GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|
| Subject name and code | Structural Analysis Laboratory, L:00122L0 | | |
| Field of study | Civil Engineering | | |
| Date of commencement of studies | October 2014 | Academic year of realisation of subject | 2015/2016 |
| Education level | first-cycle studies | Subject group | |
| Mode of study | Full-time studies | Mode of delivery | at the university |
| Year of study | 2 | Language of instruction | Polish |
| Semester of study | 4 | ECTS credits | 1.0 |
| Learning profile | general academic profile | Assessment form | assessment |
| Conducting unit | Structural Mechanics Department -> Faculty of Civil and Environmental Engineering | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. inż. Agnieszka Tomaszewska | |
| | Teachers | dr hab. inż. Agnieszka Tomaszewska<br>dr inż. Marcin Krajewski<br>dr hab. inż. Marcin Kujawa<br>dr inż. Karol Winkelmann<br>dr inż. Mateusz Sondej<br>mgr inż. Michał Gołębiewski | |

**Lesson types and methods of instruction**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 0.0 | 0.0 | 15.0 | 0.0 | 0.0 | 15 |

E-learning hours included: 0.0

**Learning activity and number of study hours**

| Learning activity | Participation in didactic classes included in study plan | Participation in consultation hours | Self-study | SUM |
|---|---|---|---|---|
| Number of study hours | 15 | 5.0 | 10.0 | 30 |

**Subject objectives**

The purpose of the laboratory is an experimental verification of previously known formulas of strength of materials and structural mechanics using model tests.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| K_K02 | Student writes an elaboration with interpretation of experimental results. | [SW3] Assessment of knowledge contained in written work and projects<br>[SU2] Assessment of ability to analyse information |
| K_W05 | Student solves simple beams, frames and trusses. | [SW1] Assessment of factual knowledge |
| K_W04 | Student defines differences between the experimental and analytical results and their reasons. Student estimates the application range of the theoretical equations of structural analysis. | [SU3] Assessment of ability to use knowledge gained from the subject |
| K_K03 | Student can use his knowledge in practical tasks. Student can work in a team. | [SK1] Assessment of group work skills<br>[SU1] Assessment of task fulfilment |

**Subject contents**

The following experiments are individually carried out and analysed: - Tension and compression tests for carbon and hardened steel specimens, bend tests for steel and aluminium beams having various sections: rectangular, T and channel; - Determination of Young modulus and Poisson's ratios for polycarbonate specimens (using strain gauges), determination of strains in selected sections for bending polycarbonate beams (T and Z sections) and steel truss model; - Measurement of simple supported beam and frame displacements; - Measurements of torsion angle for thin-walled tubes having closed and open cross sections; - Determination of the centre of twist for two thin-walled beams; - Determination of critical loads for various supported columns.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Courses: Engineering Mechanics (BSP012), Strength of Materials (BSP015) should be completed. Course Structural Analysis (BSP020) should be taken. Precondition to the executing of experiments is acquaintance with the Ref. [1].</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Defences of reports (oral or written)</td><td>60.0%</td><td>70.0%</td></tr>
<tr><td>Test</td><td>60.0%</td><td>30.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">1. J. Górski, T. Mikulski, P. Iwicki: Laboratorium z mechaniki budowli i wytrzymałości materiałów. Skrypt Politechniki Gdańskiej, Gdańsk 2008.<br>2. E. Bielewicz: Wytrzymałość materiałów, Gdańsk 1997.<br>3. Z. Dyląg, A. Jakubowicz, Z. Orłoś: Wytrzymałość materiałów. Tom 1 i 2, WNT 2003.<br>4. Z. Dyląg, E. Krzemińska-Niemiec, F. Filip: Mechanika budowli. Tom 1 i 2, PWN 1986.<br>5. M. Banasiak: Ćwiczenia laboratoryjne z wytrzymałości materiałów. PWN, Warszawa 1985.<br>6. A. Boruszak, R. Sygulski, K. Wrześniowski: Wytrzymałość materiałów, doświadczalne metody badań. PWN Warszawa-Poznań 1984.<br>7. C. Szymczak, M. Skowronek, W. Witkowski, M. Kujawa: Wytrzymałość materiałów, zadania. Wydawnictwo Politechniki Gdańskiej 2002.</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">1. Chróścielewski J.: Support materials for lectures of Strength of Materials. Electronic version available for download from www.okno.pg.gda.pl WILiŚ PG<br><br>2. Górski J., Kreja I., Skowronek M.: Support materials for lectures of Engineering Mechanics. Electronic version available for download from www.okno.pg.gda.pl WILiŚ PG</td></tr>
<tr><td>eResources addresses</td><td colspan="2">Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">- discuss experiment, data preparation and parameters identification od the Hooke's model;<br><br>- discuss methods of displacements determination in different systems, solve a given task;<br><br>- discuss strains in beam and truss regarding the experiment and theory;<br><br>- experimental and theoretical determination of: torsion angle in beams, bending center of a section, buckling force of a rod.</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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