

FACULTY OF ELECTRONICS					
<b>SUBJECT CARD</b>					
Name of subject in Polish:	<b>Programowanie obiektowe</b>				
Name of subject in English:	<b>Object Oriented Programming</b>				
Main field of study (if applicable):	<b>Electronic and Computer Engineering</b>				
Specialization (if applicable):	.....				
Profile:	<b>academic</b>				
Level and form of studies:	<b>1 st level/ full-time</b>				
Kind of subject:	<b>obligatory</b>				
Subject code:	<b>ECEA17004</b>				
Group of courses:	<b>YES</b>				
	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		30		
Number of hours of total student workload (CNPS)	90		90		
Form of crediting	credited with grade		credited with grade		
For group of courses mark (X) final course	X				
Number of ECTS points	<b>5</b>				
including number of ECTS points for practical (P) classes	-		2		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	1		2		

\*delete as applicable

**PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

1. K1ECE\_W07, K1ECE\_U07

**SUBJECT OBJECTIVES**

- C1 The student would be introduced in the basis of object oriented programming, its engineering and methodology
- C2 The student would know how to prepare program source code using object oriented approach

**SUBJECT EDUCATIONAL EFFECTS**

relating to knowledge:

- PEU\_W01 Student knows the idea of the object oriented approach.
- PEU\_W02 Can explain the fundamentals of object oriented methodology as the tool of the comprehending the real world.
- PEU\_W03 Can know an idea of object oriented methodology based on Unified Modeling Language (UML).

PEU_W04	Student knows basic tools and paradigms of the object oriented approach.
PEU_W05	Student knows basic programming tools on the exemplified object oriented programming C++ language.
Relating to skills:	
PEU_U01	Can independently formulate and use the technology of the object oriented programming.
PEU_U02	Can create and execute the parts of the source code containing definitions of constructors both in the basis and in the derived classes.
PEU_U03	Can create and execute the parts of the independently drawn up source code containing virtual functions and overloaded operators.

<b>PROGRAM CONTENT</b>		
<b>Lecture</b>		<b>Number of hours</b>
Lec1	Introduction. Object oriented approach – a general idea.	2
Lec2	Presentation of the main application of the object oriented approach (project management, etc.) and the nowadays object oriented programming languages	2
Lec3	Object oriented programming language C++. Main paradigms, Constructors and destructors.	2
Lec4	Gadgets in C++. Default arguments, references, complex declarators, modifiers, etc. A copy constructor and the assignment operator.	2
Lec5	Assessment of the main nowadays object oriented programming languages: C++, C# and Java. Microsoft .NET framework.	2
Lec6	Object oriented programming language Java. Main ideas. Packages and implementations.	2
Lec7	Object oriented programming language C#. Main ideas. Interfaces and garbage collection.	2
Lec8	Object oriented approach. Encapsulation and inheritance. Virtual functions and abstract classes.	2
Lec9	Creation of the simple class. Encapsulation. Static data and functions. Operator overloading as the global and member function. Operator overloading in C++ and C#.	2
Lec10	Inheritance and derived classes. Multiply inheritance in C++ and interfaces in C# and Java.	2
Lec11	C# language. Classes, expressions and operators.	2
Lec12	Inheritance, interfaces, iterators, exceptions handling, processes and threads	2
Lec13	Virtual functions and abstract classes. Basis of the Unified Modeling Language (UML). Class diagrams. Examples, case studies.	4
Lec14	Summary lecture.	2
	Total hours	30

<b>Laboratory</b>		<b>Number of hours</b>
L1,2	Getting acquainted with the programming platform. Simple program in	4

	structural methodology.	
L3-6	Application of the object oriented approach for the individual simple program in C++ agreed with the lecturer	8
L7-9	Individual program in C++ agreed with the lecturer	6
L10-12	Application of the object oriented approach for the individual simple program in C# or Java agreed with the lecturer	6
L13-15	Individual program in C# or Java agreed with the lecturer	6
	Total hours	<b>30</b>

<b>TEACHING TOOLS USED</b>	
N1.	LCD Projector, blackboard
N2.	Computer with an access to the Internet, Integrated Development Environment (IDE), MS .NET Framework, MS Office

#### **EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT**

Evaluation (F – forming (during semester), P – concluding (at semester end))	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01-W05	Lectures credited with grade
F2	PEU_U01-U03	Program code presented and credited with grade
$P = 0.6 * F1 + 0.4 * F2$ (subject to credit all forms)		

## PRIMARY AND SECONDARY LITERATURE

### **PRIMARY LITERATURE:**

- [1] Stroustrup B., The C++ programming language, NJ, Addison-Wesley, 2013.
- [2] Sahay S., Object oriented programming with C++, 2nd edition, New Delhi : Oxford University Press, 2012.
- [3] Eckel, B., Thinking in Java, Upper Saddle River: Prentice Hall, 2006
- [4] Hejlsberg A., Torgersen M., Wiltamuth S., Golde P., The C# Programming Language (3rd Edition), Microsoft .NET Development Series
- [5] Malik. D. S., Introduction to C++ programming, Boston, MA: Course Technology, Cengage Learning, 2009.
- [6] Actual documentation for C++, C#, Java

### **SECONDARY LITERATURE:**

- [1] Kubik T., Kruczkiewicz Z., UML and service description languages: information systems modelling, Wrocław University of Technology, PRINTPAP, 2011.
- [2] Martin J., Odell J.J., Podstawy metod obiektowych, WNT, 1997

### **SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)**

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