

DESCRIPTION OF THE COURSES

- Course code: ELR3166
- Course title: **ELECTRICAL MACHINES I**
- Language of the lecturer: Polish

| <i>Course form</i> | <i>Lecture</i> | <i>Classes</i> | <i>Laboratory</i> | <i>Project</i> | <i>Seminar</i> |
|--|---------------------|----------------|-------------------------------------|----------------|----------------|
| <i>Number of hours/week*</i> | 2 | | 1 | | |
| <i>Number of hours/semester*</i> | 20 | | 10 | | |
| <i>Form of the course completion</i> | <i>Written test</i> | | <i>Completion of lab. exercises</i> | | |
| <i>ECTS credits</i> | 3 | | 1 | | |
| <i>Total Student's Workload</i> | 90 | | 60 | | |

- Level of the course (basic/advanced):
- Prerequisites: Courses of Mathematics; Physics
Name, first name and degree of the lecturer/supervisor: Jan Zawilak Ph.D., D.Sc.
Ludwik Antal Ph.D., D.Sc., Ignacy Dudzikowski Ph.D., D.Sc., Olgierd Kasaty Ph.D.,
Roman Kramarski Ph.D., Piotr Zieliński Ph.D.,
- Names, first names and degrees of the team's members:
- Year: II Semester: IV
- Type of the course (obligatory/optional): obligatory
- Aims of the course (effects of the course):
- Form of the teaching (traditional/e-learning): traditional
- Course description: Fundamentals of electromechanical energy conversion. Transformers: construction, principle of operation, parameters, operating characteristics, inrush current, 3-ph. transformers, parallel operation. Magnetic fields in electrical machines. Induction machines: construction, principle of operation, equivalent circuit, motoring, generating and braking mode of operation, electromechanical characteristics, starting, speed control. Single-ph. induction motors.
- Lecture:

| <i>Particular lectures contents</i> | <i>Number of hours</i> |
|---|------------------------|
| <i>1. Fundamentals of electromechanical energy conversion.</i> | <i>1</i> |
| <i>2. Transformers: construction, principle of operation</i> | <i>1</i> |
| <i>3. Parameters and equivalent circuits of transformers, vector diagrams.</i> | <i>1</i> |
| <i>4. Operating characteristics, voltage regulation</i> | <i>2</i> |
| <i>5. 3-ph. transformers, groups of connections, harmonics of currents, voltages and fluxes</i> | <i>1</i> |
| <i>6. Parallel operation, inrush current, autotransformers</i> | <i>2</i> |
| <i>7. Magnetic fields in electrical machines</i> | <i>1</i> |
| <i>8. Windings of AC machines</i> | <i>1</i> |
| <i>9. Electromotive forces and winding factors</i> | <i>1</i> |
| <i>10. Induction machines: construction, principle of operation, equivalent circuit</i> | <i>2</i> |

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|--|---|
| 12. Induction machines: electromechanical characteristics motoring, generating and bracing | 2 |
| 13. Induction machines: starting, speed control | 2 |
| 14. Induction machines: construction of squirrel cage, parasitic torques | 2 |
| 15. Single-phase induction motors | 1 |

- Classes – the contents:

- Seminars – the contents:

- Laboratory – the contents: Testing of performance and steady-state characteristics of transformers and induction motors.

- Project – the contents:

- Basic literature:

- Latek W: *Zarys maszyn elektrycznych*. WNT W-wa 1974 r.

- Plamitzer A. M.: *Maszyny elektryczne*. WNT W-wa 1976 r.

- Dąbrowski M.: *Projektowanie maszyn elektr. prądu przemiennego* WNT W-wa 1994 r.

- Jezierski E.: *Transformatory* WNT Wa-wa 1983 r.

- Bajorek Z.: *Maszyny elektryczne*. WNT 1976 r.

- Antal L., Janta T., Zieliński P.: *Maszyny elektryczne. Ćwiczenia laboratoryjne*. Of. Wyd. PWr, Wrocław 2001.

- Additional literature:

- Latek W.: *Maszyny elektryczne w pytaniach i odpowiedziach*. WNT Wa-wa 1978 r.

- Conditions of the course acceptance/creditation:

Passing of a written test and completion of 4 lab exercises.

* - depending on a system of studies