

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	Bases of Electronics
1.4 Field of study	Electronic engineering, telecommunications and information technologies
1.5 Cycle of study	Bachelor of Science
1.6 Study program / Qualification	Electronic engineering, telecommunications and information technologies/ Engineer
1.7 Form of education	IF – full-time education

2. Course information

2.1 Course title	Software Engineering			Course code	29.00
2.2 Course coordinator	Assoc.Prof. Cosmin STRILETCHI, Ph.D Cosmin.Striletchi@com.utcluj.ro				
2.3 Seminar/ laboratory/ project/ practical activity coordinator	Assoc.Prof. Cosmin STRILETCHI, Ph.D Cosmin.Striletchi@com.utcluj.ro				
2.4 Year of study	II	2.5 Semester	2	2.6 Type of assessment	V
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											18	
(c) Additional documentation in the library, on specialized electronic platforms, and in the field											5	
(d) Preparation for seminars/laboratories, assignments, reports, portfolios and essays											14	
(e) Tutoring											3	
(f) Other activities											1	
3.8 Total hours of individual study and assessment (sum of (3.7(a))...3.7(f))									44			
3.9 Total hours per semester (3.4+3.8)									100			
3.10 Number of credits									4.0			

4. Prerequisites (where applicable)

4.1 curriculum	Basic knowledge from: Computer Programming and Programming Languages 1
4.2 competencies	Computer Programming and Programming Languages 2

5. Requirements (where applicable)

5.1. for the development of the lecture	Video-projector, screen, whiteboard
5.2. for the development of the seminar/ laboratory/ project	PCs with Internet access

6. Specific competencies acquired

Professional competencies	C3 Application of basic knowledge, concepts and methods related to computer-system architecture, microprocessors, microcontrollers, programming languages and techniques C3.4 Development of programs in a general-purpose and/or specific programming language, from requirements specification to execution, debugging and interpretation of the results in relation to the processor used C3.5 Implementation of projects involving hardware components (processors) and software (programming)
Transversal competence	N/A

7. Expected learning outcomes

Knowledge	The student/graduate identifies and describes basic concepts, principles and methods in mathematics, physics, chemistry, technical drawing, economy and computer science. - The student/graduate describes, identifies and summarizes elementary concepts and methods concerning computer-system architecture, microcontrollers, programming languages and techniques, as well as their application in concrete problems.
Skills	- The student/graduate evaluates, based on specific performance criteria, the type of computing system, its architecture and the manner of use required for efficiently solving concrete problems. - The student/graduate specifies requirements, develops programs in general-purpose programming languages (C, etc.) and/or object-oriented languages (C++, Java, etc.), runs and debugs them, and interprets the results of the programs developed in order to solve a concrete problem.

Skills	- The student/graduate applies evaluation criteria and methods for identifying, modelling, experimenting, analysing and qualitatively and quantitatively assessing phenomena and processes specific to the fundamental field, including by using digital technologies. - The student/graduate designs solutions, in compliance with relevant standards, for medium-complexity engineering problems that meet specified needs, while observing requirements related to public health, safety, welfare, environment, sustainability and economic factors, as well as other specific constraints.
Responsibility and autonomy	- The student/graduate applies the values of ethics and professional deontology specific to the engineering profession. - The student/graduate fluently uses at least one international language in technical communication.

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

8.1 General objective of the course	Development of competences in software engineering considering Java programming language
8.2 Specific objectives	1. Specific SE elements concerning software development 2. Theoretical knowledges about basic programming in Java language. Practical abilities to use Eclipse/NetBeans/IntelliJ Idea IDE for Java OO applications.

9. Contents

9.1 Lecture	No. of hours	Teaching methods	Remarks
Software Engineering Methodologies, general objectives/principles of SE, requirements regarding software project management. Introduction to UML programming, canonical UML diagrams	2	Presentations, discussions	
Basic concepts regarding the Object Oriented Programming and Java. Introduction in Java. IDE in Java.	2		
Java from C++ programmers. Java data types, control statements, arrays. String classes.	2		
Java classes, inheritance, interfaces, packages. Java exceptions	2		
Java Generics. Java Collections with/without Generics.	2		
Input and Output in Java. File handling in Java. Serialization, de-serialization.	2		
GUI programming in Java – overview	2		
Java events, the evolution of the events handling mechanisms. The description of the main elements included in the AWT and Swing packets.	2		
Other elements concerning the AWT and Swing graphics.	2		
Basic concepts about the Java multithreading. Multithreading in Java.	2		

