SYLLABUS

1. Data about the program of study

1.1 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 Program of study / Qualification	Telecommunications Technologies and Systems/ Engineer Applied Electronics/Engineer
1.7 Form of education	Full time
1.8 Subject code	TST-E04.00/EA-E04.00

2. Data about the subject

2.1 Subject name	Computer Programming and Programming Languages 1						
2.2 Subject area	Theoretical area Methodological area Analytic area						
2.3 Course responsible	Prof. Mircea-Florin VAIDA, Ph.D. - Mircea.Vaida@com.utcluj.ro						
2.4 Teacher in charge with laboratory	Prof. Mircea-Florin VAIDA, Ph.D. - Mircea.Vaida@com.utcluj.ro Assoc.Prof. Cosmin STRILETCHI, Ph.D Cosmin.Striletchi@com.utcluj.ro						
2.5 Year of study	1	2.6 Semester	1	2.7 Assessment	E	2.8 Subject category	DF/DI

3. Estimated total time

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 seminar / laboratory	2
3.4 To Total hours in the curriculum	56	of which: 3.5 course	28	3.6 seminar / laboratory	28

Distribution of time	hours
Manual, lecture material and notes, bibliography	34
Supplementary study in the library, online specialized platforms and in the field	9
Preparation for seminars / laboratories, homework, reports, portfolios and essays	20
Tutoring	2
Exams and tests	3
Other activities:	1

3.7 Total hours of individual study	69
3.8 Total hours per semester	125
3.9 Number of credit points	5

4. Pre-requisites (where appropriate)

4.1 curriculum	Basic high school in mathematics, physics, computer science
4.2 competence	Basic knowledge of computer science, physics and mathematics from high school

5. Requirements (where appropriate)

5.1. for the course	Video-projector, screen, whiteboard
5.2. for the seminars / laboratories / projects	PCs with Internet access

6. Specific competences

Professional competences	C2. Applying the basic methods for the acquisition and processing of signals C3. Application of the basic knowledge, concepts and methods regarding the architecture of computer systems, microprocessors, microcontrollers, languages and programming techniques C4. Design, implementation and operation of data, voice, video and multimedia services. This is based on the understanding and the application of fundamental concepts in telecommunications and transmission of information C5. Selecting, installing, configuring and operating fixed or mobile telecommunications equipment. Equipping a site with usual telecommunications networks
Transversal competences	N/A

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

7.1 General objective	Development of basic competences in programming languages
7.2 Specific objectives	1. Theoretical knowledge's about C/C++ language. 2. Practical abilities to use Microsoft Visual Studio, VC++ IDE.

8. Contents

8.1 Lecture (syllabus)	Teaching methods	Notes
1. Introduction in computer programming - algorithms. Classification and evolution of programming languages, programming principles. Anatomy of a computer. Basic data and instructions types.	Presentations, discussions	Video - projector
2. Introduction concerning C/C++ programming. Predefined data types in C/C++. General aggregate types: arrays, structures. Functions. Basic elements of preprocessing in C/C++.		
3. Input/output operations in C/C++ (*printf(), scanf(), scanf_s( ), cout, cin* and wide variants).		
4. Operators in C language.		
5. Control of program flow in C/C++.		
6. Initialization of variables and arrays. Memory classes.		
7. Arrays: one/multi- dimensional, operations, parameters.		
8. Pointers in C. Arguments transfer by address with pointers and references.		
9. Pointers and arrays. Pointers to functions. String library functions. Arguments transfer to *main( )* function.		
10. Dynamic memory allocation in C/C++.		
11. User defined data types, struct, unions, bit fields.		
12. typedef, enum. Other input/output elements in C/C++. Files in C/C++.		

13. Binary files. New considerations concerning preprocessing, macro functions.		
14. New considerations concerning functions in C++: inline, constant param., variable no. of parameters, overloading . Standard C library.		

Bibliography

1. Vaida M., Bazele dezvoltarii aplicatiilor software in electronica si telecomunicatii, curs, litografia UTC-N, 1997
2. Mircea-Florin Vaida, Petre G. Pop, Cosmin Striletchi, Ligia Chiorean, Calin G. Login, Tehnologii avansate privind dezvoltarea aplicatiilor software in limbajul C/C++, Casa Cartii de Stiinta, 2006
3. Ligia Chiorean, Mircea-Florin Vaida, Petre G. Pop, Cosmin Striletchi, , Elemente de bază şi obiectuale privind dezvoltarea aplicaţiilor în limbajul de programare C/C++, UTPress, 2007/2008
4. Mircea-Florin Vaida, Ligia-Domnica Chiorean, Lenuța Alboaie, Petre Gavril Pop, Cosmin Strileţchi, Kuderna-Iulian Benţa, Programarea în limbajul C/C++ cu elemente C++1y. Programare web C++, Casa Cartii de Stiinta, Cluj-Napoca, 2016
5. Ligia-Domnica Chiorean, Kuderna-Iulian Benţa, Mircea-Florin Vaida, Petre Gavril Pop, Cosmin Strileţchi, C/C++ - Ghid teoretic si practic, Casa Cartii de Stiinta, Cluj-Napoca, 2016

8.2 Seminar / laboratory / project	Teaching methods	Notes
1. The Anatomy of a Computer. Operating systems. Files. Internet.	Experiments, tests using PC's	Network PC's
2. Codes. Numeration systems		
3. Pseudo code. Algorithms.		
4. Minimum C/C++ applications		
5. Basic input/output operations in C/C++ (*printf(), scanf(),scanf_s(), cout, cin* and wide variants).		
6. Operators and expressions in C/C++.		
7. Instructions in C/C++. Debugging		
8. Arrays, operations with arrays. Partial evaluation.		
9. Pointers in C. Arguments transfer by address with pointers and references.		
10. Pointers and arrays. Pointers to functions. Arguments transfer to *main( )* function.		
11. Dynamic memory allocation in C/C++.		
12. Structures, included structures.		
13. Pointers and data structures. Other user data types. Text files.		
14. Binary files. Final evaluation.		

Bibliography

-English web courses site, https://helios.utcluj.ro/lab/index.php (english+romanian)
-Lab. Support on the dedicated site, https://helios.utcluj.ro/lab/index.php (english+romanian)

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

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).

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Theoretical written and oral test with questions/code	Written/oral test (T=33%)	T = 33%

10.5 Seminar/ Laboratory	Solving a problem P on a computer (1 hour). The laboratory L will also be evaluated	Lab. evaluations and computer test (P=34%, L=33%)	P+L = 67%
10.6 Minimum standard of performance			
✓ The final grade (N) is calculated as average of marks obtained in the evaluation of ongoing activities and application type: N = (T + L + P) / 3.0. The condition for obtaining the ECTS credits is that N and all components of the final grade to be higher than or equal to 5 (five).			

Date of filling in:	**Responsible**	**Title First name SURNAME**	**Signature**
16.06.2025	Course	Professor Mircea-Florin VAIDA, Ph.D.	
	Applications	Professor Mircea-Florin VAIDA, Ph.D.	
		Assoc. Professor Cosmin STRILETCHI, Ph.D.	

Date of approval in the Council of the Communications Department 18.06.2025	Head of Communications Department Prof. Virgil DOBROTA, Ph.D.
Date of approval in the Council of the Faculty of Electronics, Telecommunications and Information Technology 25.06.2025	Dean Prof. Ovidiu POP, Ph.D.