GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|
| Subject name and code | Electric Machines, PG_00038397 | | |
| Field of study | Electrical Engineering | | |
| Date of commencement of studies | October 2021 | Academic year of realisation of subject | 2022/2023 |
| Education level | first-cycle studies | Subject group | Obligatory subject group in the field of study<br>Subject group related to scientific research in the field of study |
| Mode of study | Part-time studies | Mode of delivery | at the university |
| Year of study | 2 | Language of instruction | Polish |
| Semester of study | 3 | ECTS credits | 5.0 |
| Learning profile | general academic profile | Assessment form | exam |
| Conducting unit | Department of Power Electronics and Electrical Machines -> Faculty of Electrical and Control Engineering | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. inż. Michał Michna | |
| | Teachers | dr hab. inż. Michał Michna<br>dr inż. Filip Kutt<br>dr inż. Roland Ryndzionek | |

| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|---|
| | Number of study hours | 20.0 | 0.0 | 20.0 | 0.0 | 0.0 | 40 |
| | 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 | 40 | 8.0 | 77.0 | 125 |

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| Subject objectives | Get acquainted with constraction, theory and application of electric machines and transformers. Verification of the theory in the laboratory. |

## Learning outcomes

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| K6_W06 | Student explains the general principles of construction and physical basics of electric machines, Student explains the construction, operation and modeling of transformers, student draws and explains the basic characteristics of transformers, student explains the construction, operation and modeling of DC machines, student draws and explains the basic characteristics of DC machines, student explains the construction, operation and modeling of synchronous machines, student draws and explains the basic characteristics of synchronous machines, student explains the construction, operation and modeling of induction machines, student draws and explains the basic characteristics of induction machines, student explains the general principles of designing electrical machines | [SW3] Assessment of knowledge contained in written work and projects<br>[SW1] Assessment of factual knowledge |
| K6_K01 | Student understands the importance of constantly expanding their knowledge and skills regarding electrical machines and their applications. Stteudent can use up-to-date technical documentation and publications for this purpose. | [SK5] Assessment of ability to solve problems that arise in practice |
| K6_U11 | Student connects the measuring system according to the scheme. Student selects the appropriate measuring instruments. Student correctly reads the meter indications. Student prepares a report on the measurements. | [SU5] Assessment of ability to present the results of task<br>[SU3] Assessment of ability to use knowledge gained from the subject<br>[SU1] Assessment of task fulfilment |
| K6_K02 | Student organizes work in a team. Student chooses the appropriate methods of solving problem. Student exchanges information with the team members. Student uses technical language. Student knows how to estimate the time needed to complete task. Student is able to implement the work schedule. | [SK1] Assessment of group work skills<br>[SK4] Assessment of communication skills, including language correctness<br>[SK3] Assessment of ability to organize work |
| K6_K05 | Student explains the basic principles of health and safety. Student applies the basic principles of health and safety. Student is able to react in emergency situations | [SK4] Assessment of communication skills, including language correctness<br>[SK3] Assessment of ability to organize work |

## Subject contents

**LECTURE** Kinds od magnetic fields and its making. Electrical machines and material technology. Classification of electrical machines. Magnetic circuit main dimension calculation. Properties and characteristics od motors and generators. Calculation of electrical machines and transformer parameters. **LABORATORY** Transformer properties. Characteristics of asynchronous motor fed from converter and power system. Characteristics of shunt direct current motor and generator. Characteristics of synchronous generator and parallel works at power system.

## Prerequisites and co-requisites

## Assessment methods and criteria

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| Writing, practical and oral exam | 50.0% | 90.0% |
| Practical exercise | 100.0% | 10.0% |

## Recommended reading

Basic literature


1. Ronkowski M., Michna M., Kostro G., Kutt F.: Maszyny elektryczne wokół nas: zastosowanie, budowa, modelowanie, charakterystyki, projektowanie. (e-skrypt) Wyd. PG, Gdańsk, 2009/2011.
2. Matulewicz W.: Podstawy teorii maszyn elektrycznych, Wyd. PG, Gdańsk 2014
3. Matulewicz W., Chomiakow M: Badania podstawowe maszyn elektrycznych. Wyd. PG, Gdańsk 2014
4. Roszczyk S.: Teoria maszyn elektrycznych. WNT, W-wa 1979
5. J. F. Gieras, Electrical Machines: Fundamentals of Electromechanical Energy Conversion, 1st Edition. Boca Raton: CRC Press, 2016

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|---|---|---|
| | Supplementary literature | 1. Fitzgerald A.E, Kingsley Ch. (Jr.), Umans S. D.: Electric Machinery. New York: McGraw-Hill Book Comp. 2003. Gieras J. F.: Advancements In Electric Machines, Springer, 2008.<br>2. Rafalski W., Ronkowski M.: Zadania z Maszyn Elektrycznych, cz. I, II. Wyd. 4/3 (skrypty) Wyd. PG, Gdańsk 1994.<br>3. Plamitzer A.: Maszyny elektryczne. WNT, W-wa 1976.<br>4. Manitius Z.: Transformatory. Maszyny prądu stałego. Maszyny Synchroniczne. Maszyny asynchroniczne. (seria skryptów). Wyd. PG, Gdańsk 1973 - 1978.<br>5. Latek W.: Teoria Maszyn Elektrycznych. WNT, W-wa, 1982.<br>6. Staszewski P., Urbański W.: Zagadnienia obliczeniowe w eksploatacji maszyn elektrycznych, Warszawa, Oficyna Wydawnicza Politechniki Warszawskiej 2009 |
| | eResources addresses | Adresy na platformie eNauczanie: |
| Example issues/ example questions/ tasks being completed | Explain the methods of DC motors speed regulations, describes forms of 3-phase transformer constructions. | |
| Work placement | Not applicable | |