Study program: Informatics	
Course title: Object-oriented programming	
Professor/assistant: Ivan D. Petrović	
Type of course: Compulsory	
ECTS credits: 7	
Prerequisites: Introduction to programming	

Aims of the course:
The course continues to introduce the student to OO programming after the subject *Introduction to programming*. The student masters the concepts of OO modeling and programming using UML. The student works on and develops interactive graphical user interface (GUI) using exceptions and listeners. The student masters basic data structures and application of multithreading in OO programs.

Learning outcomes:
The student can model problems by applying OO modeling methods and using UML. The student can develop an interactive graphical user interface with the application of multithreading. The student understands basic data structures and their use and develops common (medium-difficulty) OO applications using Java.

Syllabus:
Theoretical Classes
Application of UML in the OO system modeling. Events and programming with events. GUI graphic components listeners. Creating a graphical user interface (GUI) in Java and programming it. JavaFX and multimedia elements. Internationalization of graphical user interface. Advanced elements in Java GUI and application of the MVC model. Application of Swing MVC architecture. Recursion and problems in which it is applied. Generic classes and methods. Collection system in Java. Iterators. Lists. Vector and Stack classes. Wait and priority queues. Sets. Maps. Multithreading – the term, the application of the Thread class, and the Runnable interface. Synchronization of threads and application for animations. Testing the code. Unit testing using the JUnit 4 library. Testing methods and exceptions.
Practical classes
Work with examples. Individually assigned tasks. Homework. Making projects.

Literature:
1. Yakov Fain, Java 8 programiranje, Kompjuter biblioteka, 2015.
2. Y. Daniel Liang, Introduction to Java Programming, Comprehensive Version, 9th edition, Pierson, 2012 – preporučeni udžbenik
3. Harvey M. Deitel, How to Program, 4th edition, Prentice Hall, 2002.
4. HUnit in Action, Vincent Massol, Manning Publications, 2003.

Number of active classes: 75	**Lectures:** 45	**Practical classes:** 30

Teaching methods: Lectures and exercises

Grading system (maximum 100 points)
grading scale from 5 to 10: below 51 points – student fails the exam, grade 6 from 51- 60 points, grade 7 from 61-70 points, grade 8 from 71-80 points, grade 9 from 81-90 points, grade 10 from 91- 100 points.

Pre-exam obligations:	Points:	Final exam:	Points:
Activity during theoretical lectures	max 5	Oral exam	50
Practical training	max 5		
Written test(s)	max 10		
Term paper	max 30		
Minimum requirement for the final exam	30		