

SYLLABUS

1. Data about the study programme

1.1 Higher education institution	Technical University of Cluj-Napoca
1.2 Faculty	Automation and Computer Science
1.3 Department	Automation
1.4 Field of study	Systems Engineering
1.5 Cycle of study	Bachelor
1.6 Study programme / Qualification	Automation and Applied Informatics (in English language)
1.7 Form of education	Full-time education

2. Data about the subject

2.1 Subject name	Web Technologies			Subject code	55.20
2.2 Course lecturer	Assoc. Prof. Dr. Eng. Szilárd ENYEDI – Szilard.Enyedi@aut.utcluj.ro				
2.3 Teachers in charge of applications	Lect. Dr. Eng. Iulia ȘTEFAN – Iulia.Stefan@aut.utcluj.ro				
2.4 Year of study	4	2.5 Semester	2	2.6 Assessment type	E
2.7 Subject category	<i>DF – fundamental, DS – specialty, DC – complementary</i>				DS
	<i>DOB – compulsory, DOP – elective, DFA – optional</i>				DOP

3. Estimated total time

3.1 Number of hours per week	4	of which:	Course	2	Seminar	0	Laboratory	2	Project	0	Practice	0
3.2 Number of hours per semester	56	of which:	Course	28	Seminar	0	Laboratory	28	Project	0	Practice	0
3.3 Distribution of time (hours per semester) for individual study and assessment:												
(a) Assessment												3
(b) Study using textbooks, lecture materials, bibliography and notes												30
(c) Additional study in the library, on specialised electronic platforms and in the field												10
(d) Preparation for seminars / laboratories, homework, reports, portfolios and essays												23
(e) Tutoring												3
(f) Other activities												0
3.4 Total hours of individual study and assessment (sum of 3.7(a). 3.7(f))										69		
3.5 Total hours per semester (3.4+3.8)										125		
3.6 Number of credits										5		

4. Prerequisites (where applicable)

4.1 Curriculum	Notions of software engineering and programming, data management, information technologies, and computational systems.
4.2 Competence	Basic knowledge of software engineering and programming; basic knowledge of databases and data management; basic knowledge of information technologies, computational-system architecture and client-server interaction; skills in using software-development and technical-documentation tools.

5. Requirements (where applicable)

5.1. For the course	Course attendance is compulsory. Lecture notes, an electronic communication platform and the recommended bibliography are used.
5.2. For seminar / laboratory / project activities	Laboratory attendance is compulsory. The activities involve individual practical computer work, technical-documentation study, implementation of web applications and compliance with submission deadlines.

6. Specific competences acquired

Professional competences	C2. Operating with basic concepts of computer science, information technology and communication. C4. Design, implementation, testing, operation and maintenance of systems with generic and dedicated equipment, including computer networks, for automation and applied-informatics applications. C5. Development of applications and implementation of algorithms and automatic control structures, using project-management principles, programming environments and technologies based on microcontrollers, signal processors, programmable logic controllers and embedded systems.
Transversal competences	CT1. Application, in compliance with legislation and intellectual-property rights, including technology transfer, product-certification methodology, principles, norms and values of the professional code of ethics, within one's own strategy of rigorous, efficient and responsible work. CT2. Identification of roles and responsibilities in a multidisciplinary team, decision-making and task assignment, with the application of relationship-building and efficient teamwork techniques. CT3. Identification of continuing-education opportunities and efficient use of learning resources and techniques for personal development.

7. Expected learning outcomes

Knowledge	The student identifies and describes concepts, principles and technologies used in web-application development: metalanguages, HTML, CSS, DOM, client scripting, server scripting, databases, web services, mobile applications and network communication mechanisms. The student explains client-server architectures and interactive web applications, the use of languages, protocols, models and tools specific to web technologies, and their role in automation and applied-informatics applications. The student describes the use of advanced software technologies in software-application design and implementation and identifies languages and technologies used for applications connected to intelligent systems.
Skills	The student uses web programming languages, environments and technologies to develop well-defined applications with user interfaces, client-side logic, server-side logic and database access. The student designs, implements, tests and documents web applications, selecting methods, protocols, data models and tools appropriate to the technical requirements. The student implements mechanisms for web-based data transmission, remote database storage and access, and user authentication / access control. The student adapts and optimises web applications for desktop and mobile platforms, critically analysing technical solutions, limitations and obtained results. The student uses advanced technologies in the design and implementation of software applications and, where appropriate, integrates software components for applications connected to intelligent systems.
Responsibility and autonomy	The student works responsibly and autonomously on web-application development, respecting technical requirements, deadlines, documentation rules and professional-integrity principles. The student contributes constructively to individual and team activities, communicates technical progress and results, and assumes responsibility for the correctness of submitted code, tests, documentation and deliverables. The student uses current bibliographic resources and technical documentation for continuous development of competences in web technologies and software engineering.

8. Subject objectives (based on the grid of acquired specific competences)

8.1 General objective of the subject	To prepare students for the integrated use of client and server scripting technologies, web-application programming and remote database access, in order to design, implement and optimise web applications, including for mobile platforms.
8.2 Specific objectives	To develop the ability to identify and apply methods and techniques for web-application design and development. To develop skills in using technologies for transmitting data through the web and for storing, accessing and manipulating data in remote databases. To develop skills in implementing web interfaces, client and server scripts, authentication mechanisms and network-communication solutions. To develop the ability to adapt, test, document and optimise web applications for desktop and mobile platforms. To develop the ability to use modern web technologies in advanced software applications, including in contexts associated with intelligent systems.

