POLYTECHNIC OF MEĐIMURJE IN ČAKOVEC

COURSE SYLLABUS

ACADEMIC YEAR: 2020/2021

1. GENERAL COURSE INFORMATION

1.1 Course name	**Object oriented programming II**			
1.2 Study program/s	Undergraduate professional study in Computer Science			
1.3 Course status (O,E)	Obligatory	**1.6 Mode of instruction (number of hours)**	**Lectures**	30
1.4 Course code			**Exercises**	30
1.5 Course abbreviation	OOP2		**Seminars**	
1.6 Semester	5		**E-learning**	
1.7 ECTS	5	**1.7 Place and time of instruction**	The premises of Polytechnic of Medjimurje in Cakovec, according to schedule published on web pages	

2. TEACHING STAFF

2.1 Course leader/s-title	Dr.sc. Bruno Trstenjak, senior lecturer	**contact**	btrstenjak@mev.hr
		contact	
2.2 Assistant/s- title		**contact**	
		contact	
2.3 Instruction held by- title		**contact**	

3. COURSE DESCRIPTION

3.1 Course goals	After completing the course, the student will be able to apply the knowledge to create a simple Java application (desktop and web). Knowledge is acquired in the field of application of the object paradigm and the student is trained to independently perform problem tasks in the field of application of object-oriented programming languages.
3.2 Prerequisites	Passed courses: Object oriented programming 1, Programming tools in programming
3.3 Course outcomes	After successfully completing the course, students will be able to: O1 - Explain the basic methods of creating data structures O2 - Design desktop applications using basic UI elements O3 - Explain the class to work with 2D graphics O4 - Design web services and CRUD methods O5 - Design a REST service in a Cloud environment O6 - Independently create a web application according to the given problem task
3.4 Course content	The course will contain content related to the creation of desktop and web applications based on the Java programming language. The contents are processed from the aspect of programming and application of the Java programming language. The teaching units present contents related to project creation, defining classes, creating UI interfaces, creating services and repositories for database access, development of CRUD methods and REST services in the Cloud environment.

3.5 Types of coursework	X	Lectures	X	Exercises		Blended e-learning	X	Individual activities		Laboratory

		Seminars and workshops	X	Distant learning		Field classes		Multimedia and network		Mentorship
		Other								

3.6 Language of instruction

3.7 Monitoring students' work (enter the number of ECTS credits for each activity so that the total number of ECTS credits is equal to the total ECTS value of the course, 1 ECTS = 30 hours)

2,0	Class attendance		Seminars		Essay
	Class activity	1,0	Project		Report/paper
1,0	Midterm exams		Practical task		Continuous knowledge check
	Written exam		Experimental work		
1,0	Oral exam		Research		

3.8 Assessment and evaluation of students' work during classes and at the final exam

Activity specification	Percent %	Points
Assessment during instruction		
Attendance	5%	5
Project	40%	40
Midterm exam 1	15%	15
Midterm exam 2	15%	15
Oral exam	25%	25
Exam assessment for the students who failed to fullfil all the obligatory requirements during the semester		
Written exam	*30%*	*30*
Total:	**100%**	**100**

3.9 Assessment criteria – analysis per learning outcomes

Ways of evaluating learning outcomes						
	Attendance	**Mid-term exam 1**	**Mid-term exam 2**	**Practical work**	**Oral exam**	**Total**
Outcome 1		5		5	5	15
Outcome 2		5		5	5	15
Outcome 3		5		5	5	15
Outcome 4			5	5	5	15
Outcome 5			5	10	5	20
Outcome 6			5	10		15
Outcome not-related	5					5
Total	**5**	**15**	**15**	**40**	**25**	**100**

Grading of outcomes (in order to pass the mid-term exam/exam the student must achieve at least 50% points for each learning outcome)

Points	Grade
89 – 100	excellent (5)
76 – 88	very good (4)
63 – 75	good (3)
50 – 62	pass (2)
0 – 49	fail (1)

3.10 Specific features related with taking the course

If a student collects 50% of the points of each outcome, he / she directly takes the exam, if he / she has submitted a seminar paper. A student cannot access the exam if he / she has not submitted a seminar paper. Seminar papers are prepared according to the instructions published on the Merlin system and are submitted by posting on the Merlin. The seminar paper should be submitted at least 3 days before the exam deadline.

3.11 Students obligations	Full-time students are required to attend at least 70% of the total number of hours of lectures and exercises in order to exercise the right to take the exam. Part-time students are required to attend at least 30% of the total number of hours of lectures and exercises in order to exercise the right to take the exam. If the student has not fulfilled all the obligations set by the course, he is obliged to attend the lectures again and meet the conditions for taking the exam. Attendance can be offset by online tuition, organised webinars and added assignments given by teachers. One lesson lasts 45 minutes, and several hours form a teaching unit. Absence from one teaching unit is counted as one absence. Delays and apologies are recorded separately. In that case, if the student missed more than 50% of classes, and has a justifiable reason/apology, the request should be submitted to the Department Council, which then decides on the justification of student absences with the obligatory opinion of the course leader.	
3.12 Written assignments		
3.13 Required reading	1.	Marc Loy: Learning Java: An Introduction to Real-World Programming with Java, Oreilly 2020.
	2.	
3.14 Additional reading	1.	Nick Samoylov: Learn Java 12 Programming: A step-by-step guide to learning essential concepts in Java SE 10, 11, and 12 ,Packt Publishing, 2019.
	2.	Craig Walls: Spring in Action, Manning Publications, 2018.
4 ADDITIONAL COURSE INFORMATION		
4.1 Quality control	The quality of the program, teaching process, teaching skills and level of mastery of the material will be established by conducting a written evaluation based on questionnaires, and in other standardised ways and in accordance with the by-laws of the Polytechnic of Međimurje in Čakovec.	
4.2 Contact the teacher	Students can contact the teacher during the office hours and during classes, while for short questions and explanations they can contact him/her any day during working hours by coming in person or by landline. It is also possible to ask questions by e-mail, which will be answered in 48 hours at the latest. It is desirable for students to come as often as possible for any possible questions during the teacher's office hours.	
4.3 Information about the course	It is the obligation of each student to be regularly informed about the course. All notifications about the classes or possible postponement of classes will be posted on the bulletin board and on the website of the Polytechnic at least 24 hours in advance.	
4.4 Course contribution to the study program	- Work in a team, manage professional projects and cooperate with experts from the real sector - Develop programming code in multiple programming languages using modern methods and tools - Choose ways of structuring data in program code, as well as techniques for writing complex program forms and use standard algorithms - Apply database basics through database creation, modelling and administration	

