

COURSE DESCRIPTION CARD – SPECIMEN

Faculty of Mechanical Engineering										
Field of study	Biomedical Engineering							Degree level and programme type	Bachelor's degree	
Specialization/ diploma path								Study profile		
Course name	Object Oriented Programming							Course code	IS-FME-00151W	
								Course type	elective	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	winter	
	15			30				No. of ECTS credits	3	
Entry requirements	Introduction to Computer Programming									
Course objectives	The purpose of the course is teach students about the basic concepts and techniques of object-oriented programming language for example C ++. Learn to use in practice, the most important object-oriented techniques. Learn to design, implementation and analysis of programs in the object-oriented paradigm.									
Course content	<p>Principles of object-oriented programming. General structure of a C++ program. Analysis of the problem domain, object-oriented design and object-oriented programming. The concept of class and object. Components and methods. Static variables. Static class members, friend functions and classes, nested classes. Creating objects (construction, removal, lifetime) in C ++. Constructors and destructors. Encapsulation components: access control. Stream input and output operators (<< and >>), including the way of defining them for a given class and stream type. Overloading methods and operators. Inheritance: decomposition problem on a hierarchy of classes. Polymorphism. Abstract classes. Virtual methods. Multiple inheritance. Operation of special situations: C++ exception handling mechanism. Standard C++ library and its application to dynamic data structures (e.g. vectors, lists).</p>									
Teaching methods	presentation and self-learning									
Assessment method	lecture – written exam; project – project completion, presentation and discussion									
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study		
LO1	knows the basic constructs of C / C ++							IBK_W13		
LO2	knows the basic concepts and mechanisms of object-oriented programming of C ++							IBK_W13		

LO3	knows and understands the mechanisms of handling special situations (exceptions), I / O, files, streams and classes	IBK_W13	
LO4	can design, implement and analyze programs in structural paradigm in C / C ++. Knows and understands the mechanisms of handling special situations (exceptions), I / O, files and streams, classes	IBK_U08, IBK_U10	
LO5	can recognize the need for and use the most important mechanisms in the field of object-oriented programming. Can create a proper inheritance hierarchy of classes given to the problem of modelling reality in object-oriented paradigm	IBK_U02, IBK_U06, IBK_U08, IBK_U10	
LO6	can accept and correctly fulfil the roles of programmer-class creator and programmer-customer during the project programming in the object-oriented paradigm	IBK_K01, IBK_K02, IBK_K03	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
LO1	exam	L	
LO2	exam	L	
LO3	exam, project completion	L, P	
LO4	reports of project	P	
LO5	reports of project	P	
LO6	evaluation of reports, presentation and discussion	P	
Student workload (in hours)		No. of hours	
Calculation	lecture attendance	15	
	participation in projects	30	
	preparation for projects	30	
	working on projects, reports, etc.	15	
	participation in student-teacher sessions related to the project	5	
	implementation of project tasks	5	
	TOTAL:	120	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		50h	1
Student workload – practical activities		70h	2
Basic references	<p>1. Object-oriented programming for Windows. Ernest R Tello. New York : Wiley J. 1991.</p> <p>2. Object-Oriented Programming in Python. Michael Goldwasser, David Letscher. Prentice Hall. 2007. http://www.freetechbooks.com/object-oriented-programming-in-python-t1093.html</p> <p>3. Ruby on Rails 4.0 Guide: A step by step guide to learn Ruby on Rails 4.0 and Ruby 2.0. Stefan Wintermeyer. CreateSpace Independent Publishing Platform. 2013. http://www.freetechbooks.com/ruby-on-rails-40-guide-a-step-by-step-guide-to-learn-ruby-on-rails-40-and-ruby-20-t1101.html</p>		

	4. Object-Oriented Programming in C++ (4th Edition). Robert Lafore. Sams Publishing. 2002. https://docs.google.com/file/d/0B21HoBq6u9TsUHhqS3JIUmFuamc/view	
Supplementary references	1. Object-oriented data structures using Java. Nell Dale, Daniel T Joyce. Chip Weems. Boston : Jones and Bartlett Publishers. 2002. 2. Beginning object-oriented programming with C#. Jack Purdum, Indianapolis : John Wiley a. Sons. 2013.	
Organisational unit conducting the course	Institute of Biomedical Engineering	Date of issuing the programme
Author of the programme	Marta Borowska, PhD Eng.	16.03.2021

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work,

S – seminar