STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Information technology and communication systems in power	**1010311451010315642**

Field of study	Profile of study (general academic, practical)	Year /Semester
Power Engineering	**(brak)**	**3 / 5**
Elective path/specialty	**Subject offered in:**	**Course (compulsory, elective)**
-	**Polish**	**obligatory**

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

No. of hours	No. of credits
Lecture: **30** Classes: **-** Laboratory: **15** Project/seminars: **-**	**3**

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	**3 100%**
Technical sciences	**3 100%**

Responsible for subject / lecturer:

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Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Possesses basic knowledge of the electric power systems and grid, flow and sfort-circuits calculations in the networks, electric power generation ways. Knows fundamentals of electrical power engineering, automation and information technology and database theory.
2	**Skills**	Possesses basic knowledge of the electric power systems and grid, flow and sfort-circuits calculations in the networks, electric power generation ways. Knows fundamentals of electrical power engineering, automation and information technology and database theory.
3	**Social competencies**	Is aware of the need to develop his competencies. Has understanding of the necessity to use innovation technologies in the remote control processes and information management.

Assumptions and objectives of the course:

Getting knowledge of structures and functions of the IT systems supporting the transmission and distribution networks operators as to the run/power flow, communication systems between the electric power system elements, Computation techniques, information acquisition and dispatch in electric power engineering.

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

Knowledge:

1. Has an ordered and theory-underpinned knowledge about simulation and programming of phenomena in the electric power systems, - [K_W10++]

2. Has elementary knowledge of fundamentals of the control and automation of technological processes in electrical engineering; understands the dynamic systems? stability problems and knows their description methods. - [K_W14++]

Skills:

1. Can use acquired mathematical methods and models as well as the computer simulation to discuss and assess the operation of the electric power elements and systems, - [K_U07 ++]

2. Can construct proper algorithm and use properly chosen programistic environments, simulators and computer-aided design tools to simulate, design and verify the power electric elements and systems as well as the simple electronic and automatic systems. - [K_U09 ++]

Social competencies:

1. Is aware of the weight and understands the non-technical aspects and effects of the electric power engineer?s activities and responsibility including those related to the environmental impact and regarding the responsibility for the undertaken decisions. - [K_K02 ++]

Assessment methods of study outcomes

Lectures:

1.Assesment of the knowledge and skills shown at the written and oral examinations ,

2.Continuous assessment during courses (bonus for activity and perception quality).

Laboratory:

1.Test of the knowledge necessary to deal with problems posed in the lab tasks.

2. Assessment of the knowledge and skills related to the lab task completion. Assessment of the task report.

Course description

Lectures: Electric power systems as the control subject. On-line DYSTER information system supporting the transmission network run/power operators. On-line information system supporting the distribution network run/power operators Functions accomplished by SCADA, EMS and DMS. SCADA lab system. Communication between the electric power system elements - communication standards, data transmission, ETN links, communication protocols, IEC61850 standard.

Databases as information source for technical computations, control and decision-making processes. Management systems for processes of connecting the loads and energy sources to the electric power grid. Local and wide-area Information transmission standards Data transmission over electric power network - Power Line Communication(PLC) systems.

Laboratory involves experiments on database construction, development of advanced SQL queries. Information management in the terminals' connecting processes, application of measuring data to technical and optimization computations. Presentation of the SCADA lab system operation.

Basic bibliography:

1. Wiszniewski A.: Algorytmy pomiarów cyfrowych w automatyce elektroenergetycznej, Warszawa, WNT 1990

2. Rosołowski E.: Komputerowe metody analizy elektromagnetycznych stanów przejściowych, Oficyna Wydawnicza Politechniki Wrocławskiej, 2009

3. Rosołowski E.: Cyfrowe przetwarzanie sygnałów w automatyce elektroenergetycznej. Akademicka Oficyna Wydawnicza EXIT, 2002

4. Lesiak P., Świsulski D.: Komputerowa Technika Pomiarowa. AW PAK, 2004

Additional bibliography:

1. H?idalen H. K., Prikler L.: ATPDRAW Users' Manual, 2009

2. Manitoba HVDC Research Centre: PSCAD? Users Guide V4.3., 2010

3. Pinçon B., Wprowadzenie do Scilaba, Institut Elie Cartan Nancy E.S.I.A.L., Université Henri Poincaré, 2009

Result of average student's workload

Activity	Time (working hours)
1. participation in lecture courses	30
2. participation in labs	15
3. participation in discussions related to lectures	5
4. participation in discussions related to labs	5
5. preparation to labs	5
6. lab reports? elaboration	5
7. preparation to examination	5
8. taking an examination	3

Student’s workload

Source of workload	hours	ECTS
Total workload	73	3
Contact hours	48	2
Practical activities	35	1