STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Computer aided design for Electrical Power Engineering	**1010312321010314878**

Field of study	Profile of study (general academic, practical)	Year /Semester
Electrical Engineering	**(brak)**	**1 / 2**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
High Voltage Engineering	**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: **15** Project/seminars: **-**	**2**

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 %)
technical sciences	**2 100%**

Responsible for subject / lecturer:

Andrzej Trzeciak
email: andrzej.trzeciak@put.poznan.pl
tel. 61 665 2581
Elektryczny
Poznań, ul. Piotrowo 3A

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge in field of Electrical engineering 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 and network designing. Computer technology in power system control. Computer decision support systems in power stations 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. - [K_W18+++]
2. Knowledge in decision support and design systems in power plants and power system. - [K_W16++, K_W17+++]
3. Describe and implement numerical analysis methods for modelling physical processes. - [K_W18+++]

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_U11+++, K_U18++]
2. Use knowledge of the decision and support systems in power plants and power systems. - [K_U07+++, K_U13+++]
3. Ability to numeric modelling methods in insulation systems. - [K_U07+++]

Social competencies:

1. One has an awareness of usage of modern methods for designing and high-class solutions. - [K_K01+]
2. One has an awareness of economic and social acceptance for the choosen technical solution. - [K_K02+]

Assessment methods of study outcomes

- assessment of knowledge on final test,
- assessment of knowledge and skills on the basis of test consisting on solving of design problem.
- 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.

Update 2017: Fuel cells modeling

Laboratory: Practical studies linked with lecture.

Applied training methods

Lecture: the theory of the closely related to practice, Multimedia lecture

Laboratory: Team programming

Basic bibliography:

1. Kulczycki J., Optymalizacja struktur sieci elektroenergetycznych, WNT, Warszawa, 1990 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.
4. Rakowski J. Automatyka cieplnych urządzeń siłowni. WNT. 1976.
5. Janiczek R. Eksploatacja elektrowni parowych. WNT. 1992.

Additional bibliography:

1. Planning of Power Distribution - the manual for Totally Integrated Power, Siemens AG, Erlangen, 2001.
2. Marszałkiewicz K., Trzeciak A.: Nowa wersja systemu Simaris deSign. Elektrosystemy, Warszawa, czerwiec 2005, 6 - ISSN 1509-2100 ss. 114-121.
3. http://www.automation.siemens.com/_en/simaris
4. Bartosz Ceran, Paul A. Bernstein: Application PEM fuel cells in virtual power plant. Computer Applications in Electrical Engineering, Rocznik: 2014 | Tom: vol. 12

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	15
2. Participation in laboratory	15
3. Consultations	5
4. Preparaton to laboratory classes and report realisation	20
5. Preparation to final test	6
6. Final test	2

Student's workload

Source of workload	hours	ECTS
Total workload	63	2
Contact hours	37	1
Practical activities	75	2