STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Computer aided calculations and decision making in power	**1010312411010315649**

Field of study	Profile of study (general academic, practical)	Year /Semester
Power Engineering	**(brak)**	**1 / 1**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
Second-cycle studies	**full-time**

No. of hours	No. of credits
Lecture: **15** Classes: **-** Laboratory: **45** Project/seminars: **-**	**4**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge in field of electrical engineering, power engeneering and computer operations.
2	**Skills**	Effective self-education in study field. Skills in basic operations in computer systems.
3	**Social competencies**	Student should have consciousness of necessity of improving his competences in innovation technologies for electrical engeneering.

Assumptions and objectives of the course:

Studies of computer methods in power system, power plants and network designing. Computer technology in power system control. Computer decision support systems in power stations, power plants and networks. Mathematic models for power instalations and other elements. Simle optimization problems solutions.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Knowledge in methodology and principles of modern, automated designing for power engeneering objects and power plants. - [K_W04+++, K_W15++, K_W18++]

2. Knowledge in decision support and design systems in power plants and power system. - [K_W04+++, K_W13+++]

3. Knowledge in basis of computer modelling for substations, electrical networks and distributed generation. - [K_W04+++, K_W08++]

Skills:

1. Use knowledge of supply structure desingning for electrical power objects, exploitation configuration for normal and failure states and final documentation in european standard. - [K_U04++, K_U06+++, K_U08+++]

2. Ability to implementation expert and design tools for determination of secure exploitation parameters for network and systems cooperated with power and distributed generation. - [K_U04++, K_U13++]

3. Use knowledge of the simple optimization solutions in field of electrical power engineering. - [K_U06+++, K_U09++]

Social competencies:

1. One has an awareness of usage of modern methods for designing and high-class solutions. - [K_K02+++]

2. One has an awareness of economic and social acceptance for the choosen technical solution. - [K_K01+++]

Assessment methods of study outcomes

- assessment of knowledge on final exam,
- assessment of knowledge and skills on the basis of test consisting on solving of design problems in laboratory.
- permanent assessment on lectures and laboratories.

Course description

Lecture: Power flow, voltage levels and power losses calculations. Short-circuit calculations in power networks. Substation and distribution network designing supported by Siemens Simaris Design system. Power unit as control object. Power unit control systems. Thermal power station work simulation.

Laboratory: Practical studies linked with lecture.

Desing classes: Desing problems and solutions linked with lecture and laboratory content.

Basic bibliography:

1. Kacejko P.: Generacja rozproszona w systemie elektroenergetycznym. Wydawnictwo Politechniki Lubelskiej, Lublin, 2004 r.
2. Kujszczyk Sz.: Nowoczesne metody obliczeń elektroenergetycznych sieci rozdzielczych. WNT, Warszawa, 1984 r.
3. Pawlik M. Układy i urządzenia potrzeb własnych elektrowni. WNT. 1986 r.
4. Lorenc J. Admitancyjne zabezpieczenia ziemnozwarciowe. Wyd. PP. 2007 r.
5. Zajczyk R.: Zwarcia w układach elektroenergetycznych, Gdańsk, 2005 r.
6. Lubośny Z.: Farmy wiatrowe w systemie elektroenergetycznym, WNT, Warszawa, 2009 r.

Additional bibliography:

1. Planning of Power Distribution - the manual for Totally Integrated Power, Siemens AG, Erlangen, 2001.
2. Marszałkiewicz K., Grządzielski I., Trzeciak A.: Ocena wielokryterialna możliwości przyłączenia jednostek wytwórczych do sieci elektroenergetycznej średniego napięcia. Wiadomości Elektrotechniczne, Warszawa, 2012, 1 - ISSN 0043-5112 ss. 3-8..
3. Beynon-Davis Paul: Systemy baz danych. WNT, Warszawa, 2000 r.

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	15
2. Participation in laboratory classes	45
3. Consultations	5
4. Preparaton to laboratory classes and report realisation	25
5. Preparation to final exam	6
6. Final exam	2

Student's workload

Source of workload	hours	ECTS
Total workload	98	4
Contact hours	50	3
Practical activities	75	3