9.1 Lecture	No. of hours	Teaching methods	Remarks
Mutual exclusion, synchronization in Java. Multithreading with <i>concurrent</i> package	2		
The Socket (stream) programming in Java Network programming in Java using the client-server model.	2		
The socket programming. (Datagram programming).	2		
Theoretical evaluation.	2		
Bibliography			
Cosmin Strilețchi, Ligia-D. Chiorean, Mircea-F. Vaida, Adriana Stan, Ștefan Dragoș - Tehnologii Java orientate spre aplicații cross-platform, Casa Cărții de Știință, Cluj-Napoca, 2020			
Cosmin Strilețchi, Mircea-F. Vaida, Ligia-D. Chiorean, Adriana Stan, Noțiuni esențiale și tehnologii specifice limbajului Java, Casa Cartii de Stiinta, 2018/2019			
English web courses site, https://helios.utcluj.ro/learn2code/index.php (english+romanian)			

9.2 Seminar /laboratory /project /practical training	No. of hours	Teaching methods	Remarks
C++ recapitulative applications. Basic SE elements	2		
The Eclipse environment. Basic Java applications (Stand-alone and applets).	2		
Simple stand-alone Java applications: Operators. Instructions. Arrays of variables.	2		
Java classes, methods, access specifiers. Classes for arrays of characters.	2		
Inheritance in Java. Java interfaces. Lambda expressions.	2		
User defined packages. Exceptions in Java.	2		
Java Generics. Collections in Java with/without generics.	2		
I/O and file applications in Java.	2		
Graphical Java applications	2		
Events and AWT graphics in Java.	2		
Events and Swing graphics in Java.	2		
Basic multithreading in Java.	2		
Basic Java distributed applications using stream sockets and datagram sockets. Homework's evaluations.	2		
Final practical test and evaluation.	2		
Bibliography			
Cosmin Strilețchi, Ligia-D. Chiorean, Mircea-F. Vaida, Adriana Stan, Ștefan Dragoș - Tehnologii Java orientate spre aplicații cross-platform, Casa Cărții de Știință, Cluj-Napoca, 2020			
Cosmin Strilețchi, Mircea-F. Vaida, Ligia-D. Chiorean, Adriana Stan, Noțiuni esențiale și tehnologii specifice limbajului Java, Casa Cartii de Stiinta, 2018/2019			
Lab support on dedicated site, https://helios.utcluj.ro/learn2code/index.php (english+romanian)			

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 course content and the teaching-learning-assessment methods are aligned with the current requirements of the Electronics, Telecommunications, and Information Technology Engineering field, considering the expectations of the academic and professional community, representative employers, as well as the national quality assurance standards in higher education. The course helps prepare students in line with employer expectations and the quality requirements set for engineering study programs.

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 Lecture	Theoretical (T) written and oral test with questions/code	Written/oral test (T=33%) continuous	T = 33%
11.5 Seminar/ Laboratory/ Project /Practical activity	Practical activity P: solving specific tasks, activity during the entire semester, bonuses	Practical tests, assignments, continuous	P = 67%
11.6 Minimum performance standard The final grade (N) is calculated as average of marks obtained in the evaluation of ongoing activities and application type: $N = T \cdot 33\% + P \cdot 67\%$. The condition for obtaining the ECTS credits is that $N \geq 5$, $T \geq 4$, $P \geq 4$.			

Completion date:	Course coordinators	teaching rank, title First name LAST NAME	Signature
23.06.2026	Lecture	Assoc.Prof. Cosmin STRILETCHI, Ph.D Cosmin.Striletschi@com.utcluj.ro	
	Applications	Assoc.Prof. Cosmin STRILETCHI, Ph.D Cosmin.Striletschi@com.utcluj.ro	
		Assist.Prof. Stefan-Szalai Dragos, Ph.D Stefan.Dragos@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 the Communications
Department
Prof. Virgil DOBROTĂ, Ph.D.

Date of approval by the Council of the Department of Bases of Electronics

Head of the Bases of Electronics
Department
Prof. Sorin HINTEA, Ph.D.

26.06.2026

Date of approval by the Council of the Faculty of Electronics, Telecommunications and Information Technology

Dean,
Prof. Ovidiu-Aurel POP, Ph.D.

30.06.2026