syllabus

1. Information regarding the programme

1.1 Higher education institution	**Babeş-Bolyai University**
1.2 Faculty	**Faculty of Mathematics and Computer Science**
1.3 Department	**Department of Computer Science**
1.4 Field of study	**Computers and Information Technology**
1.5 Study cycle	**Bachelor**
1.6 Study programme / Qualification	**Information Engineering**

2. Information regarding the discipline

2.1 Name of the discipline (en) (ro)			**Principles of Performance Oriented Coding**				
2.2 Course coordinator			**Assoc. Prof. PhD. Grigoreta Cojocar**				
2.3 Seminar coordinator			**Assoc. Prof. PhD. Grigoreta Cojocar**				
2.4. Year of study	**3**	2.5 Semester	**5**	2.6. Type of evaluation	**C**	2.7 Type of discipline	**Optional DS**
2.8 Code of the discipline							

3. Total estimated time (hours/semester of didactic activities)

3.1 Hours per week	5	Of which: 3.2 course	2	3.3 seminar/laboratory	1 LP
3.4 Total hours in the curriculum	56	Of which: 3.5 course	28	3.6 seminar/laboratory	28
Time allotment:					hours
Learning using manual, course support, bibliography, course notes					5
Additional documentation (in libraries, on electronic platforms, field documentation)					20
Preparation for seminars/labs, homework, papers, portfolios and essays					10
Tutorship					5
Evaluations					4
Other activities:					0

3.7 Total individual study hours	44
3.8 Total hours per semester	100
3.9 Number of ECTS credits	4

4. Prerequisites (if necessary)

4.1. curriculum	• Object Oriented Programming • Advanced Programming Methods
4.2. competencies	• Average Java programming skills

5. Conditions (if necessary)

5.1. for the course	• Projector
5.2. for the seminar /lab activities	• Laboratory with internet access and ability to use personal laptops

6. Specific competencies acquired

Professional competencies	C2.2 Explaining the role, interaction and operation of hardware, software and communication components C2.4 Metric based evaluation of functional and non-functional characteristics of computing systems C3.1 Identifying classes of problems and solving methods that are specific to computing systems C3.2 Using interdisciplinary knowledge, solution patterns and tools, making experiments and interpreting their results C3.3 Applying solution patterns using specific engineering tools and mehods C3.4 Comparatively and experimentaly evaluation of the alternative solutions for performance optimization
Transversal competencies	· CT1 Honorable, responsible, ethical behavior, in the spirit of the law, to ensure the professional reputation · CT3 Demonstrating initiative and pro-active behavior for updating professional, economical and organizational culture knowledge

7. Objectives of the discipline (outcome of the acquired competencies)

7.1 General objective of the discipline	- To acquire a deeper insight of Java Core Technologies
7.2 Specific objective of the discipline	- To attain an enhanced level of object oriented design principles (in Java) - To get a good grasp of Concurrent Programming in Java - To be a solid base for preparing to become a Java certified programmer

8. Content

8.1 Course	Teaching methods	Remarks
1. Requirements and overview	Exposition: presentation, explanations, practical examples, demonstrations, case-study discussions	
2. Application and process performance	Exposition: presentation, explanations, practical examples, demonstrations, case-study discussions	
3. High performance collections (1)	Exposition: presentation, explanations, practical examples, demonstrations, case-study discussions	
4. High performance collections (2)	Exposition: presentation, explanations, practical examples, demonstrations, case-study discussions	
5. Lambdas – good and bad	Exposition: presentation, explanations, practical examples, demonstrations, case-study discussions	
6. String processing and regular expressions in practice	Exposition: presentation, explanations, practical examples, demonstrations, case-study discussions	

7. Java I/O performance	Exposition: presentation, explanations, practical examples, demonstrations, case-study discussions	
8. Profiling in practice	Exposition: presentation, explanations, practical examples, demonstrations, case-study discussions	
9. Concurrency in practice (1)	Exposition: presentation, explanations, practical examples, demonstrations, case-study discussions	
10. Concurrency in practice (2)	Exposition: presentation, explanations, practical examples, demonstrations, case-study discussions	
11. Concurrency in practice (3)	Exposition: presentation, explanations, practical examples, demonstrations, case-study discussions	
12. Performance traps in design patterns (1)	Exposition: presentation, explanations, practical examples, demonstrations, case-study discussions	
13. Performance traps in design patterns (2)	Exposition: presentation, explanations, practical examples, demonstrations, case-study discussions	
14. Exam	Exposition: presentation, explanations, practical examples, demonstrations, case-study discussions	

Bibliography

1. Jeanne Boyarsky, Scott Selikoff, *OCA: Oracle Certified Associate Java SE 8 Programmer I Study Guide*, John Wiley & Sons, Dec 11, 2014
2. Jeanne Boyarsky, Scott Selikoff, *OCP: Oracle Certified Professional Java SE 11 Programmer II Study Guide*, John Wiley & Sons, 2020
3. Joshua Bloch, *Effective Java (3nd Edition),* Addison-Wesley Professional, 2018
4. Joshua Bloch, Neal Gafter, *Java puzzlers: traps, pitfalls, and corner cases,* Addison-Wesley, 2005
5. Tim Peierls, Brian Goetz, Joshua Bloch, Joseph Bowbeer, Doug Lea, David Holmes, *Java Concurrency in Practice,* Pearson Education, May 9, 2006
6. Vaskaran Sarcar, Java Design Patterns (A Tour with 23 Gang of Four Design Patterns in Java), Apress, 2016
7. Robert C. Martin, Clean Code (A Handbook of Agile Software Craftsmanship), Pearson Education, 2009

8.2 Laboratory	Teaching methods	Remarks
1. Requirements and overview. Application and process performance	Explanation, examples, dialog, case-studies	The lab is structured as 2 hours classes every second week.
2. High performance collections – profiling in practice	Explanation, examples, dialog, case-studies	
3. Lambdas, Java I/O performance	Explanation, examples, dialog, case-studies	
4. Concurrency in practice (1)	Explanation, examples, dialog, case-studies	
5. Concurrency in practice (2)	Explanation, examples, dialog, case-studies	
6. Performance traps in design patterns	Explanation, examples, dialog, case-studies	
7. Exam	Explanation, examples, dialog, case-studies	

Bibliography

1. Jeanne Boyarsky, Scott Selikoff, *OCA: Oracle Certified Associate Java SE 8 Programmer I Study Guide*, John Wiley & Sons, Dec 11, 2014
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9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations and representative employers within the field of the program

- The course respects the IEEE and ACM Curricula Recommendations for Computer Science studies
- The course is very well appreciated by the software industry the content being set up in very close collaborations with various software companies

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	- understanding the concepts and language features presented at the course	Written exam or quizzes during the course	40%
10.5 Seminar/lab activities	- implementing course concepts and algorithms	Lab assignments	60%
10.6 Minimum performance standards			
At least grade 5 (1 to 10 scale) at all activities seminar/lab, written exam. The final grade must be at least 5.			

Date	Signature of course coordinator	Signature of seminar coordinator
Mai 2022	Assoc. Prof, Cojocar Grigoreta, Phd	Assoc. Prof. Cojocar Grigoreta, Phd
	grigscojocar	grigscojocar

Date of approval

Signature of the head of department

Prof. dr. Laura Diosan

24.05.2022

Diosan