DESCRIPTION OF THE COURSES

- Course code: **ELR2270**
- Course title: **Converters and signaling sensors in electric power automation**
- Language of the lecture: **polish, english**

Course form	***Lecture***	***Classes***	***Laboratory***	***Project***	***Seminar***
*Number of hours/week**	**1**		**1**		
*Number of hours/semester**	**11**		**11**		
Form of the course completion	**Quiz**		**Completion**		
ECTS credits					
Total Student's Workload					

- Level of the course (basic/advanced): **basic**
- Prerequisites:physics, automatics,power system protection and control
- Imie,nazwisko I tytul/stopien prowadzacego:**Bogdan Miedziński, prof. dr hab. inż.**
- Names, first names and degrees of the team's members:
  Grzegorz Wiśniewski, Ph.D.
- Year:..... **I/studia II stopnia**..... Semester:..... **1 lub 2**.....
- Type of the course (obligatory/optional): optional
- Aims of the course (effects of the course): **acquaintance of student with principle of operation, performance and applicability of selected convertors and sensors.**
- Form of the teaching (traditional/e-learning): **traditional**
- Course description: **Structure and principle of operation of convertors and selected inductive, capacitive and magnetic sensors and example of their application in measuring and control systems.**
- Lecture:

Particular lectures contents	*Number of hours*
1. Introduction.,program,requirements	**1**
2. Principle of operation and properties of mechanical converters and sensors	**1**
3. Generating and parametric convertors and sensors	**1**
4. Manufacturing and properties of electrects	**1**
5. Piezo and piroelectric properties of dielectrics	**1**
6. Electrects in practical use, electromechanical convertors	**1**
7. Piroelectric convertors, piezoelectric relays	**1**
8. Structure and principle of operation of reed switches	**1**
9. Applicability of reeds in measuring systems	**1**
10. Switching ability of reeds, one and multi-input reed relays	**1**
11. Quiz	**1**

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

1. **Introduction, conditions of the lab acceptance**
2. **Testing of selected mechanical sensors**
3. **Testing of generation electric converters**
4. **Testing of parametric electric converters**
5. **Testing of reed sensors operated by a coil**
6. **Testing of reed sensors controlled by permanent magnet.**

- Project – the contents:
- Basic literature:

1. **B. Hilczer, J. Małecki, Elektrety i piezopolimery, PWN Warszawa 1992.**
2. **B. Szumielewicz, B. Słomski, W. Styburski, Pomiary elektroniczne w technice – metody i urządzenia, WNT Warszawa 1982**
3. **Chai Yeh, Handbook of Fiber Optics – Theory and Applications, Academic Press Inc. London 1990**
4. **B. Miedziński, Kontaktrony jako elementy automatyki elektroenergetycznej, Prace Naukowe Inst. Energoel. PWr nr 53, Monografia nr 11, 1990**

- Additional literature:

1. **C. Z. Rosen, B. V. Hiremath, R. Newnham, Piezoelektricity, AIP, New York, 1992**
2. **KTV Grattan, Sensors – Technology, Systems and Application, A. Hilger IOP Publishing Ltd, 1991**
3. **V N. Shoffa, Gerkony i gerkonovyje aparaty, Moskva, Izd. MEI, 1993**

- Conditions of the course acceptance/credition: **Passing grade of quiz**

***** - depending on a system of studies