

COURSE INFORMATION SHEET (Karta informacyjna przedmiotu)

Course title (Nazwa przedmiotu)	<i>Strength of materials 1</i>	<i>Wytrzymałość materiałów 1</i>
Course code (Kod przedmiotu)	WMEMXCSI-23Z3-SM1	
Language of instruction (Język wykładowy)	<i>English (angielski)</i>	
Study profile (Profil studiów)	<i>General academic (ogólnoakademicki)</i>	
Study form (Forma studiów)	<i>Full time studies (stacjonarne)</i>	
Study level (Poziom studiów)	<i>First-cycle studies (studia pierwszego stopnia)</i>	
Course group (Rodzaj przedmiotu)	<i>Core/mandatory (podstawowy/obowiązkowy)</i>	
Effective from recruitment (Obowiązuje od naboru)	2023/2024	
Form of classes, no. of hours/evaluation, total no. of hours, ECTS credits (Forma zajęć, liczba godzin/rygor, razem godz., pkt ECTS)	<i>Lectures: 18h, (Wykłady: 18h)</i> <i>Practical classes: 18h, (Ćwiczenia: 18h)</i> <i>Total: 36hrs, (Razem: 36h)</i> <i>2,5 ECTS, (2,5 pkt ECTS)</i>	
Introductory courses: prerequisites (Przedmioty wprowadzające: wymagania wstępne)	Mathematics: <i>vectors; differential equations; derivatives and integrals of one variable.</i> Engineering mechanics 1: <i>2D modeling, 3D modeling, reduction and balance of load systems, determination of reactions.</i>	
Programme (Program)	<i>3rd semester / Mechanics and machine construction / all specializations</i>	
Autor(s) (Autor/autorzy)	<i>dr inż. Roman GIELETA</i>	
Organizational unit administering the course (Jednostka organizacyjna odpowiedzialna za przedmiot)	<i>Institute of Mechanics and Computational Engineering</i> <i>Faculty of Mechanical Engineering</i> <i>Military University of Technology</i>	
Short description of the course (Skrócony opis przedmiotu)	<i>Geometric characteristics of plane figures. Plane modeling and classification of bar systems. Internal forces in straight bars. Internal forces in plane frames. Internal forces in spatial frames. Fundamentals of strength of materials. Tension/compression of prismatic stocky bars. Free torsion of prismatic rods.</i>	
Full description of the course / programme content	<i>Lectures / multimedia presentations</i> <i>1. Geometric characteristics of plane figures / 3 /</i> <i>Definitions of first and second degree characteristics. Steiner's theorem. Rota-</i>	

