



Subject card

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| Subject name and code | Measurements and Measurement Systems, PG_00055884 | | | | | | |
| Field of study | Power Engineering | | | | | | |
| Date of commencement of studies | October 2026 | Academic year of realisation of subject | | | 2027/2028 | | |
| Education level | first-cycle studies | Subject group | | | Obligatory subject group in the field of study Subject group related to scientific research in the field of study | | |
| Mode of study | Full-time studies | Mode of delivery | | | at the university | | |
| Year of study | 2 | Language of instruction | | | Polish | | |
| Semester of study | 3 | ECTS credits | | | 4.0 | | |
| Learning profile | general academic profile | Assessment form | | | assessment | | |
| Conducting unit | Partment of Metrology and Information Systems -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. inż. Anna Golijanek-Jędrzejczyk | | | | | |
| | Teachers | | | | | | |
| Lesson types | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 30.0 | 0.0 | 15.0 | 0.0 | 0.0 | 45 |
| | 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 | 45 | 6.0 | 49.0 | 100 | | |
| Subject objectives | Familiarizing students with issues related to metrology and measurement systems. | | | | | | |
| Learning outcomes | Course outcome | Subject outcome | | | Method of verification | | |
| | [K6_U02] is able to apply the learned mathematical methods to the analysis and design of elements, systems and energy systems | Student explains the structure and principle operation of measurement systems. The student explains the rules of selection tools and measurement methods relevant to the task measuring. Student discusses development of the results measurement, evaluates errors and measurement uncertainty. | | | [SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment | | |
| | [K6_W05] has structured knowledge in the field of electrical engineering and electronics, necessary to understand the basics of operation and selection of electrical machines, electricity transmission systems and power electronic devices | Student uses correctly with standard instruments analog and digital. The student carries out projects size measuring systems electric and non-electric. Student presents physical principles of operation and properties basic metrology transducers for measurements non-electrical quantities. | | | [SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge | | |
| Subject contents | Course content – lecture Basic metrological concepts. Measurement methods. Fundamentals of the calculus of errors i development of measurement results. Measuring converters for electrical quantities. Analog and digital meters. Ways of extending the measuring ranges. Measurements of basic electrical quantities (voltage and current, resistance, inductance, capacitance, frequency, phase shift, power and energy in single and three-phase circuits). Measurements of non-electrical quantities by electrical methods. Electrical temperature measurements. Resistance and thermoelectric thermometers, pyrometers. The use of thermovision in measurements. Tensometric measurements of mechanical quantities. Measurement systems - classification, structure and application. | | | | | | |

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| Prerequisites and co-requisites | Basic knowledge of electrical engineering and physics. | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | Laboratory. | 60.0% | 50.0% |
| | Written test - lecture. | 60.0% | 50.0% |
| Recommended reading | Basic literature | 1. Parchański J.: Miernictwo elektryczne i elektroniczne, WSiP, Warszawa, Wydanie ósme 2006. 2. Chwaleba A., Poniński M., Siedlecki A.: Metrologia elektryczna, WNT, Warszawa 2012. 3. Gawędzki W.: Pomiary elektryczne wielkości nieelektrycznych, Wydawnictwo AGH, Kraków, 2010. 4. Czabanowski R.: Sensory i systemy pomiarowe, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 2010 | |
| | Supplementary literature | 1. Alan S Morris Reza Langari: Measurement and Instrumentation. Theory and Application. Elsevier, 2012. ISBN: 978-0-12-381960-4. 2. Handbook of Measurements: Benchmarks for Systems Accuracy and Precision. CRC Press, 2015. Print/ISBN: 978-1-4822-2522-8. 3. Raghavendra, N.V.; Krishnamurthy, L.: Engineering Metrology and Measurements. Published by Oxford University Press, 2013. ISBN 9780198085492. | |
| | eResources addresses | | |
| Example issues/ example questions/ tasks being completed | 1. Causes of errors: systematic, random and gross. Ways to reduce these mistakes. 2. How is the measurement uncertainty of type A and type B defined? 3. Give the diagram and the method of balancing the Wheatstone bridge. 4. What is phase measurement with a dual-channel oscilloscope by comparison method? 5. Present the systems for measuring active and reactive power in a three-phase, four-wire system unbalanced. 6. Present the systems for measuring active and reactive power in a three-phase, three-wire system symmetrical. | | |
| Practical activities within the subject | Not applicable | | |

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