GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|
| Subject name and code | Control of Processes in Electrical Power Engineering, PG_00042318 | | |
| Field of study | Electrical Engineering | | |
| Date of commencement of studies | October 2023 | Academic year of realisation of subject | 2023/2024 |
| Education level | second-cycle studies | Subject group | |
| Mode of study | Part-time studies | Mode of delivery | at the university |
| Year of study | 1 | Language of instruction | Polish |
| Semester of study | 2 | ECTS credits | 3.0 |
| Learning profile | general academic profile | Assessment form | assessment |
| Conducting unit | Department of Electrical Power Engineering -> Faculty of Electrical and Control Engineering | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. inż. Robert Małkowski | |
| | Teachers | | |

**Lesson types and methods of instruction**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 10.0 | 10.0 | 0.0 | 0.0 | 0.0 | 20 |

E-learning hours included: 0.0

**Learning activity and number of study hours**

| Learning activity | Participation in didactic classes included in study plan | Participation in consultation hours | Self-study | SUM |
|---|---|---|---|---|
| Number of study hours | 20 | 7.0 | 48.0 | 75 |

**Subject objectives**

Knowledge related to regulatory processes occurring in the power system.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| K7_U02 | Depending on the amount of students, students prepares a multimedia presentation | [SU2] Assessment of ability to analyse information |
| K7_U03 | A student sees the importance of broadening his/her individual knowledge and skills concerning related fields. | [SU3] Assessment of ability to use knowledge gained from the subject |
| K7_W01 | Student Explains regulation processes in Power grid in normal work state and after disturbance. Describes controllers used to maintain correct operation of power grid. Chooses correct operation algorithms for those controllers. Calculates chosen operation parameters of power grid with simplifying assumptions taken to consideration. | [SK2] Assessment of progress of work |
| K7_W02 | Student Explains regulation processes in Power grid in normal work state and after disturbance. Calculates chosen operation parameters of power grid with simplifying assumptions taken to consideration. On the base of the basic mathematical relations students can describe fundamental elements of power system | [SW1] Assessment of factual knowledge |

<table>
<tr><td>Subject contents</td><td>LECTURES: Generator as a regulated object. Generator controllers, limits of operation points for synchronic generators.Influence of automatic control of a tap changing step-up transformer on power capability area of generating unit. Connecting electric power subsystems to parallel running after system breakdown. Defining limits of criterial parameters. Relations between basic electric parameters in power grid. Protective Automatic : under-frequency load shedding systems, under-voltage load shedding systems.<br><br>CLASSES: Coupling parameters of simple power grid model elements( generators, transformers, power lines ) to conduct research including various load level in modelled power grid. Calculating load flow. Characterizating dependencies of voltage and/or transformer tap controllers on voltage levels and load flow in analised grid.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge of basic electrotechnics Knowledge of basic electrical machinery Knowledge of basic electroenergetics</td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Midterm colloquium</td><td>50.0%</td><td>100.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>1. Hellmann W., Szczerba Z.: Regulacja częstotliwości i napięcia w systemie elektroenergetycznym. Warszawa: WNT 1978. 2. Kożuchowski J.: Sterowanie systemów elektroenergetycznych. Warszawa: PWN 1981. 3. Machowski Jan: Regulacja i stabilność systemu elektroenergetycznego, Oficyna Wydawnicza Politechniki Warszawskiej, 2007.</td></tr>
<tr><td>Supplementary literature</td><td>1. Kowalik R.: Teletechnika. Podstawy dla elektroenergetyków. Wyd. Politechniki Warszawskiej 1999. 2. J. Machowski, J. Bialek, J. Bumby : "Power System Dynamics and Stability". John Wiley & Sons, Chichester, New York, 1997.</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. Describe example waveforms (figure below) of switching currents for the case of synchronization with failure to meet the voltage equality condition.<br><br>2. List the terms of cooperation of a parallel group of generators. Describe the consequences of not meeting these conditions.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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