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-E29.00/EA-E29.00

2. Data about the subject

2.1 Subject name	Software Engineering						
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	2	2.6 Semester	4	2.7 Assessment	V	2.8 Subject category	DS/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	14
Supplementary study in the library, online specialized platforms and in the field	9
Preparation for seminars / laboratories, homework, reports, portfolios and essays	15
Tutoring	2
Exams and tests	3
Other activities:	1

3.7 Total hours of individual study	44
3.8 Total hours per semester	100
3.9 Number of credit points	4

4. Pre-requisites (where appropriate)

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

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	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 competences in software engineering considering Java programming language
7.2 Specific objectives	1. Specific SE elements concerning software development 2. Theoretical knowledges about basic programming in Java language. 3. Practical abilities to use Eclipse/NetBeans/IntelliJIdea IDE for Java OO applications.

8. Contents

8.1 Lecture (syllabus)	Teaching methods	Notes
1. Software Engineering Methodologies, general objectives/principles of SE, requirements regarding software project management. Introduction to UML programming, canonical UML diagrams	Presentations, discussions	Video - projector
2. Basic concepts regarding the Object Oriented Programming and Java. Introduction in Java. IDE in Java.		
3. Java from C++ programmers. Java data types, control statements, arrays. String classes.		
4. Java classes, inheritance, interfaces, packages. Java exceptions		
5. Java Generics. Java Collections with/without Generics.		
6. Input and Output in Java. File handling in Java. Serialization, de-serialization.		
7. GUI programming in Java. Java applets - overview		
8. Java events, the evolution of the events handling mechanisms. The description of the main elements included in the AWT and Swing packets.		
9. Other elements concerning the AWT and Swing graphics.		

10. Basic concepts about the Java multithreading. Multithreading in Java.		
11. Mutual exclusion, synchronization in Java. Multithreading with *concurrent* package		
12. The Socket (stream) programming in Java Network programming in Java using the client-server model.		
13. The socket programming. (Datagram programming).		
14. Theoretical evaluation.		

Bibliography

1. Cosmin Striletchi, Mircea-F. Vaida, Ligia-D. Chiorean, Adriana Stan, Noțiuni esențiale și tehnologii specifice limbajului Java, Casa Cartii de Stiinta, 2018/2019
2. Cosmin Striletchi, Mircea-F. Vaida, Elemente de baza privind programarea si securitatea in mediul Java, UTPress, 2009
3. Mircea-Florin Vaida, si colab., Java 2 Enterprise Edition (J2EE). Aplicatii multimedia, Editura Albastra Cluj-Napoca, 2002
4. Mircea-Florin Vaida, Petre G. Pop, Cosmin Striletchi, Ligia Chiorean, Calin G. Login, Tehnologii avansate privind dezvoltarea aplicatiilor software in limbajul C/C++, C# si Java, Casa Cartii de Stiinta, 2006

8.2 Laboratory	Teaching methods	Notes
1. C++ recapitulative applications. Basic SE elements	Experiments, tests using PC's	Network PC's
2. The Eclipse environment. Basic Java applications (Stand-alone and applets).		
3. Simple stand-alone Java applications: Operators. Instructions. Arrays of variables.		
4. Java classes, methods, access specifiers. Classes for arrays of characters.		
5. Inheritance in Java. Java interfaces. Lambda expressions.		
6. User defined packages. Exceptions in Java.		
7. Java Generics. Collections in Java with/without generics.		
8. I/O and file applications in Java.		
9. Graphical Java applications		
10. Events and AWT graphics in Java.		
11. Events and Swing graphics in Java.		
12. Basic multithreading in Java.		
13. Basic Java distributed applications using stream sockets and datagram sockets. Homework's evaluations.		
14. Final practical test and 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.