

DESCRIPTION OF THE COURSES

- Course code: ELR3205
- Course title: ELECTROMECHANICAL DRIVE SYSTEMS
- 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>1</i>	
<i>Number of hours/semester*</i>	<i>15</i>		<i>15</i>	<i>15</i>	
<i>Form of the course completion</i>	<i>exam</i>		<i>Completion of all labs</i>	<i>Written projects</i>	
<i>ECTS credits</i>	<i>3</i>		<i>1</i>	<i>1</i>	
<i>Total Student's Workload</i>	<i>90</i>		<i>30</i>	<i>30</i>	

- Level of the course (/advanced): basic
- Prerequisites: Electrical machines, Electrical drives
- Name, first name and degree of the lecturer/supervisor: Krzysztof Pieńkowski, D.Sc.

- Names, first names and degrees of the team's members:
 Teresa Orłowska-Kowalska, Prof. D. Sc.
 Stanisław Azarewicz, Ph.D.
 Krzysztof Dyrz, Ph.D.

- Year:..... 1..... Semester:.....2
- Type of the course (obligatory/optional): obligatory
- Aims of the course (effects of the course):
 Presentation of analysis and modeling methods of electromechanical drive systems in renewable energy systems.. Knowledge of design of electromechanical drive systems in renewable energy systems.
- Form of the teaching (traditional/e-learning): traditional
- Course description:
 Presentation of electromechanical drive systems with special including of design problems and applications of electromechanical drive systems in renewable energy systems. Principles of determination of parameters and equivalent values, analysis of motion equation, modeling and calculation of electromechanical and electromagnetic transients in complex electromechanical systems. Preparation of projects of electromechanical drive systems for chosen types of machines and electromechanical transducers. Study of control of electromechanical drive systems in renewable energy systems.

- Lecture:

<i>Particular lectures contents</i>	<i>Number of hours</i>
1.Structures and components of electromechanical drive systems in	

renewable energy systems	1
2. Modeling of electromechanical transducers applied in renewable energy systems	2
3. Determination of equivalent parameters of electromechanical transducers applied in renewable energy systems	2
4. Analysis of working states of induction machine, synchronous machine, doubly fed induction machine and other types of electromechanical transducers	2
5. Power electronics systems of control of electromechanical systems with wind energy systems	2
6. Power electronics systems of control of electromechanical systems with PV systems	2
7. Principles of control system design and controllers setting in power electronics electromechanical systems of renewable energy	2
8. Modeling of power electronics control systems of electromechanical systems in renewable energy systems	2

- Classes – the contents:

- Seminars – the contents:

- Laboratory – the contents:

Identification of mechanical and electromagnetic parameters in electromechanical drive systems. Testing of selected states of operation of electromechanical systems with application of wind energy. Testing of selected states of operation of electromechanical systems with application of PV energy. Testing of power electronics control systems applied in renewable energy systems.

- Project – the contents:

Project of electromechanical system of renewable energy with squirrel cage induction machine. Project of electromechanical system of renewable energy with double fed slip-ring induction machine. Project of electromechanical system of renewable energy with synchronous machine.

- Basic literature:

- o Cannon Robert H. : Dynamika układów fizycznych, WNT, Warszawa, 1973.
- o Meisel Jerome: Zasady elektromechanicznego przetwarzania energii, WNT, Warszawa, 1970.
- o Puchała Arkadiusz: Dynamika maszyn i układów elektromechanicznych, PWN, Warszawa, 1977.
- o Jastrzębska G.: Odnawialne źródła energii i pojazdy proekologiczne. WNT, Warszawa, 2007 r.
- o Lewandowski W.M.: Proekologiczne źródła energii odnawialnej. WNT, Warszawa, 2002.

- Additional literature:

- o Bisztyga K.: Sterowanie i regulacja silników elektrycznych. WNT, Warszawa, 1989.
- o Praca zbiorowa pod red. Z. Grunwalda: Napęd elektryczny, WNT, Warszawa, 1987
- o Kaźmierkowski M.P., Tunia H.: Automatyka napędu przekształtnikowego. PWN, Warszawa, 1987
- o Tunia H., Winiarski B.: Energoelektronika. WNT, Warszawa, 1994.

- Conditions of the course acceptance/creditation:
 - Lecture – exam
 - Laboratory – written reports;
 - Project – written project;
- * - depending on a system of studies