Załącznik nr 1 do Zarządzenia Nr 915 z 2019 r. Rektora PB

**COURSE DESCRIPTION CARD**

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| **Faculty of Mechanical Engineering** | | | | | | | | | | | |
| Field of study | |  | | | | | | | **Degree level and programme type** | Master's degree | |
| Specialization/ diploma path | |  | | | | | | | **Study profile** | Mechanical  engineering | |
| Course name | | **Experimental methods in mechanics** | | | | | | | **Course code** | IS-FME-00189W | |
| **Course type** | obligatory | |
| Forms and  number of hours  of tuition | | L | C | LC | P | SW | FW | S | **Semester** | **2** | |
| **15** | **-** | **15** | **-** | **-** | **-** | **-** | **No. of ECTS**  **credits** | **5** | |
| **Entry**  **requirements** | | mathematics, physics, statics, dynamics, statistic, strength of materials | | | | | | | | | |
| **Course**  **objectives** | | Acquire skills in applying different research methods to evaluate the physical properties of materials and mechanical structures. Develop creative abilities to identify the properties of physical objects. Use modern techniques to analyse experimental results and visualize them graphically. Be able to conclude well. | | | | | | | | | |
| **Course content** | | The essence of experimental studies. Strain gauge measurements. Organization of the measurement path. Experimental methods of materials tests in simple stress states: tensile test, compression test, shear test, bending test, torsion test. Testing of materials in complex stress states. Evaluation of the rheological properties of materials - creep and relaxation. Non-standard test methods.  Laboratory classes: selected methods of thermo-mechanical tests of materials properties and structures. | | | | | | | | | |
| **Teaching**  **methods** | | lectures, laboratory classes | | | | | | | | | |
| **Assessment**  **method** | | lectures - written exam- test;  laboratory classes - evaluation of reports, verification of preparation for classes, tests | | | | | | | | | |
| **Symbol of**  **learning**  **outcome** | | Learning outcomes | | | | | | | | Reference to the  learning outcomes for  the field of study | |
| LO1 | | The student is knowledgeable about experimental methods used in mechanics. | | | | | | | | M2 W02, M2 W05 | |
| LO2 | | The student knows modern techniques in experimental mechanics. | | | | | | | | M2 W08 | |
| LO3 | | Students correctly formulate research problems and check them experimentally. | | | | | | | | M2 U09, M2 U07 | |
| LO4 | | Student carries out measurements of mechanical quantities. | | | | | | | |  | |
| LO5 | | The student can analyse the results and formulate conclusions. | | | | | | | | M2\_U20, M2\_U08 | |
| **LO6** | | Students can work in teams and apply safety rules. | | | | | | | | M2\_K04 | |
| Symbol of learning outcome | | Methods of assessing the learning outcomes | | | | | | | | Type of tuition during which the outcome is  assessed | |
| LO1 | | written exam, checking knowledge required to perform laboratory exercises | | | | | | | | L, LC | |
| LO2 | | written exam, | | | | | | | | L, LC | |
| LO3 | | laboratory report | | | | | | | | L | |
| LO4 | | laboratory report | | | | | | | | L | |
| LO5 | | laboratory report | | | | | | | | L | |
| LO6 | | laboratory report, observation work in teams | | | | | | | | L | |
| Student workload (in hours) | | | | | | | | | | No. of hours | |
| **Calculation** | | lecture attendance | | | | | | | | 30 | |
| participation in laboratory classes | | | | | | | | 15 | |
| preparation for laboratory classes | | | | | | | | 21 | |
| working on reports | | | | | | | | 21 | |
| participation in student-teacher sessions related to the classes | | | | | | | | 8 | |
| preparation for and participation in exams | | | | | | | | 20 | |
| TOTAL: | | | | | | | | 115 | |
| Quantitative indicators | | | | | | | | | | HOURS | ECTS |
| Student workload - activities that require direct teacher participation | | | | | | | | | | 53 | 2 |
| Student workload - practical activities | | | | | | | | | | 85 | 3 |
| Basic  references | 1. Doyle J. F.: Modern experimental stress analysis, John Wiley & Sons Ltd, 2004. 2. Sciammarella C. S., Sciammarella F. M., Experimental Mechanics of Solids, Wiley, 2012. 3. Sharpe W. N.: Springer Handbook of Experimental Solid Mechanics, Springer, 2008. 4. Doyle J. F. Modern experimental stress analysis, John Wiley & Sons Inc. 2016 5. Ashby M. F., Jones D. R. H.: Engineering Materials 1,2: 1. An Introduction to properties, applications and design 2. An Introduction to microstructures and processing, Butterworth-Heinemann, 2006. | | | | | | | | | | |
| Supplementa ry references | 1. Davis J.R.: Tensile Testing, Materials Park, ASM International, 2004. 2. Kobayashi A.S.: Handbook on experimental mechanics, Prentice-Hall, Inc. N.Y. 1986. 3. Gilat R., Banks-Sills L.: Advances in mathematical modelling and experimental methods for materials and structures, Springer, 2010 4. Molimard J. Experimental mechanics of solids and structures, John Wiley & Sons Inc. 2016 | | | | | | | | | | |
| Organisation al unit conducting the course | Department of Mechanics and Applied Computer Science | | | | | | | | | Date of issuing the programme | |
| Author of the  programme | Robert Uścinowicz | | | | | | | | | 30.01.2025 | |