1. Course title: DEVELOPING ENTERPRISE APPLICATIONS

2. Course code


4. Level of studies: BSc programme

5. Mode of studies: intramural studies

6. Field of study: COMPUTER SCIENCE

(FACULTY SYMBOL)

7. Profile of studies: COMPUTER SCIENCE

8. Programme:

9. Semester: 6

10. Faculty teaching the course: Institute of Informatics, RAu2

11. Course instructor: Paweł Kasprowski, PhD

12. Course classification:

13. Course status: compulsory

14. Language of instruction: English

15. Pre-requisite qualifications: Databases, programming

16. Course objectives: The purpose of the subject is to show student how multi-tier applications run on application servers work. This topic is explained based on the most popular set of standards gathered under the umbrella of Java Enterprise Edition.

During the course student will learn how to create all triers of the application starting from database trier using JPA (Java Persistence API) and logic trier using EJB (Enterprise Java Beans) and ending with REST trier using JAX-RS specification. Students will build their applications in groups of 2-4 persons.

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>W1</td>
<td>Knows basic elements of enterprises applications</td>
<td>project</td>
<td>workshop</td>
<td>K1A_W09</td>
</tr>
<tr>
<td>W2</td>
<td>Knows JEE standards: JPA, EJB, JAX-RS</td>
<td>project</td>
<td>workshop</td>
<td>K1A_W12</td>
</tr>
<tr>
<td>W3</td>
<td>Has knowledge about functionality provided by application servers</td>
<td>project</td>
<td>workshop</td>
<td>K1A_W16</td>
</tr>
<tr>
<td>U1</td>
<td>Can develop a database using JPA standard</td>
<td>project</td>
<td>workshop</td>
<td>K1A_U16</td>
</tr>
<tr>
<td>U2</td>
<td>Has skills to prepare REST interface using JAX-RS standard</td>
<td>project</td>
<td>workshop</td>
<td>K1A_U24</td>
</tr>
<tr>
<td>U3</td>
<td>Is able to build an application deployed on application server that utilizes EJB standard</td>
<td>project</td>
<td>workshop</td>
<td>K1A_U26</td>
</tr>
<tr>
<td>K1</td>
<td>Understands pros and cons of the enterprise architecture</td>
<td>project</td>
<td>workshop</td>
<td>K1A_K01</td>
</tr>
<tr>
<td>K2</td>
<td>Is ready to collaborate in a group of programmers</td>
<td>project</td>
<td>workshop</td>
<td>K1A_K02</td>
</tr>
</tbody>
</table>

18. Teaching modes and hours

Lecture / BA / MA Seminar / Class / Project / Laboratory

Project 15h

19. Syllabus description:

- Properties of enterprise applications
- Standards belonging to Java Enterprise Edition
- Modus operandi of application servers
- Configuration of enterprise applications – XML, annotations
Building SOAP and REST web services
Connecting with database using JPA
Developing REST interface
Creating REST clients

20. Examination: none

21. Primary sources:
Bill Burke. RESTful Java with JAX-RS 2.0: Designing and Developing Distributed Web Services
Mike Keith and Merrick Schincariol Pro JPA 2 in Java EE 8: An In-Depth Guide to Java Persistence APIs
Francesco Marchioni Practical Java EE Development on WildFly

22. Secondary sources:
Internet sources presented during the lectures and laboratories

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>/</td>
</tr>
<tr>
<td>2</td>
<td>Classes</td>
<td>/</td>
</tr>
<tr>
<td>3</td>
<td>Laboratory</td>
<td>/</td>
</tr>
<tr>
<td>4</td>
<td>Project</td>
<td>15/30</td>
</tr>
<tr>
<td>5</td>
<td>BA/MA Seminar</td>
<td>/</td>
</tr>
<tr>
<td>6</td>
<td>Other</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td>Total number of hours</td>
<td>15/30</td>
</tr>
</tbody>
</table>

24. Total hours: 45

25. Number of ECTS credits: 1

26. Number of ECTS credits allocated for contact hours: 1

27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 1

28. Comments:

Approved:

......................................................
(date, Instructor's signature)

......................................................
(date, the Director of the Faculty Unit signature)