UNIVERSITY OF ECONOMICS – VARNA

FACULTY OF INFORMATICS

DEPARTMENT OF INFORMATICS

Adopted by the FC (record № 9/24.04.2024)

Adopted by the DC (record № 10/16.04.2024)

ACCEPTED BY:

Dean:

(Prof. Vladimir Sulov, PhD)

SYLLABUS

SUBJECT: OBJECT-ORIENTED PROGRAMMING

DEGREE PROGRAMME: Computer Science; MASTER`S DEGREE

YEAR OF STUDY: 6 for other field graduates; SEMESTER: 12 for other field graduates

TOTAL STUDENT WORKLOAD: 240 hours; incl. curricular 60 hours

CREDITS: 8

DISTRIBUTION OF STUDENT WORKLOAD ACCORDING TO THE CURRICULUM

TYPE OF STUDY HOURS	**WORKLOAD, hours**	**TEACHING HOURS PER WEEK, hours**
CURRICULAR: incl.		
• LECTURES	30	2
• SEMINARS / LAB. EXERCISES	30	2
EXTRACURRICULAR	180	-

Prepared by:

1. **……………………………………..**
(Assoc. Prof. Pavel Petrov, DSc)

2. **……………………………………**
(Chief Assist. Prof. Bonimir Penchev, PhD)

Head of department
of Informatics: ………………………………………
(Prof. Julian Vasilev, PhD)

I. ANNOTATION

The course "Object-Oriented Programming" provides knowledge about modern concept of modeling real-world objects through programming code. As a result of the training, students need to understand how encapsulation of data, abstraction, inheritance and polymorphism allows better reuse of programming code, better support and ability to extend the functionality of applications.

In the applied aspect knowledge and skills students acquire through one of the established in the practice object-oriented programming language. Its study allows in-depth to explore the ba-sics of object-oriented programming.

The course aims to provide expertise in the areas of software development; the students should acquire practical programming skills and knowledge how to use standard object-oriented programming libraries.

In the course of training, the following key competencies are applied and developed, according to the recommendation of the Council of the European Union dated May 22, 2018, namely:

• *Mathematical competence and exact sciences - group 3. Ability to solve multicriteria tasks, to use and apply models and concepts. Students should be able to put into practice the concepts of object-oriented programming.*

• *Digital competence - group 4. Knowledge of the possibilities and limitations of computer technologies; understanding the principles and logic underlying software systems; ability to create and use programs and digital content.*

• *Personal competence - group 5. Ability to apply a variety of communication approaches and tools that are adapted to the context of interaction. Acquiring skills to solve real-life problems, to plan tasks, to organize one's own work and to deal with conflicts.*

II. THEMATIC CONTENT

№	TITLE OF UNIT AND SUBTOPICS	NUMBER OF HOURS		
		L	S	L.E.
Theme 1. Object-oriented design and programming		**2**	**1**	
1.1	Concept for creating object-oriented applications.			
1.2	Main stages in the creation of object-oriented application.			
Theme 2. Classes and Objects		**10**	**10**	
2.1	Class definition. Methods and properties.			
2.2	Interface and implementation.			
2.3	Constructor. Destructor. Objects initialization.			
2.4	Passing objects as arguments to functions.			
2.5	Creating and using dynamic objects.			
Theme 3. Encapsulation		**4**	**5**	
3.1	Modes of access to members of the class.			
3.2	Static members. Pointer this.			
Theme 4. Inheritance		**8**	**6**	
4.1	Redefining members.			
4.2	Virtual functions.			
4.3	Polymorphism.			
4.4	Abstract classes.			
Theme 5. Advanced object-oriented techniques		**6**	**8**	
5.1	Exceptions. Throwing and catching exceptions			
5.2	Standard Libraries. Containers. Iterators. Algorithms.			
	Total:	**30**	**30**	

III. FORMS OF CONTROL:

№	TYPE AND FORM OF CONTROL	Number	extracur-ricular, hours
1.	**Midterm control**		
1.1.	Programming test	2	70
1.2.	Programming project related to the topics discussed in this course	1	45
	Total midterm control:	**3**	**115**
2.	**Final term control**		
2.1.	Examination (test)	1	65
	Total final term control:	**1**	**65**
	Total for all types of control:	**4**	**180**

IV. LITERATURE

REQUIRED (BASIC) LITERATURE:

1. Bjarne Stroustrup, Programming: Principles and Practice Using C++ (3rd Edition), Addison-Wesley, 2024.
2. Green, D., et al. The C++ Workshop, Packt Publishing, 2020.
3. The C++ Resources Network - http://www.cplusplus.com/

RECOMMENDED (ADDITIONAL) LITERATURE:

1. Butler, M. Exploiting Modern C++, Addison-Wesley Professional, 2020.
2. Google's C++ Class - https://developers.google.com/edu/c++
3. Quinn, R. Advanced C++ Programming Cookbook, Packt Publishing, 2020.