STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Information Technologies for Electrical Power Engineering	**1010324371010314772**

Field of study	Profile of study (general academic, practical)	Year /Semester
Electrical Engineering	**general academic**	**4 / 7**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**

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

No. of hours							No. of credits
Lecture:	**18**	Classes:	**-**	Laboratory:	**12**	Project/seminars: **-**	**4**

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

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**4 100%**
Technical sciences	**4 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Knowledge of mathematical analysis, circuit theory, basic signal processing and programming
2	**Skills**	Can achieve the calculation due to the theory of circuits and verify their results, can operate computer software and network communication tools
3	**Social competencies**	Is able to work in group

Assumptions and objectives of the course:

Knowledge of modern information technology used in the power industry. The use of numerical methods for the calculation of steady-state and transient in power and electrical systems. To familiarize students with the methods of data collection, transmission and storage of data relative to the grid and control systems, transmission systems and distribution of electricity. Get to know the laws and regulations concerning to the patents, intelectual property and personal data protection.

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

Knowledge:

1. Has knowledge in modeling power and electrical systems - [KW_26 +++]
2. Has knowledge on the implementation of power and energy measurements in electrical systems using digital technology - [KW_16 +++]
3. He has knowledge of IT systems and data communication protocols used in the electrical power engineering - [KW_10 +++]

Skills:

1. s able to design models of basic systems and devices of power system - [KU_04 +++]
2. Know how to use computer programs to build models of power protection automatics - [KU_11 +++]
3. s able to use IT technology to gather and present information on electrical enginering - [KU_07 +++]

Social competencies:

1. Development of skills for self-study, group work and obtaining new knowledge - [K_K01 ++]
2. Understanding the impact of IT technology on engineer work, the safety of the power system and the environment - [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 exercises

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

Monitoring of power system operation (control and supervision systems). The use of microprocessor technology, event and interference logging, signal processing of recorded measurements in Electrical Power Engineering Protection Systems (EAZ). Selected topics in the field of data transmission. Modeling systems and components of the power system. Security in IT systems. Guides for the presentation of the results of engineer calculations in electronic and traditional form. Selected topics in the field of intellectual property rights (patents, database protection, software licensing methods).

Basic bibliography:

1. Bolkowski B., Elektrotechnika, WSiP, 2016
2. Bradford, R, Podstawy sieci komputerowych, WKŁ, 2009
3. Brozi A., Scilab w przykładach, NAKOM, 2007
4. Czemplik A., Scilab i Matlab - podstawowe zastosowania inżynierskie, Oficyna wydawnicza PWr, 2012
5. Gierycz P., SCILAB w obliczeniach inżynierskich, Oficyna wydawnicza PW, 2015
6. Komar B., Administracja sieci TCPIP dla każdego, Helion, 2000
7. Krzyżanowski P., Obliczenia inżynierskie i naukowe, PWN, 2011
8. Lockhart A.100 sposobów na bezpieczeństwo Sieci, Helion, 2004
9. Musierowicz K., Staszak B., Technologie informatyczne w elektroenergetyce, WPP, 2010
10. Rosołowski E., Cyfrowe przetwarzanie sygnałów w automatyce elektroenergetycznej, AOW EXIT, 2002
11. Rosołowski E., Komputerowe metody analizy elektromagnetycznych stanów przejciowych,WPWr, 2009
12. Zieliński T.P., Cyfrowe przetwarzanie sygnałów. Od teorii do zastosowań, WKŁ, 2007
13. Owen M., Przetwarzanie sygnałów w praktyce, WKŁ, 2009

Additional bibliography:

1. Barta J., Markiewicz R., Prawo autorskie i prawa pokrewne, LEX, 2014
2. Golat R., Prawo autorskie i prawa pokrewne, C.H. Beck, 2012
3. H?idalen H. K., Prikler L., ATPDRAW version 5.6 Users' Manual, 2009
4. Lorenc J., Admitancyjne zabezpieczenia ziemnozwarciowe, WPP, 2007
5. Marciniak J., Regulaminy i procedury w firmie, LEX, 2014
6. Kwiatkowski W., Wstęp do cyfrowego przetwarzania sygnałów, GEL, 2015
7. Lyons R.G., Wprowadzenie do cyfrowego przetwarzania sygnałów, WKŁ, 2010
8. Stranneby D.: ? Cyfrowe przetwarzanie sygnałów. Metody, algorytmy, zastosowania, BTC, 2004
9. 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	15
2. participation in laboratory classes	15
3. participate in the consultations on the lecture	4
4. participate in the consultations on the laboratory	4
5. preparation laboratory reports	20
6. prepararion to the laboratory classes	6
7. preparation of home work	9
8. prepare for the completion of laboratory	6
9. completion of laboratory classes	3
10. prepare for the completion of class lectures	8
11. completion of class lectures	2
12. student`s selfmanaged work	15

Student's workload		
Source of workload	**hours**	**ECTS**
Total workload	67	4
Contact hours	42	1
Practical activities	44	1