STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Computer Assistance Systems for Power Grids	**1010314381010316900**

Field of study	Profile of study (general academic, practical)	Year /Semester
Electrical Engineering	**(brak)**	**4 / 8**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Power Networks and Electric Power System	**Polish**	**obligatory**

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

No. of hours	No. of credits
Lecture: **9** Classes: **-** Laboratory: **18** 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%**
Technical sciences	**2 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Knows the basic mathematical models of electrical power devices , knows the power system operating conditions, know technology of electrical power generation, transmission and distribution
2	**Skills**	Has ability to model some elements of the power system, is able to create applications using structured and object-oriented programming methods
3	**Social competencies**	Can organize and participate in team work

Assumptions and objectives of the course:

Knowledge of methods and programs for design, develop and operation of the power grid, knowledge methods of measurement and analysis used in the electrical power engineering

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

Knowledge:

1. Has knowledge of programming and use of software tools for engineering tasks - [K_W08 ++]
2. He the knowledge on the implementation of energy measurements in objects using digital technology - [K_W11 ++]
3. He knows the structure of the power system and the phenomenas accompanying to generation, transmission and distribution of electrical energy - [K_W24 +++]

Skills:

1. He can use the software tools in the process of supporting the operation of the power grid - [K_U10 ++]
2. Is able to create procedures, algorithms and computer programs to aid the design and operation of the power grid - [K_U22 +]

Social competencies:

1. Understands the importance of the impact of engineer jobs for environmental and the associated liability - [K_K02 ++]

Assessment methods of study outcomes

Lecture
evaluation of the knowledge and skills on the basis of written tests,
classroom activity rewarding.
Laboratory:
tests and written tests,
evaluation of knowledge and skills related to the accomplishment practice task,
evaluation of report from performed exercise.
Obtainment of extra points for the activity in the classroom, in particular for:
effectiveness of the application of acquired knowledge during studies,
ability to work within a team performing the detailed practice task in the laboratory,
contribution to the achievement of the tasks.

Course description

Programs for computer aided power network design (equipment selection, drawing diagrams). The use of phasor and synchrophasor to assess the state of the grid. Measurement methods used to determine the operating parameters of the power system, measurement data acquisition, analysis and visualization the results of measurements of electrical and non-electrical quantities. The use of database systems for grid inventory. Interactive lectures, stimulating students to actively participate in classes, presentation of practical approach to theoretical problem solving,

activating the student's self-reliance in expanding knowledge through additional tasks, supplementing the content with attractive visual addons,

activating self-problem solving by the student during a classes, teaching support through wide use of open license software,

encouraging alternative sources for self-improvement of knowledge and skills by the student, learning to use individual skills in teamwork,

encourage students to independently design equipment, develop experiments and develop programming and go beyond the study program.

Basic bibliography:

1. Kacejko P., Machowski J.: Zwarcia w systemach elektroenergetycznych. WNT, Warszawa, 2002
2. Kaczmarek K., Nowak A., Sieci. Analiza i optymalizacja, WPŚ, 2007
3. Kremens Z. , Sobierajski M. : Analiza systemów elektroenergetycznych. WNT, Warszawa, 1996
4. Marzecki J. ,Elektroenergetyczne sieci miejskie. Zagadnienia wybrane, OWPW, 2006
5. Rybarczyk A., Sztuczne sieci neuronowe. Laboratorium, WPP, 2008
6. Smith I. M., Smith W., Programming in FORTRAN 90: A First Course for Engineers and Scientists, John Wiley & Sons, 1995
7. Stroustrup B., Język C++. Kompendium wiedzy, Helion, 2014
8. Wiatr J., Orzechowski M, Poradnik projektanta elektryka wydanie V rozszerzone, Grupa Medium, 2012
9. Wróblewski P., Algorytmy, struktury danych i techniki programowania, Helion, 2009

Additional bibliography:

1. Cegielski M.: Sieci i systemy elektroenergetyczne. PWN, Warszawa, 1979
2. Czemplik A., Scilab i Matlab - podstawowe zastosowania inżynierskie, OWPWr, 2012
3. DuBois P., MySQL. Vademecum profesjonalisty, Helion, 2014
4. Gierycz P., SCILAB w obliczeniach inżynierskich, OWPWr, 2015
5. H?idalen H.K., Prikler L., ATPDRAW version 5.6 Users' Manual, 2009
6. Lorenc J., Admitancyjne zabezpieczenia ziemnozwarciowe, WPP, 2007
7. Users guide on the use of PSCAD, Manitoba HVDC Research Center

Result of average student's workload

Activity	Time (working hours)

1. participation in class lectures	9
2. participation in laboratory classes	18
3. participate in the consultations on the lecture	4
4. participate in the consultations on the laboratory	4
5. preparation laboratory reports	9
6. prepararion to the laboratory classes	4
7. preparation of home work	4
8. prepare for the completion of laboratory	3
9. completion of laboratory classes	2
10. preparation for the completion of lecture classes	4
11. completion of lecture classes	2
12. student`s selfmanaged work	10

Student's workload

Source of workload	hours	ECTS
Total workload	73	2
Contact hours	39	1
Practical activities	52	1