

DESCRIPTION OF THE COURSES

- Course code: ELR3363
- Course title: **MEASUREMENTS OF ELECTRICAL AND MAGNETIC QUANTITIES - TECHNIQUES**
- 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> | <i>1</i> | | <i>1</i> | | |
| <i>Number of hours/semester*</i> | <i>11</i> | | <i>11</i> | | |
| <i>Form of the course completion</i> | colloquium | | pass | | |
| ECTS credits | | | | | |
| Total Student's Workload | | | | | |

- Level of the course (basic/advanced): *ADVANCED*
- Prerequisites:
Theoretical electrical engineering, electrical metrology, basic electrical engineering, physics.
- Name, first name and degree of the lecturer/supervisor:
JERZY BAJOREK, PhD, Eng
- Names, first names and degrees of the team's members:
GRZEGORZ KOSOBUDZKI, PhD Eng.
- Year:..V..... Semester: 9.
- Type of the course (obligatory/optional): *OPTIONAL*
- Aims of the course (effects of the course): Students get knowledge and skills of measurement technique electric and magnetic quantity; methods of taking signals from transducers. They get skills of managing with electric and magnetic quantity measurement
- Form of the teaching (traditional/e-learning): *TRADITIONAL*
- Course description:
Course presents contemporary measuring techniques of electrical and magnetic quantities by means of existing possibilities of conversing quantities, signals and information.
- Lecture:

| <i>Particular lectures contents</i> | <i>Number of hours</i> |
|---|------------------------|
| 1. <i>Voltage values conversion, voltage dividers: compensate resistive, capacitive, capacitive-resistive, resistive-capacitive, inductive; voltage transformers.</i> | 2 |
| 2. <i>Current to voltage signal conversion: broad-band resistance converters, resistor-loaded current converter, inductive sensors.</i> | 2 |
| 3. <i>Analog integration and averaging of inductive sensors' signals, optional big DC values and peak alternating current measurement.</i> | 2 |
| 4. <i>Integrated method of current and voltage actual values measurement, integrated sampling; measurement circuit structure.</i> | 2 |
| 5. <i>Electromagnetic field power of in space limited to closed surface, field</i> | |

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| <i>power described by means of current and voltage, power parameters, active and passive power - definition problem. Measurement of flowing power correct.</i> | 3 |
| 6. <i>Synchronous measurement of current (samples), voltage actual values and their derivatives and integrals in many channels; determination of substitute circuits parameters of electrical objects during their normal work and in failure state.</i> | 3 |
| 7. <i>Magnetic quantities inductive sensors and their applications for examination of materials and objects' properties.</i> | 2 |

- Classes – the contents:
- Seminars – the contents:
- Laboratory – the contents:

Inductive conversion of network alternating current with optional run, also containing constant component. Measurement of DC big values without circuit breaking. Synchronous measurement of voltage and current actual values. Determination of power parameters and substitute circuit parameters of electric energy receivers. Measurement of parameters characterizing magnetic properties of materials and object.

- Project – the contents:
- Basic literature:

1. *Nowak J., Przetwarzanie wielkości charakteryzujących pole magnetyczne, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2005.*

2. *Sources materials – available in Laboratory of Magnetic Quantities Measurements of Institute of Machines, Drivers and Electrical Measurements*

- Additional literature:

1. *Bolikowski J., Czarnecki L., Milek M.: "Pomiary wartości skutecznej i mocy w obwodach o przebiegach niesinusoidalnych". PWN Warszawa 1990r.*

2. *Kuśnierek. Z.: "Pomiary mocy i energii w układach elektroenergetycznych", WNT, Warszawa 1994r*

- Conditions of the course acceptance/creditation:
100% acceptance of laboratory classes, examination

* - depending on a system of studies