for developing web applications

9. Contents

9.1 Lecture	No. of hours	Teaching methods	Remarks
1. Database fundamentals: introduction, database management systems; the stages of database development; data models;	2	Exposition, discussions	Video-projector, employment of the lecture notes available on the laboratory site
2. The relational model: integrity constraints, domain constraints, tuple constraints	2		
3. The relational model: relationship constraints, moving from the concept to the logical model, maintaining the referential integrity;	2		
4. SQL: introduction, data types, instructions; SQL functions;	2		
5. The SELECT instruction; interrogations; junctions;	2		
6. Relational databases design stages of implementation, normal forms;	2		
7. Configuring a computational system for implementing and running web applications; HTML fundamentals; CSS fundamentals;	2		
8. HTTP fundamentals; HTTP methods; web forms; URL programming;	2		
9. JavaScript fundamentals; variables, functions, classes (attributes and methods), exceptions, lambda expressions;	2		

9.1 Lecture	No. of hours	Teaching methods	Remarks
10.Browser Object Model. Document Object Model. JavaScript events.	2		
11.The jQuery library	2		
12.AJAX. XMLHttpRequest. JavaScript Object Notation (JSON)	2		
13.PHP fundamentals; variables, functions, classes (attributes and methods), objects;	2		
14.PHP libraries; work sessions; data persistence; encryption technologies;	2		
References: 1. R. Nixon, <i>Learning PHP, MySQL, JavaScript, and CSS: A Step-by-Step Guide to Creating Dynamic Websites</i> , O'Reilly Media, 2012, ISBN-10: 1449319262 1. R.W. Sebesta, <i>Programming the World Wide Web (8th Edition)</i> , Addison-Wesley, 2014. 2. L. Shklar, R. Rosen, <i>Web Application Architecture: Principles, Protocols and Practices</i> , 2 nd Edition. Wiley, 2009. 3. Z. Mednieks, L. Dornin, <i>Programming Android: Java Programming for the New Generation of Mobile Devices</i> , O'Reilly Media, 2012, ISBN-10: 1449316646. 4. E. Hellman, <i>Android Programming: Pushing the Limits</i> , Wiley, 2013, ISBN-10: 1118717376 5. J. Raasch, <i>JavaScript Programming: Pushing the Limits</i> , Wiley, 2013, ISBN-10: 111852456X 6. D.T. Larosse, <i>Exploration de données: Méthodes et modèles du data mining</i> , Vuibert 2012, ISBN-10: 2311007416 7. G.P. Pop, <i>Baze de date</i> , Editura Risoprint, Cluj-Napoca, 2013. 8. F. Ionescu, <i>Baze de date relaționale și aplicații</i> , Editura Tehnică, București, 2004. 9. M. Fotache, <i>Proiectarea bazelor de date. Normalizare și postnormalizare. Implementari SQL si Oracle</i> , Editura Polirom, București, 2005. Online references: 10. C. Striletschi, Computer programming collective web portal (students' registration, theoretical materials, practical examples and problems to be solved, work upload, similarity scores and automated evaluation), Technical University of Cluj-Napoca, 2026, https://helios.utcluj.ro/lab/index.php			

9.2 Laboratory	No. of hours	Teaching methods	Remarks
1. Databases: a study case (entities, attributes, domains, links, Entity Relationship Diagrams)	2	Exposition, whiteboard, slides, video conference tools, screen sharing, Helios -our own software platform	
2. Database administration software. Database creation. Tables. Information insertion. Data editing. Relationships implementation.	2		
3. SQL: Data Definition Language	2		
4. SQL: Data Modelling Language (DML): simple interrogations on a single data source	2		
5. SQL: DML: interrogations on multiple data sources (joins)	2		
6. SQL: DML: nested interrogations	2		
7. Configuring the infrastructure for implementing and running web applications.	2		