9. Contents

9.1 Course	No. hours	Teaching methods	Notes
Metalanguage basics. SGML.	2	Presentation and study based on course notes and bibliography, questions and answers face-to-face and online, case studies, presentation and exemplification.	
The basics of the HTML language.	2		
HTML elements. Presentation and structure.	2		
User-interface design for the Web.	2		
Client scripting techniques. The Document Object Model.	2		
Server scripting techniques.	2		
Web-application design principles.	2		
Database access through the Internet. Data definition. Data manipulation.	2		
Server scripting for database connections.	2		
Controlling client access to data.	2		
Client applications, interactivity and graphical interfaces on the Web. Features introduced by HTML 5.	2		
Web applications for mobile platforms.	2		
Network application servers in current operating systems (BSD, Linux, Windows, cloud services).	2		
Web communication mechanisms: WebSockets and WebTransport versus TCP/IP sockets. IPv6.	2		
Bibliography			
1. Szilárd Enyedi, Liviu Miclea, Istvan Hoka, Iulia Adina Popa, Adrian Gut, <i>Dezvoltarea aplicațiilor Web cu unelte open-source</i> , EIKON, Cluj-Napoca, 2007, ISBN 978-973-757-054-3, 167 p. (UTCN Library – 10 copies; available online at http://users.utcluj.ro/~szilard/ ; access details will be communicated during course and laboratory activities).			
2. Sebastien Dubois et al., <i>Learn TypeScript 3 by Building Web Applications: Gain a Solid Understanding of TypeScript, Angular, Vue, React, and NestJS</i> , Packt Publishing, 2019.			
3. Saroj Pandey et al., <i>Web Technology: XML, PHP, MySQL, Semantic Web</i> , Amazon, 2022.			
4. Radu Crețulescu, Daniel Morariu, <i>Dezvoltarea aplicațiilor Web</i> , Lucian Blaga University of Sibiu Publishing House, 2015 (UTCN Library – 1 copy).			
9.2 Seminar / laboratory / project / practical work	No. hours	Teaching methods	Notes
Presenting information.	2		
HTML elements (I).	2		
HTML elements (II).	2		

Cascading Style Sheets.	2	Documentation study, presentation and exemplification, individual paper-based and computer-based exercises, practical implementation, testing and problem solving.	
Client scripting (JavaScript, DOM).	2		
Server scripting.	2		
Accessing data: from the client to the application server, to the data source and back.	2		
SQL elements. Database servers.	2		
Server scripts for database connections.	2		
Client authentication.	2		
Client applications, interactivity and graphical interfaces on the Web. SVG, CSS, HTML 5.	2		
Developing and optimising web applications for mobile platforms.	2		
Network application servers (Linux, Windows, cloud).	2		
Developing network communication applications using sockets and web services.	2		
Bibliography 1. Szilárd Enyedi, Liviu Miclea, Istvan Hoka, Iulia Adina Popa, Adrian Gut, <i>Dezvoltarea aplicațiilor Web cu unelte open-source</i>, EIKON, Cluj-Napoca, 2007, ISBN 978-973-757-054-3, 167 p. (UTCN Library – 10 copies; available online at http://users.utcluj.ro/~szilard/; access details will be communicated during course and laboratory activities). 2. Sebastien Dubois et al., <i>Learn TypeScript 3 by Building Web Applications: Gain a Solid Understanding of TypeScript, Angular, Vue, React, and NestJS</i>, Packt Publishing, 2019. 3. Saroj Pandey et al., <i>Web Technology: XML, PHP, MySQL, Semantic Web</i>, Amazon, 2022. 4. Radu Crețulescu, Daniel Morariu, <i>Dezvoltarea aplicațiilor Web</i>, Lucian Blaga University of Sibiu Publishing House, 2015 (UTCN Library – 1 copy).			

10. Correlation of subject contents with the expectations of the epistemic community, professional associations and representative employers in the field of the programme

The subject contents are correlated with the qualifications and occupations targeted by the study programme, such as systems and computer engineer/designer, automation engineer and industrial electromechanical-automation maintenance specialist, as well as with professional activities related to web-application and information-system development and administration. The topics address current professional requirements: designing, implementing, testing and maintaining web applications, using client-server technologies, accessing databases, developing web interfaces, network communication, adapting applications to mobile platforms, using advanced software technologies and integrating web applications into information systems and intelligent systems. The contents are updated based on technological developments, specialised bibliography, industry practices, and graduate and employer feedback.
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11. Assessment

Activity type	11.1 Assessment criteria	11.2 Assessment methods (and assessment type: continuous/summative)	11.3 Weight in the final grade
11.4 Course	Mastery of concepts, technologies and terminology specific to web-application development; capacity for analysis, design and technical reasoning in automation and applied-informatics contexts.	Written examination or online assessment on an institutional platform – summative assessment.	60%
11.5 Seminar / laboratory / project / practical work	Completion of laboratory work and practical assignments; correctness of implementations; quality of code, testing and documentation; practical application of web technologies; compliance with deadlines.	Practical examination, project / laboratory work or online assessment on an institutional platform – continuous assessment.	40%
11.6 Minimum performance standard: grade $G \geq 5$, $G = 0.6 \times E + 0.4 \times C$, where E = exam and C = colloquium. Passing condition: $E \geq 5$ and $C \geq 5$.			

Date of completion:	Teaching staff	Academic rank, title, First name LAST NAME	Signature
29.06.2026	Course	Assoc. Prof. Dr. Eng. Szilárd ENYEDI	
	Applications	Lect. Dr. Eng. Iulia ȘTEFAN	

Date of approval by the Automation Department Board _____	Head of the Automation Department Prof. dr. ing. Honoriu VĂLEAN
Date of approval by the Faculty Council of Automation and Computer Science _____	Dean Prof. dr. ing. Vlad MUREȘAN