OBJECT-ORIENTED PROGRAMMING 1

ACADEMIC YEAR 2024-2025

Degree	**B**achelor of **S**cience in **C**omputer **S**cience			
Qualification	**C**omputer **S**cience			
Professor	PhD Karen Petrosyan			
Distribution of hours	**CM 13.5 h.**	**TP 16.5 h.**	**TPS 60 h.**	**ECTS 3**

EXPECTED LEARNING OUTCOMES OF THE COURSE		
A- Knowledge		A 1 knowledge of object-oriented paradigm in the Java programming language A 2 Object, data encapsulation, state invariants, specification of behaviors (pre/postconditions) A 3 Interaction between objects. Sequence and collaboration diagrams. A 4 Class, composition, instantiation. Class diagram. A 5 Inheritance and subtype, inheritance graph; notions of polymorphism, dynamic binding.
B-Skills	**B1 -** Skills to apply professional knowledge	B 1.1 Understand the fundamental concepts of computer science: structure of the computational process, algorithms and complexity of computation B 1.2 Summarize the strengths and weaknesses of Java programming and the basic concepts of object-oriented programming B 1.3 Write Java code using advanced Java features B 1.4 Understand the basic approaches to the design of software applications B 1.5 Understand the basic principles of creating Java applications B 1.6 Read and understand Java-based software code of medium-to-high complexity
	B2 - General (transversal) skills	B 2.1 Use standard and third party Java's API's when writing applications B 2.2 Apply the above to design using UML, implement and test a Java application consisting of multiple classes

KNOWLEDGE / SKILLS ASSESSMENT & EVALUATION		
Ongoing evaluation tasks *(max 1/3 of grade for the total course)*	**Midterm exam** *(max 1/3 of grade for the total course)*	**Final exam**

Assessment :	Assessment :	Assessment :
Oral ☐ Written ☐ Duration : XXX h. Criteria :	Oral ☐ Written ☐ Group base: Yes ☐ No ☐	Oral ☐ Written ☒ Group base: Yes ☐ No ☒
Course project : Yes ☐ No ☐ Presentation : Yes ☐ No ☐	Duration : XXX h.	Duration : 1.5 h.
Tasks type & Weight : XXXXXX	Exam type : XXXXXX	Exam type : Summative Semestral Exam (written) / Assignment /Practical Assignment

TEACHING METHODS & TOOLS

Students will be guided to develop problem-solving skills through interactive activities that are closely tailored to the lesson at hand. Students will be guided to discover activities that promote self-learning and help students develop critical thinking skills and retain knowledge that leads to self-actualization.

Lecture	Practical Work	Extra-mural/individual work
Explanation	Modeling	Study of textbooks, sources
Slideshow	Exercises	Individual work
Presentation	Self-study	Problem solving learning
Demonstration	Instruction with demonstration	
Video-presentation		

KNOWLEDGE & SKILLS PREREQUISITS

Sets and their operations, functions, relations, recurrence

COURSE DESCRIPTION /SYLLABUS / RESOURCES

TOPIC	HOURS	CORE RESOURCES [1]	ADDITIONAL RESOURCES
General introduction ▪ Different programming paradigms ▪ Java features ▪ Application structure, execution platform, abstract machine	1.5hCM	Herbert Schild. Java Complete Reference.	https://www.tutorialspoint.com/java/index.htm

[1] *For each topic max 20 -25 page of reading*

▪ Control Statements, arrays (singledimensional, multidimensional arrays)	13.5hCM 14hTD	Herbert Schild. Java Complete Reference. pp. 100-336	https://www.tutorialspoint.com/java/index.htm

▪ Classes and objects, data encapsulation in Java, class diagrams ▪ Classes in Java, methods, constructors, overloading, this ▪ Composition, class diagrams ▪ Inheritance and constructors, class diagrams ▪ Polymorphism ▪ Abstract classes and interfaces		Y. Daniel Liang. Introduction to Java Programming and Data Structures pp. 7-129 K. Barclay, J. Savage. Object-Oriented Design with UML and Java pp. 34-182	

STRUCTURE OF THE COURSE & ADDITIONAL INFORMATION REGARDING THE COURSE PREPARATION

CORE REFERENCES

1. Y. Daniel Liang. Introduction to Java Programming and Data Structures, 12th Edition - Pearson, 2020
2. Herbert Schild. Java Complete Reference, Eleventh Edition-Oracle, 2019
3. K. Barclay, J. Savage. Object-Oriented Design with UML and Java, Elsevier, 2004
4. Apprendre la Programmation Orientée Objet avec le langage Java, L. Gervais, 2020

ADDITIONAL REFERENCES

1. Cay S. Horstmann, Core Java, Volume I Fundamentals, 12th Edition-Oracle, 2021
2. Paul Deitel, Java How to program, Tenth Edision-Pearson, 2015.
3. David Flanagan. Java examples, Third Edition - O`ReIlly, 2004.

WEB RESOURCES

1. https://www.tutorialspoint.com/java/index.htm
2. https://www.javatpoint.com/java-programs
3. https://www.w3resource.com/java-exercises/basic/index.php