Advanced data processing

Faculty of	**Mechanical and Power Engineering**
Name in English	**Advanced data processing**
Name in Polish	**Zaawansowane przetwarzanie danych**
Main field of study	**Power Engineering**
Specialization	**-**
Level of studies	**II level**
Form of studies	**full-time**
Kind of subject	**wybieralny**
Subject code	**W09ENG-SM2345**
Group of courses	**NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	15		30		
Number of hours of total student workload (CNPS)	25		50		
Form of crediting	Colloquium		Colloquium		
For group of courses mark final course with (X)					
Number of ECTS points	1		2		
including number of ECTS points for practical (P) classes			2		
including number of ECTS points for direct teacher-student contact (BU) classes	0,68		1,36		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1.	Basic understanding of the programming process
2.	Knowledge of basic phenomena in thermodynamics and fluid mechanics and their mathematical modeling

SUBJECT OBJECTIVES

C1	Provide knowledge on how to conduct automated measurement methods
C2	Provide knowledge of methods for analysing measurement data
C3	Providing knowledge on the verification of mathematical models

SUBJECT LEARNING OUTCOMES

relating to knowledge:	
PEU_W01	Knowledge of programming in simulation conditions
PEU_W02	Knowledge of programming in real conditions
PEU_W03	Knowledge of selecting and using appropriate measurement systems
relating to skills:	
PEU_U01	Ability to program in LabView™
PEU_U02	Ability to use Diadem™ software
PEU_U03	Ability to connect the appliance in practice
PEU_U04	Ability to model and verify a mathematical model
relating to social competences:	
PEU_K01	Ability to work together in a small group (of two or three people)

PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec1	Organizing issues. Introduction to measurement automation and data analysis.	1
Lec2	LabView™ environment, data types, clustered arrays etc. Debugging and error handling capabilities.	2
Lec3	Implementation of loops and structures to facilitate programming.	2
Lec4	Preliminary analysis of the system for measurement. Selection of appropriate equipment. Programming of acquisition systems. File operations.	2
Lec5	'Live' data processing and presentation. Advanced data processing (filters, transforms) "live" and postprocessing.	2
Lec6	Global and local variables.	2
Lec7	Synchronisation and communication.	2
Lec8	Passing classes.	2
Suma godzin		15

Laboratory		Number of hours
La1	Course issues (input, output, assessment). Introduction to the course. Overview of tools used (LabView, Diadem, National Instruments hardware). (Computer Classes)	2
La2	Introduction to the LabView™ environment, basics of programming in graphical languages. (Computer Classes)	2
La3	Preparation of data-acquisition programme using simulation of measuring devices. Preparation of UI screen, basic data processing. (Computer classes)	2
La4		2
La5		2
La6	Advanced data processing, signal filtering, spectrum analysis. (Computer classes)	2
La7		2
La8	Development of measurement software for the thermodynamics test stand. Postprocessing of measurement data. (Laboratory classes)	2
La9		2
La10	Development of measurement software for the thermodynamics and heat transfer test stand. Processing of measurement data. Analysis incorporating and verifying the mathematical model. (Laboratory classes)	2
La11		2
La12		2
La13		2
La14		2
La15	Organisational and knowledge enhancement laboratory classes.	2
Suma godzin		30

TEACHING TOOLS USED	
N1	Multimedia presentations
N2	Computers with installed LabView™ software
N3	Laboratory workstations including National Instruments™ components

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F– forming (during semester), C– concluding (at semester end)	Educational effect number	Way of evaluating educational effect achievement
F1	PEU_U01	Report 1 (Computer Classes)
F2	PEU_U02, PEU_U04, PEU_K01	Report 2 (Laboratory Classes)
F3	PEU_U03	Activity during Laboratory Classes
C1 (Laboratory)	PEU_U01 – PEU_U03	2/5 F1 + 2/5 F2 + 1/5 F3
C2 (Lecture)	PEU_W01 – PEU_W03	Colloquium

PRIMARY AND SECONDARY LITERATURE

Primary literature	
1	LabView Application Development and Design Guidelines
2	Hands-On Introduction to LabVIEW for Scientists and Engineers, Dr John Essick
3	Control Systems Engineering Paperback, Norman S. Nise
4	Środowisko LabVIEW w eksperymencie wspomaganym komputerowo, Wiesław Tłaczała
Secondary literature	
1	LabVIEW - The Ultimate CLAD Preparation Book, Pierre FIÉVET
2	Software Engineering Approach to LabVIEW, Jon Conway
3	LabVIEW w praktyce, Marcin Chruściel

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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