DESCRIPTION OF THE COURSES

- Course code: ELR3305
- Course title: MEASUREMENT TECHNIQUES OF NON-ELETRIC VALUES
- Language of the lecturer: polish

Course form	***Lecture***	***Classes***	***Laboratory***	***Project***	***Seminar***
*Number of hours/week**	*1*		*1*		
*Number of hours/semester**	*15*		*15*		
Form of the course completion					
ECTS credits	*1*		*1*		
Total Student's Workload	*30*		*30*		

- Level of the course (basic/advanced): basic
- Prerequisites: Electrical metrology
- Name, first name and degree of the lecturer/supervisor: Jerzy LESZCZYŃSKI,dr inż.
- Names, first names and degrees of the team's members:
  Wojciech GROTOWSKI , dr inż.
  Grzegorz KOSOBUDZKI, dr inż.
- Year:..... Semester:.....
- 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: The course includes total problems related to measurement of non-electric values by electric methods. Construction, rules of functioning and characteristics of processing most frequently used measurement transformers are described as well as methods of measuring various non-electric values. The laboratory deals with tensometric measurements, pressure and flows measurements, thermal measurements, p-hmetric, conductrometic and optic measurements.
- Lecture:

Particular lectures contents	*Number of hours*
1. Processing non-electric values into electric signal – general problems.	1
2. Tensometric sensors, measurement of the twisting moment, forces measurements.	2
3. Measurements of the intensity of the flow of gases and liquids.	2
4. Pressure measurements.	1
5. P-hmetric and conductometric measurements.	1
6. Temperature measurements – temperature scale, methods.	1
7. Resistance and thermoelectric thermometers.	1
8. Methods of temperature measurements – measurements of solid states, gases and liquids.	2
9. Temperature measurements in industrial equipment.	2
10. Higroscopic measurements.	1
11. Measurements of chemical composition.	1

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

- Laboratory – the contents:
  1. Temperature measurements – designating characteristics of transformers
  2. Tensometric measurements – transformers properties, examining forces transformers
  3. Pressure measurements – examining manometers
  4. Ph and liquid conductivity measurements
  5. Flow measurements
  6. Contrast measurement of LCD Display and light influence on results
- Project – the contents:
- Basic literature:
  1. Romer R., Miernictwo przemysłowe, PWN, Warszawa, 1970.
  2. Hagel R., Miernictwo wielkości nieelektrycznych metodami elektrycznymi, Cz. 1, Przetworniki i ich zastosowanie, Skrypt Pol. Śląskiej, 1982
  3. Hagel R., Miernictwo wielkości nieelektrycznych metodami elektrycznymi, Cz. 2, Przetworniki i ich zastosowanie, Skrypt Pol. Śląskiej, 1992
  4. Michalski L., Eckersdorf K., Kucharski J.: Termometria – przyrządy i metody. Polit. Łódzka 1998
- Additional literature:
  1. Szumielewicz B., Słomski B., Stryburski W., Pomiary elektroniczne w technice, WNT, 1982
  2. Zagajewski T., Malzacher S., Kwieciński A., Elektronika przemysłowa, WNT, Warszawa, 1975
  3. Pomiary cieplne – praca zbiorowa. WNT 1995 cz. 1 i 2
- Conditions of the course acceptance/credition:

* - depending on a system of studies