1. Course title: **OBJECT ORIENTED PROGRAMMING**

2. Course code

3. Validity of course description: 2016/2017

4. Level of studies: BSc programme

5. Mode of studies: intramural studies

6. Field of study: MACROCURS (FACULTY SYMBOL)

7. Profile of studies: general

8. Programme:

9. Semester: 6

10. Faculty teaching the course: Institute of Automatic Control, Rau1

11. Course instructor: Dariusz Bismor, Ph. D.

12. Course classification: programme courses

13. Course status: elective

14. Language of instruction: English

15. Pre-requisite qualifications: C++ programming basics

16. Course objectives: The aim of the course is to introduce the modern, object-oriented program design and programming techniques. Students should learn the difference between procedural and object-oriented techniques as well as analysis and design techniques for object-oriented style and those programming languages that give support for object-oriented programming. Knowledge attained during the course should allow for easy and fast completion of even large programming projects.

17. Description of learning outcomes:

<table>
<thead>
<tr>
<th>Nr</th>
<th>Learning outcomes description</th>
<th>Method of assessment</th>
<th>Teaching methods</th>
<th>Learning outcomes reference code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knows basic concepts and rules of the object-oriented analysis</td>
<td>Lab</td>
<td>Lecture</td>
<td>K_W05</td>
</tr>
<tr>
<td>2</td>
<td>Knows the most popular object-oriented design patterns</td>
<td>Lab</td>
<td>Lecture, Lab</td>
<td>K_W05</td>
</tr>
<tr>
<td>3</td>
<td>Is able to find a design pattern to be used during the design phase of a computer program</td>
<td>Lab, Proj</td>
<td>Lab</td>
<td>K_U11</td>
</tr>
<tr>
<td>4</td>
<td>Is aware of differences between procedural and object-oriented design and programming style</td>
<td>Lab, Proj</td>
<td>Lecture, Lab</td>
<td>K_K04</td>
</tr>
<tr>
<td>5</td>
<td>Can analyze a programming problem and find abstractions to be modeled as objects</td>
<td>Lab</td>
<td>Lecture, Lab</td>
<td>K_K06</td>
</tr>
</tbody>
</table>

18. Teaching modes and hours

Lecture / BA / MA Seminar / Class / Project / Laboratory
Lecture - 15 h, Laboratory - 15 h

19. Syllabus description:

**Lecture:**

The lecture emphasizes, but is not limited to the following topics: introduction to object-oriented analysis, object statics, object dynamics, object relationships and interactions, class as object part, class relationships, constructing a model of a system, Unified Modeling Language (UML), design patterns, creational patterns, structural patterns, behavioral patterns. The lecture is based on slides displayed with multimedia projector. Students are allowed to download outlines prior to lecture.
All issues mentioned above are discussed by the lecturer, with emphasize on the issues selected by students. Many issues are illustrated by working program examples.

**Laboratory:**

1. Introduction to the project: analysis and design.
2. Finding the design patterns in the project.
6. Other patterns and programming idioms.

20. Examination: none

21. Primary sources:
   1. E. Gamma, R. Helm, R. Johnson, J. Vlissides: Design Patterns, Addison Wesley, 1995.

22. Secondary sources:

23. Total workload required to achieve learning outcomes

<table>
<thead>
<tr>
<th>Lp.</th>
<th>Teaching mode</th>
<th>Contact hours / Student workload hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lecture</td>
<td>15/10</td>
</tr>
<tr>
<td>2</td>
<td>Classes</td>
<td>/</td>
</tr>
<tr>
<td>3</td>
<td>Laboratory</td>
<td>15/10</td>
</tr>
<tr>
<td>4</td>
<td>Project</td>
<td>/</td>
</tr>
<tr>
<td>5</td>
<td>BA/ MA Seminar</td>
<td>/</td>
</tr>
<tr>
<td>6</td>
<td>Other</td>
<td>10/10</td>
</tr>
<tr>
<td></td>
<td>Total number of hours</td>
<td>40/30</td>
</tr>
</tbody>
</table>

24. Total hours: 70

25. Number of ECTS credits: 3

26. Number of ECTS credits allocated for contact hours: 2

27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 2

28. Comments:

Approved:

..........................................................  ..........................................................
(date, Instructor’s signature)                    (date, the Director of the Faculty Unit signature)