**COURSE DESCRIPTION CARD**

<table>
<tr><td colspan="10">Bialystok University of Technology</td></tr>
<tr><td>Field of study</td><td colspan="5">Civil Engineering</td><td>Degree level and programme type</td><td colspan="2">Bechelor’s degree<br>Full time study</td></tr>
<tr><td>Specialization/ diploma path</td><td colspan="5">-</td><td>Study profile</td><td colspan="2">academic</td></tr>
<tr><td rowspan="2">Course name</td><td colspan="5" rowspan="2">Strength of materials</td><td>Course code</td><td colspan="2">IS-FCEE-00001W</td></tr>
<tr><td>Course type</td><td colspan="2">elective</td></tr>
<tr><td rowspan="2">Forms and number of hours of tuition</td><td>L</td><td>C</td><td>LC</td><td>P</td><td>SW</td><td>FW</td><td>S</td><td>Semester</td><td colspan="2">3</td></tr>
<tr><td>30</td><td></td><td>15</td><td>30</td><td></td><td></td><td></td><td>No. of ECTS credits</td><td colspan="2">6</td></tr>
<tr><td>Entry requirements</td><td colspan="9">Theoretical mechanics</td></tr>
<tr><td>Course objectives</td><td colspan="9">Students become familiar with the mechanical properties of basic construction materials. Introduce to students methods of determining selected parameters of plane sections, identifying strength cases, analyzing stresses and deformations in bar structures. Students become familiar with the relationships between deformations and stresses, and designing of bar structures.</td></tr>
<tr><td>Course content</td><td colspan="9">Lecture: material parameters, geometric characteristics of plane sections; simple and complex strength cases - tensile and axial compression, pure and transverse bending, technical shear, torsion, eccentric compression / tensile, eccentric bending, shear bending; stress state, strain state, beam deflection, straight bar stability. Introduction to computer calculations. Presentation of static and dynamic measurement equipment.<br>Project: application of material parameters and geometric characteristics of plane sections; application of simple and complex strength cases – computational problems.<br>Laboratory: laboratory tests of mechanical properties of construction materials; illustration of the laws of mechanics using the physical models.</td></tr>
<tr><td>Teaching methods</td><td colspan="9">Informative lecture, solving practical problems, discussion on the project, performing laboratory tests</td></tr>
<tr><td>Assessment method</td><td colspan="9">Lecture – written exam, project - discussion on the project, test, laboratory – reports, test</td></tr>
<tr><td>Symbol of learning outcome</td><td colspan="7">Learning outcomes</td><td colspan="2">Reference to the learning outcomes for the field of study</td></tr>
<tr><td>LO1</td><td colspan="7">Student has knowledge about f the strength of materials and the general principles of designing of building structures,</td><td colspan="2">K_B1_W03</td></tr>
<tr><td>LO2</td><td colspan="7">Student knows the principles of analysis, modeling, designing of construction elements. Is able to define</td><td colspan="2">K_B1_W05<br>K_B1_U06</td></tr>
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| | computational models of structures and their elements for analytical and numerical analysis of structures, and carry out their analysis. | |
| **LO3** | Student knows the physical and mechanical properties of materials used in construction and testing methods. He can make a choice and correctly use building materials. | K_B1_W01<br>K_B1_U05 |
| **LO4** | Student can critically assess his knowledge in the field of strength of materials. | K_B1_K01 |
| **Symbol of learning outcome** | **Methods of assessing the learning outcomes** | **Type of tuition during which the outcome is assessed** |
| **LO1** | Lecture – written exam, | L |
| **LO2** | Lecture – written exam, project – discussion and tests | L, P |
| **LO3** | Lecture – written exam, project – discussion and tests, laboratory - reports, test | L, P, LC |
| **LO4** | Lecture – written exam, project – discussion and tests | L,P |
| **Student workload (in hours)** | | **No. of hours** |
| **Calculation** | lecture attendance | 30 |
| | participation in project, laboratory classes | 45 |
| | preparation for laboratory classes | 15 |
| | Laboratory reports, homework | 25 |
| | participation in student-teacher sessions related to the course | 5 |
| | Solving project tasks (including preparation of multimedia presentations) | 30 |
| | preparation for exam and participation in it | 15 |
| | Preparation for the project | 15 |
| | **TOTAL:** | 180 |

| **Quantitative indicators** | **HOURS** | **No. of ECTS credits** |
|---|---|---|
| **Student workload – activities that require direct teacher participation** | 85 | 2,8 |
| **Student workload – practical activities** | 135 | 5 |

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|---|---|
| **Basic references** | 1. Dyląg Z., Jakubowicz A., Orłoś Z.: Wytrzymałość materiałów, t.1 i t.2.<br>2. Grabowski J., Iwańczewska A.: Zbiór zadań z wytrzymałości materiałów.<br>3. Bandyszewski W, Ibiańska-Jarmoc D.: Wytrzymałość materiałów, przykłady obliczeń Część I., Wydawnictwo Politechniki Białostockiej, Białystok, 2008. |
| **Supplementary references** | 1. Jastrzębski P., Mutermilch J., Orłowski W.: Wytrzymałość materiałów, cz.1 i cz.2.<br>2. Aleksander J. M.: Strength of Materials, Vol. 1.<br>3. Bandyszewski W, Ibiańska-Jarmoc D.: Wytrzymałość materiałów, przykłady obliczeń Część II, Wydawnictwo Politechniki Białostockiej, Białystok, 2008. |
| **Organisational unit conducting the course** | Department of Geotechnics and Structural Mechanics **Date of issuing the programme** |

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| **Author of the programme** | **Phd. Eng. Joanna Krętowska** | 7.02.2019 |

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