

## DESCRIPTION OF THE COURSES

- Course code: ELR3208
- Course title: **CONVERTER-FED DRIVE SYSTEMS**
- Language of the lecturer:

| <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>         | 2              |                | 1                 |                |                |
| <i>Number of hours/semester*</i>     | 30             |                | 15                |                |                |
| <i>Form of the course completion</i> | colloquium     |                | pass              |                |                |
| <i>ECTS credits</i>                  |                |                |                   |                |                |
| <i>Total Student's Workload</i>      |                |                |                   |                |                |

- Level of the course (~~basic~~/advanced):
- Prerequisites: The knowledge from the basics course on electrical drives and power electronics
- Name, first name and degree of the lecturer/supervisor: Stanisław Azarewicz , Ph.D.
- Names, first names and degrees of the team's members:
- Year:.....2..... Semester:.....4.....
- Type of the course (~~obligatory~~/optional):
- Aims of the course (effects of the course): Good knowledge about static converters and their industrial application
- Form of the teaching (traditional/~~e-learning~~):
- Course description:

Static converter-fed DC motor drives; static and dynamic characteristics and the possibilities influencing their shape; operating problems, designing rules, power indicators. Frequency and amplitude-controlled AC motor drives. Methods of static converters' control and their impact on electro-mechanical and power parameters of the drives. Cascade drives with static converters. The influence of converter-fed drives on power grid and ways of minimizing this influence. Tendencies in the development of converter-fed drives.

- Lecture:

| <i>Particular lectures contents</i>  | <i>Number of hours</i> |
|--|------------------------|
| 1. Operating problems in converter-fed drives.   | 2                      |
| 2. Static converter-fed DC motor drives.   | 3                      |
| 3. Structures regulating controllable rectifier and impulse rectifier-fed DC motor drives    | 3                      |
| 4. Designing rules of converter-fed DC drives.   | 2                      |
| 5. Power parameters and power grid control.  | 2                      |
| 6. AC motor drives with frequency converters.  | 3                      |
| 7. Methods of frequency converters' control and their influence on the current's parameters. | 3                      |
| 8. Aspects of selecting the inverters for frequency converters                               | 3                      |
| 9. Regenerative braking of drives with frequency converters                                  | 3                      |
| 10. Cascade power transmission systems – control, operational parameters                     | 3                      |
| 11. Converter-fed power transmission systems with synchronous motor                          | 2                      |
| 12. Tendencies in the development of converter-fed drives                                    |                        |

- Classes – the contents:
- Seminars – the contents:
- Laboratory – the contents:
  - Laboratory exercises illustrating lecture subject:
  - DC converter-fed power transmission systems testing
  - AC inverter and voltage controller -fed power transmission systems testing
  - Cascade systems testing
  - Induction slip-ring motor and resistance modulators in rotor's circuit testing
  - Frequency converter-controlled synchronous motor drives testing
  - AC converter actuators testing
  - AC and DC motor drives' regenerative braking testing
  - Influence on grid and power indicators of converter-fed motor drives
- Project – the contents:
- Basic literature:
  1. Barlik R., Nowak M.: Technika tyrystorowa, WNT W-wa 1994
  2. Bisztyga K.: Sterowanie i regulacja silników elektrycznych, WNT W-wa 1994
  3. Tunia H., Kaźmierkowski M.....:Automatyka napędu przekształtnikowego, PWN W-wa 1987
- Additional literature:
- Conditions of the course acceptance/creditation:

\* - depending on a system of studies