(Pełny opis przedmiotu / treści programowe)	<p>tion of centroidal axes. Solutions for regular figures. System of regular figures. Examples.</p> <p>2. Plane modeling and classification of bar systems / 2 /</p> <p>3. Internal forces in straight bars / 4 / Tension/compression. Torsion. Characteristic features of cross-sectional quantity diagrams. Differential relationships. Examples.</p> <p>4. Internal forces in plane frames / 2 / Theoretical foundations. Example.</p> <p>5. Internal forces in spatial frames / 1 / Spatial modeling. Orthogonal cantilever spatial frames. Example.</p> <p>6. Fundamentals of strength of materials / 2 / Basic concepts and assumptions of strength of materials. Tensile test of steel. Principles of design.</p> <p>7. Tension/compression of prismatic rods / 1 / State of displacement, deformation and normal stresses. Saint Venant's principle. Design. Examples.</p> <p>8. Free torsion of prismatic rods / 3 / State of displacement, deformation and shear stresses. Torsional characteristics of cross-sections of rods. Design. Examples.</p> <p>Practical classes</p> <p>1. Geometrical characteristics of plane figures / 4</p> <p>2. Solving bending beams and statically determinate plane frames / 6</p> <p>3. Analysis and design of short bars in tension/compression / 2</p> <p>4. Analysis and design of torsion bars / 3</p> <p>5. Test 1: Geometrical characteristics of plane figures / 1</p> <p>6. Test 2: Solving a statically determinate beam and plane frame / 1</p> <p>7. Test 3: Analysis and design of a torsion bar / 1</p>
Literature (Literatura)	<p>Primary:</p> <p>M. Klasztorny, Wytrzymałość materiałów dla mechaników. Kurs inżynierski, DWE, 2013</p> <p>Gieleta R., Wytrzymałość materiałów. Zbiór zadań z rozwiązaniami, WAT, 2018.</p> <p>Z. Dyląg, A. Jakubowicz, Z. Orłóś: Wytrzymałość materiałów, T. 1, WNT, 1997</p> <p>R. Bąk, T. Burczyński: Wytrzymałość materiałów z elementami ujęcia komputerowego, WNT, 2001</p> <p>M.E. Niezgodziński, T. Niezgodziński: Zadania z wytrzymałości materiałów, WNT, 2000</p> <p>M. Bijak-Żuchowski, A. Jaworski, G. Krzesiński, T. Zagrajek: Wytrzymałość konstrukcji, OW PW, 2004</p> <p>K. Gołoś, J. Osiński: Zbiór zadań z wytrzymałości materiałów, OW PW, 2001</p> <p>Complementary:</p> <p>–</p>
Learning outcomes (Efekty uczenia się)	<p>Symbol and number of the course outcome /learning outcomes /reference to the major outcome</p> <p>W1 / has knowledge of fundamentals of strength of materials, and knowledge that allows for analysis of typical strength cases in the field of tension/compression and torsion /K_W01, K_W02, K_W05</p> <p>U1 / is able to solve statically determinate beams and plane frames is able to solve simple strength cases in the field of tension/compression and torsion based on the principles of the strength of materials / K_U07, K_U09</p> <p>K1 / understands the need and knows the possibilities of continuous education; can inspire and organize the process of improving own's and other people professional qualifications / K_K01</p>
Methods and criteria of evaluation I manners of verification the student's achievement of the as-	<p>The course is credited based on: credit.</p> <p>Practical classes are credited based on: tests.</p> <p>The condition for passing the course is: passing the theory test (lectures) and the auditorium exercises.</p>

<p>sumed learning outcomes (Metody i kryteria oceniania / sposób sprawdzania osiągnięcia przez studenta zakładanych efektów uczenia się)</p>	<p><i>The achievement of W1 learning outcome is verified based on the theoretical test from the lectures.</i></p> <p><i>The achievement of U1 learning outcome is verified based on tests during practical classes.</i></p> <p><i>The achievement of K1 learning outcome is effected based on students' activity.</i></p> <p><i>Assessment of the achieved learning outcomes (according to opinion of the Faculty Commission for the Functioning of the Education Quality Assurance System):</i></p> <p>Very good (A) - grade awarded to students who achieved 91-100% of the learning outcomes.</p> <p>Good plus (B) - grade awarded to students who achieved 81-90% of the learning outcomes.</p> <p>Good (C) - grade awarded to students who achieved 71-80% of the learning outcomes.</p> <p>Satisfactory plus (D) - grade awarded to students who achieved 61-70% of the learning outcomes.</p> <p>Satisfactory (E) - grade awarded to students who achieved 51-60% of the learning outcomes.</p> <p>Unsatisfactory (F) - grade awarded to students who achieved 50% of the learning outcomes or less</p>
<p>ECTS balance / student workload (Bilans ECTS / nakład pracy studenta)</p>	<p><i>Activity / student workload in hrs</i></p> <ol style="list-style-type: none"> 1. <i>Participation in lectures / 18</i> 2. <i>Participation in practical classes / 18</i> 3. <i>Participation in laboratories / 0</i> 4. <i>Participation in seminars / 0</i> 5. <i>Independent study of the lectures subject-matter/ 14</i> 6. <i>Independent preparation for practical classes / 18</i> 7. <i>Independent preparation for laboratories / 0</i> 8. <i>Independent preparation for seminars / 0</i> 9. <i>Project implementation / 0</i> 10. <i>Participation in consultations / 3</i> 11. <i>Preparation for the exam / 0</i> 12. <i>Preparation for the credit / 9</i> 13. <i>Participation in the exam / 2</i> <p><i>Total student workload:</i></p> <p>82 hrs /2.73 ECTS, 2.5 ECTS assumed</p> <p><i>Classes with academic teacher (1+2+3+4+9+10+13): 41 hrs / 1.5 ECTS</i></p> <p><i>Classes related to scientific skill development (Σ1+9): 68 hrs / 2 ECTS</i></p>