GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|
| Subject name and code | Process Modelling in Electrical Power Engineering, PG_00045973 | | |
| Field of study | Electrical Engineering | | |
| Date of commencement of studies | February 2024 | Academic year of realisation of subject | 2024/2025 |
| Education level | second-cycle studies | Subject group | |
| Mode of study | Full-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. Jacek Klucznik | |
| | Teachers | | |

**Lesson types and methods of instruction**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 15.0 | 0.0 | 15.0 | 0.0 | 0.0 | 30 |

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 | 30 | 6.0 | 39.0 | 75 |

**Subject objectives**

Teaching of modeling and simulations of processes in power systems, using modern computer tools.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| K7_K03 | The student determines the initial conditions for dynamic models and assesses their correctness. | [SK2] Assessment of progress of work<br>[SK1] Assessment of group work skills |
| K7_U06 | The student builds models of selected power system components using the PowerFactory environment. | [SU1] Assessment of task fulfilment<br>[SU4] Assessment of ability to use methods and tools |
| K7_W03 | The student distinguishes between steady state and transient models. The student recognises the differences in the ways of describing a dynamic model. The student demonstrates methods of modelling power grids, synchronous generators, excitation systems and turbines. | [SW1] Assessment of factual knowledge |

**Subject contents**

Modelling of Power system steady and dynamic states. Single machine and multi machine models. Power system components modelling: synchronous generators, asynchronous machines, overhead and cable lines, two and three windings transformers, loads. Modelling of thermal and hydro power plants devices and controllers: prime movers, speed and power governors, excitation systems, voltage controller, power system stabiliser. Modelling of wind generators and wind farms. Reduced models of wind farms.

**Prerequisites and co-requisites**

Electric power engineering basics. Power systems.

**Assessment methods and criteria**

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| Final test | 50.0% | 30.0% |
| Model building | 50.0% | 70.0% |

**Recommended reading**

Basic literature


1. Zajczyk R.: Modele matematyczne systemu elektroenergetycznego do badania elektromechanicznych stanów nieustalonych i procesów regulacyjnych, Wydawnictwo Politechniki Gdańskiej, 2003
2. Machowski J., Regulacja i stabilność systemu elektroenergetycznego, Oficyna Wydawnicza Politechniki Gdańskiej, Warszawa, 2007

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|---|---|---|
| | Supplementary literature | 1. Kacejko P., Machowski J.: Zwarcia w sieciach elektroenergetycznych, WNT, Warszawa 2002.<br>2. Lubośny Z.: Farmy wiatrowe w systemie elektroenergetycznym, WNT, Warszawa 2009 |
| | eResources addresses | Adresy na platformie eNauczanie: |
| Example issues/ example questions/ tasks being completed | Single generator model building with turbine model and voltage controller. | |
| Work placement | Not applicable | |