

## DESCRIPTION OF THE COURSES

- Course code: **ELR2209**
- Course title: **Medium voltage networks protection**
- 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>	<b>1</b>		<b>1</b>		
<i>Number of hours/semester*</i>	<b>15</b>		<b>15</b>		
<i>Form of the course completion</i>	<b>colloquium</b>		<b>completion</b>		
<i>ECTS credits</i>	<b>1</b>		<b>1</b>		
<i>Total Student's Workload</i>	<b>30</b>		<b>30</b>		

- Level of the course (basic/advanced): **basic**
- Prerequisites: **Disturbances in industrial devices and distribution networks, Power system relaying**
- Name, first name and degree of the lecturer/supervisor: **Wilhelm Rojewski, Ph.D**
- Names, first names and degrees of the team's members:  
**Henryk Belka, Ph.D., Witold Dzierżanowski, Ph.D.**
- Year:..... **II/Second degree**..... Semester:.....**3**.....
- Type of the course (obligatory/optional): **optional**
- Aims of the course (effects of the course): **understanding of phenomena of earth-fault and short-circuits in medium voltage networks and knowledge of basic principles of relaying**
- Form of the teaching (traditional/e-learning): **traditional**
- Course description:

**Characteristics of medium voltage networks with ungrounded, compensated and resistor grounded of the neutral. The earth-fault phenomena and protection of networks of low earth-fault currents. Short-circuit protection of radial networks. Auto-reclosing and automatic transfer switching in medium voltage networks.**

- Lecture:

<i>Particular lectures contents</i>	<i>Number of hours</i>
<b>1. Introduction, course description and requirements</b>	<b>1</b>
<b>2. Characteristics of medium voltage networks with ungrounded, compensated and resistor grounded of the neutral</b>	<b>2</b>
<b>3. The earth-fault phenomena in medium voltage networks</b>	<b>2</b>
<b>4. The earth-fault protection of medium voltage networks</b>	<b>2</b>
<b>5. Evaluation of values measured by protection in ungrounded and resistor grounded networks</b>	<b>2</b>
<b>6. Evaluation of values measured by protection in compensated networks</b>	<b>2</b>
<b>7. The selected problems of short-circuit protection</b>	<b>2</b>
<b>8. Auto-reclosing and automatic transfer switching in medium voltage networks.</b>	<b>1</b>

<b>9. Colloquium</b>	<b>1</b>
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- Classes – the contents:
- Seminars – the contents:
- Laboratory – the contents:
- 1. Introduction**
- 2. Survey of the characteristics of directional earth-fault protection**
- 3. Testing of earth-fault protection on the model of ungrounded medium voltage networks**
- 4. Testing of earth-fault protection on the model of compensated medium voltage networks**
- 5. Testing of earth-fault protection on the model of resistor grounded medium voltage networks**
- Project – the contents:
- Basic literature:
- 1. Praca zbiorowa pod red. B. Synala, Automatyka elektroenergetyczna, ćwiczenia laboratoryjne. Cz. I, Przetworniki sygnałów pomiarowych i przekaźniki automatyki zabezpieczeniowej, Cz. II, Układy automatyki zabezpieczeniowej i regulacyjnej, Wyd. PWr. 1991.**
- 2. Synal B. Rojewski W., Dzierżanowski W., Elektroenergetyczna automatyka zabezpieczeniowa. Podstawy, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2003.**
- Additional literature:
- 1. Winkler W., Wiszniewski A., Automatyka zabezpieczeniowa w systemach elektroenergetycznych, WNT, Warszawa, 1999, oraz Wydanie II 2004.**
- Conditions of the course acceptance/creditation: **Completion of laboratory tasks and positive result of colloquium**

\* - depending on a system of studies