# COURSE DESCRIPTION

1. **Course title:** Fundamentals of Structural Design  
2. **Course code:** RB-S1-17-W28

3. **Validity of course description:** 2017

4. **Level of studies:** BSc programme

5. **Mode of studies:** intramural studies

6. **Field of study:** Civil Engineering  
   (FACULTY SYMBOL) RB

7. **Profile of studies:** general

8. **Programme:** SE

9. **Semester:** 2

10. **Faculty teaching the course:** Department of Building Structures (RB2)

11. **Course instructor:** dr hab. inż. Mariusz Jaśniok, prof. PŚi

12. **Course classification:** common subjects

13. **Course status:** obligatory subject

14. **Language of instruction:** English

15. **Pre-requisite qualifications:**  
   No prerequisites.

16. **Course objectives:**  
   Getting basic information concerning structural design. Getting ability of determination of actions on building structures. Understanding methods of achievements of structures reliability. Introduction to use of standards in design. Understanding simplifications used in design.

17. **Description of learning outcomes:**

<table>
<thead>
<tr>
<th>No</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>Student knows system of standards used in structural design and understands the way in which it is organised.</td>
<td>test</td>
<td>project</td>
<td>K1A_W06+</td>
</tr>
<tr>
<td>2</td>
<td>Student understands methods of assuring safety in structures design and knows types of actions and methods of their determination.</td>
<td>test</td>
<td>lecture</td>
<td>K1A_W07+</td>
</tr>
<tr>
<td>3</td>
<td>Student is able to prepare a load statement for various types of structures and actions.</td>
<td>elaboration of the project</td>
<td>project</td>
<td>K1A_U02+++</td>
</tr>
<tr>
<td>4</td>
<td>Student can work independently on the specific task.</td>
<td>test</td>
<td>classes</td>
<td>K1A_K01+</td>
</tr>
</tbody>
</table>

18. **Teaching modes and hours:**
   lecture: 10, classes: 2, project: 10,

19. **Syllabus description:**

   **Lecture:** 1. Basic information: the design process; structural materials; factors affecting choice of structural material; comparison of properties of structural materials; basic mechanisms of load transfer; member nomenclature; selected structural systems. 2. Actions on structures: forces; types of loads; basic terms; classification of Eurocodes; selected definitions; classification of actions; limit states; combination of actions. 3. Permanent and variable actions: Eurocode 1-1; imposed loads for buildings; categories of use; densities of construction materials. 4. Snow loads: Eurocode 1-3; snow load arrangements; characteristic value of snow load; roof shape coefficient; local effects. 5. Wind action: Eurocode 1-4; wind forces; structural factor; peak velocity pressure; the exposure factor; reference height; wind pressure on surfaces; pressure coefficient.

   **Classes:** Classes are related to the introduction of standards: Eurocode 0 and Eurocode 1. There are three issues to discuss: 1) Permanent and variable actions according to PN-EN 1991E Part 1-1: General actions - Densities, self-weight, imposed loads for buildings. 2) Snow actions according to PN-EN 1991 Part 1-3: General actions - Snow loads. 3) Wind actions according to PN-EN 1991 Part 1-4: Wind actions. Methods of appropriate reliability achievement are introduced. Methods of load statements determination and combination of actions are discussed.

   **Project:** There are three project to perform: Project No 1 - Permanent and variable actions according to PN-EN 1991 Part 1-1: Project No 2 - Snow actions according to PN-EN 1991 Part 1-3 Project No 3 - Wind actions according to PN-EN 1991 Part 1-4
20. Examination: no

21. Primary sources:

22. Secondary sources:

23. Total workload required to achieve learning outcomes:

<table>
<thead>
<tr>
<th>No</th>
<th>Teaching mode</th>
<th>Hours</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>contact</td>
<td>student workload</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Participation in lectures</td>
<td>10</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Participation in exercises</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Participation in project classes</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Participation in additional consultations</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Own work of student on preparatory to exam, colloquium, etc.</td>
<td>0</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Own work of student on preparatory to project</td>
<td>0</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Defense of the laboratory report, project etc.</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Participation of the student in knowledge checking (exam, test, etc.)</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Summary: 27 41

24. Total hours: 54  (1 ECTS = 27 h, PO 19/14/15)

25. Number of ECTS credits: 2

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

27. number of ECTS credits allocated for in-practice hours: 2

28. Comments:
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1) shortened form of a speciality for the Civil Engineering: SE - Structural Engineering