9.2 Laboratory	No. of hours	Teaching methods	Remarks
8. HTML and CSS applications	2		
9. Java HTTP programming. URL applications. Web forms.	2		
10. JavaScript applications using variables, functions, classes, objects. exceptions; lambda expressions;	2		
11. BOM and DOM applications. JavaScript events.	2		
12. jQuery applications	2		
13. AJAX, XMLHttpRequest, JSON	2		
14. PHP applications using variables, functions, classes, objects	2		
References:			
1. R. Nixon, <i>Learning PHP, MySQL, JavaScript, and CSS: A Step-by-Step Guide to Creating Dynamic Websites</i> , O'Reilly Media, 2012, ISBN-10: 1449319262			
2. R.W. Sebesta, <i>Programming the World Wide Web (8th Edition)</i> , Addison-Wesley, 2014.			
3. L. Shklar, R. Rosen, <i>Web Application Architecture: Principles, Protocols and Practices</i> , 2 nd Edition. Wiley, 2009.			
4. Z. Mednieks, L. Dornin, <i>Programming Android: Java Programming for the New Generation of Mobile Devices</i> , O'Reilly Media, 2012, ISBN-10: 1449316646.			
5. E. Hellman, <i>Android Programming: Pushing the Limits</i> , Wiley, 2013, ISBN-10: 1118717376			
6. J. Raasch, <i>JavaScript Programming: Pushing the Limits</i> , Wiley, 2013, ISBN-10: 111852456X			
7. D.T. Larosse, <i>Exploration de données: Méthodes et modèles du data mining</i> , Vuibert 2012, ISBN-10: 2311007416			
8. G.P. Pop, <i>Baze de date</i> , Editura Risoprint, Cluj-Napoca, 2013.			
9. F. Ionescu, <i>Baze de date relaționale și aplicații</i> , Editura Tehnică, București, 2004.			
10. M. Fotache, <i>Proiectarea bazelor de date. Normalizare și postnormalizare. Implementari SQL si Oracle</i> , Editura Polirom, București, 2005.			
Online references:			
11. C. Striletschi, Computer programming collective web portal (students' registration, theoretical materials, practical examples and problems to be solved, work upload, similarity scores and automated evaluation), Technical University of Cluj-Napoca, 2026, https://helios.utcluj.ro/lab/index.php			

10. Alignment of the course contents with the expectations of the epistemic community, professional associations, and representative employers in the field related to the program

The discipline content and the acquired skills are in agreement with the expectations of the professional Competences acquired will be used in the following COR occupations (Electronics Engineer; Telecommunications Engineer; Electronics Design Engineer; System and Computer Design Engineer; Communications Design Engineer) or in the new occupations proposed to be included in COR (Sale Support Engineer; Multimedia Applications Developer; Network Engineer; Communications Systems Test Engineer; Project Manager; Traffic Engineer; Communications Systems Consultant).

11. Assessment

Activity type	11.1 Assessment criteria	11.2 Assessment methods and type of assessment: continuous/ summative)	11.3 Weight in final grade
---------------	--------------------------	--	----------------------------

11.4 Course	The level of acquired theoretical knowledge and practical skills	Evaluation test (theoretical questions)	T - 34%
11.5 Laboratory	The level of acquired knowledge and abilities	Laboratory evaluation (L), practical test (P)	L - 33% P - 33%
11.6 Minimum performance standard Qualitative point of view <i>Minimal knowledge:</i> ✓ the basic concepts related to web applications programming ✓ the basic syntax for running queries in a relational database environment <i>Minimum competencies:</i> ✓ to develop and run simple web applications ✓ to execute simple database queries Quantitative point of view: ✓ performing the weekly assigned individual tasks ✓ $P \geq 5, T \geq 4, L \geq 4$ și $34\%T + 33\%L + 33\%P \geq 4.5$			

Completion date:	Course coordinators	teaching rank, title First name LAST NAME	Signature
16.06.2026	Course	Assoc. Prof. Cosmin STRILEȚCHI, Ph.D. - Cosmin.Striletschi@com.utcluj.ro	
	Applications	Assoc. Prof. Cosmin STRILEȚCHI, Ph.D. - Cosmin.Striletschi@com.utcluj.ro	
		Assist. Eusebiu JECAN, Ph.D. - Eusebiu.Jecan@com.utcluj.ro	

Approval of the Head of the Department coordinating the course, only if this differs from the department organizing the study program	Head of Department
---	--------------------

Date of approval by the Council of the Communications Department 19.06.2026	Head of Communications Department Prof. Virgil DOBROTA, Ph.D.
Date of approval by the Council of the Faculty of Electronics, Telecommunications and Information Technology 30.06.2026	Dean, Prof. Ovidiu-Aurel POP, Ph.D.