POLYTECHNIC OF MEĐIMURJE IN ČAKOVEC

COURSE SYLLABUS

ACADEMIC YEAR: 2020/2021

1. GENERAL COURSE INFORMATION				
1.1 Course name	**Complex application programs**			
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			**Seminars**	
1.6 Semester	6		**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**	
		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 gain an overview of modern software technologies for the development of complex programs for running in a cloud environment. Knowledge is acquired for the development of scalable RESTfull services in the cloud and the application of JavaScript technologies for the development of single applications. In the implementation of the project, the acquired prior knowledge in the field of Database and Object Oriented Programming will be used.
3.2 Prerequisites	Attended courses: Object Oriented Programming 2 and Databases 2.
3.3 Course outcomes	After successfully completing the course, students will be able to: O1 - Apply server concepts to implement CRUD and RESTful Cloud API services O2 - Implement a web application on the client side (SPA) using a modern JavaScript framework O3 - Improve your knowledge related to the use of various development software tools and planning tools O4 - Improve IT project management and system development skills
3.4 Course content	Project planning and management, Development of SPA application concept, JavaScript framework concept and controller development, creating a Spring Boot web application, creating a RESTful service, connecting RESTful services, databases and CRUD methods, Authentication and security, Setting up a project in a production environment. Overall project development.

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)

1,5	Class attendance		Seminars		Essay
	Class activity		Project		Report/paper
1,0	Midterm exams	2,0	Practical task		Continuous knowledge check
	Written exam		Experimental work		
0,5	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	10%	10
Continuous assessment	20%	20
Project	40%	40
Midterm exams	30%	30
Exam assessment for the students who failed to fullfil all the obligatory requirements during the semester		
Project	*40%*	*40*
Written & oral exam	*30%*	*30*
Total:	**100%**	**100**

3.9 Assessment criteria – analysis per learning outcomes

	Attendance	Mid-term exam 1	Mid-term exam 2	Project	Oral exam	Total
Outcome 1		5		10	5	20
Outcome 2		10		10	5	25
Outcome 3			10	10	5	25
Outcome 4			5	10	10	25
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.	AJ Henley , Introduction to Java Spring Boot: Learning By Coding, (2019)
3.14 Additional reading	1.	Autor: GoalKicker.com, AngularJS - Notes for Professionals (2018)
	2.	Rodrigo Branas, AngularJS - Essentials (2014)

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	- 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

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	Learning outcomes	Course outcome

		• Direct teaching (lecture, instruction, pp presentation) • Discovery learning (individual, lead, discussion) • Group learning • Case study • Field classes…		
1. & 2.	Introduction to the course content, teaching methods, evaluation of student work during the semester Basic concepts of the concept of data structure and algorithms	Lecture, discussion, PP presentation	Explain the basic properties and characteristics of different data structures.	O1
3. & 4.	Introduction to IT project	Lecture, discussion, PP presentation	Explain the concept of an IT project and explain the functionality of individual components	O2
5. & 6.	Spring boot application (introduction)	Lecture, discussion, PP presentation	Explain the concept of Spring boot web application, component	O3
7. & 8.	Web controller	Lecture, discussion, PP presentation	Explain the formation of a web controller and the connection to the display of web pages	O3
9. & 10.	Spring boot & relational base	Lecture, discussion, PP presentation	Explain how to connect a web application to a relational database, set up on a cloud platform	O2, O3
11.&12.	Java Persistence API	Lecture, discussion, PP presentation	Explain the basic principles of using the JPA interface	O3
13.&14.	Java repository, services and interface	Lecture, discussion, PP presentation	Distinguish basic concepts. Explain how to create repositories and services and how to connect to each other	O2, O3
15.&16.	RESTful servis i REST controller	Lecture, discussion, PP presentation	Explain how to create a RESTful controller and service.	O2, O3
17.&18.	Midterm exam 1	Individual work	Outcome check O1, O2	O1, O2
19.&20.	CRUD methods	Lecture, discussion, PP presentation	Explain the concept of CRUD method	O2, O3

			and method of implementation. Test methods.	
21.&22.	JavaScript framework	Lecture, discussion, PP presentation	Explain the basic properties of the framework tool and the method of implementation in a web project.	O4
23.&24.	JavaScript kontroler & REST services	Lecture, discussion, PP presentation	Explain how to connect the JavaScript controller and REST service.	O3, O4
25.&26.	SPA application i JavaScript Ruther	Lecture, discussion, PP presentation	Explain web application testing tools and classes. Distinguish ways of data management	O4
27.&28.	Midterm exam 2	Individual work	Outcome check O3, O4	O3, O4
29.&30.	Web security	Individual work	Explain how to implement security in a web application.	O1, O2
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 the course content, teaching methods, evaluation of student work during the semester Basic concepts of the concept of data structure and algorithms	Lecture, discussion, PP presentation	Explain the basic properties and characteristics of different data structures.	O1
3. & 4.	Introduction to IT project	Presentation, independent work	Explain the concept of an IT project and explain the functionality of individual components	O2
5. & 6.	Spring boot application (introduction)	Individual work	Explain the concept of Spring boot web application, component	O3
7. & 8.	Web controller	Presentation, independent work	Explain the formation of a web controller and the	O3

			connection to the display of web pages	
9. & 10.	Spring boot & relational base	Presentation, independent work	Explain how to connect a web application to a relational database, set up on a cloud platform	O2, O3
11.&12.	Java Persistence API	Presentation, independent work	Explain the basic principles of using the JPA interface	O3
13.&14.	Java repository, services and interface	Presentation, independent work	Distinguish basic concepts. Explain how to create repositories and services and how to connect to each other	O2, O3
15.&16.	RESTful servis i REST controller	Individual work	Explain how to create a RESTful controller and service.	O2, O3
17.&18.	RESTful servis i REST controller	Individual work	Creating a controller according to the default functionality	O3
19.&20.	CRUD methods	Presentation, independent work	Explain the concept of CRUD method and method of implementation. Test methods.	O2, O3
21.&22.	JavaScript framework	Presentation, independent work	Explain the basic properties of the framework tool and the method of implementation in a web project.	O4
23.&24.	JavaScript kontroler & REST services	Individual work	Explain how to connect the JavaScript controller and REST service.	O3, O4
25.&26.	SPA application i JavaScript Ruther	Presentation, independent work	Explain web application testing tools and classes. Distinguish ways of data management	O4
27.&28.	Project deployment in a cloud environment	Presentation, independent work	Explain the process of deploying a finished web	O2

			application in a cloud environment	
29.&30.	Web security	Presentation, independent work	Explain how to implement security in a web application.	O1, O3