	Use Cloud computing as a concept to access data and applications

5. ANALYSIS OF COURSE TOPICS (the number of hours is equal to the number of lectures and exercises of the course)

LECTURES

Hours	Topic and description	Method • Direct teaching (lecture, instruction, pp presentation) • Discovery learning (individual, lead, discussion) • Group learning • Case study • Field classes…	Learning outcomes	Course outcome
1. & 2.	Introductory lecture, teaching methods, evaluation of student work during the semester, criteria, scoring, expected learning outcomes. Basic concepts for the Java language	Lecture, discussion, PP presentation	Explain the basic properties and characteristics of the Java programming language.	O1
3. & 4.	Data collections	Lecture, discussion, PP presentation	Explain the types of classes for the data collection, properties and method of application.	O1
5. & 6.	Threads, synchronization process	Lecture, discussion, PP presentation	Explain the concept of threads, how to start, synchronize and thread prioritization	O2
7. & 8.	Basic elements of a desktop application	Lecture, discussion, PP presentation	Distinguish the basic elements of a desktop application (methods, classes, derived classes).	O2
9. & 10.	UI elements, methods	Lecture, discussion, PP presentation	Distinguish basic UI elements for creating desktop applications.	O2
11.&12.	Application testing	Lecture, discussion, PP presentation	Explain the basic properties and method of making test classes and methods.	O1,O2
13.&14.	2D graphic	Lecture, discussion, PP presentation	Distinguish basic classes for displaying graphics,	O3

			properties, and usage.	
15.&16.	File management classes	Lecture, discussion, PP presentation	Explain file management classes, how to use basic file operations.	O4
17.&18.	Web application, basic properties, structure (Spring boot)	Lecture, discussion, PP presentation	Explain the basic features of a modern web application based on the object paradigm.	O4
19.&20.	Web controller: concept, properties, view elements	Lecture, discussion, PP presentation	Explain the concept of controller, how to create and connect to a website.	O4
21.&22.	The concept of repository, service and object interface	Lecture, discussion, PP presentation	Explain the concept of repositories, ways of defining methods for database access.	O4,O5
23.&24.	The REST controller and CRUD operations	Lecture, discussion, PP presentation	Explain the properties of REST controllers and how to implement CRUD methods.	O5
25.&26.	Asynchronous communication - classes, properties and methods	Lecture, discussion, PP presentation	Explain classes for implementing asynchronous communication.	O5
27.&28.	Classes for implementing security applications in the cloud	Lecture, discussion, PP presentation	Explain classes for implementing application security to work in a cloud environment.	O6
29.&30.	Project analysis	Lecture, discussion, PP presentation	Know the methods for evaluating the quality of applications.	O6
EXERCISES/ SEMINARS				
Hours	**Topic and description**	**Method** • Direct teaching (lecture, instruction, pp presentation) • Discovery learning (individual, lead, discussion) • Group learning • Case study • Field classes…	**Learning outcomes**	**Course outcome**
1. & 2.	Introduction to development tools	Lecture, discussion, PP presentation	Explain the basic elements of the	O1

			development tool, the principle of creating a project.	
3. & 4.	Development a simple desktop application	Presentation, individual work	Develop a simple application.	O1
5. & 6.	Classes and objects in Java	Individual work	Explain the elements of a modern application, purpose and function in the work of the application.	O1
7. & 8.	Basic UI elements for swing application	Presentation, individual work	Develop an application interface according to the problem task.	O2
9. & 10.	Methods and events	Presentation, individual work	Explain the properties of basic view elements, how to apply them in the application.	O2
11.&12.	Parallel and asynchronous processes	Presentation, individual work	Develop the simple asynchronous methods and classes.	O2
13.&14.	Application testing	Presentation, individual work	Develop test methods for the developed application.	O1,O2
15.&16.	2D graphic	Individual work	Develop methods for displaying basic graphic elements in the application.	O3
17.&18.	File management classes	Presentation, individual work	Create a database according to the problem task. Create CRUD methods.	O4
19.&20.	Web application, basic properties, structure (Spring boot)	Presentation, individual work	Create a simple Spring boot application.	O4
21.&22.	Web controller	Presentation, individual work	Create a web controller class to display web pages.	O4
23.&24.	The concept of repository, service and object interface	Presentation, individual work	Create a repository, classes, and services according to database properties.	O5
25.&26.	The REST controller and CRUD operations	Presentation, individual work	Create CRUD methods based on	O5

			database properties.	
27.&28.	Classes for implementing security applications in the cloud	Presentation, individual work	Explain the class responsible for safety applications in the cloud.	O6
29.&30.	Project analysis	Presentation, individual work	Explain the good characteristics of the developed projects. Basic elements of project documentation.	O6