DOCTORAL SCHOOL OF WROCŁAW UNIVERSITY OF SCIENCE AND TECHNOLOGY

SUPERVISOR/TEAM/ DECLARING/CONDUCTING COURSE:
dr hab. inż. Ireneusz Jabłoński, prof. uczelni
DEPARTMENT:
Katedra Metrologii Elektronicznej i Fotonicznej, K31W04D02
SCIENTIFIC DISCIPLINE: Automatic control, Electronics and Electrical engineering

COURSE CARD

Course name in Polish: Warsztat badacza w dyscyplinie AEE

Course name in English: Research skills in AEE discipline

Course language Polish / ~~English~~

The course is intended for all PhD students: YES

~~1) basic course~~
~~2) specialist course~~
~~3) seminar~~
~~4) humanistic course~~
~~5) language~~
6) research skills

Subject code: AEQ100250W, AEQ100251L

* delete as applicable

	Lecture	Foreign language course	Seminar	Mixed forms
Number of hours of organized classes in university (ZZU)	15			15
Grading	Presentation			Report

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic computer skills
2. Communication in English language
3. Knowledge of a given discipline valid for the second level of studies.
4. Pre-defined research topic of PhD.
5. Mathematics valid for the second level of studies

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COURSE OBJECTIVES

C1 To gain basic knowledge on academic career.
C2 To gain skills related to the searching for, the evaluation and organizing information from scientific databases.
C3 To gain skills related to the methodology of research work.
C4 To gain skills required to prepare a presentation of a scientific work.
C5 To gain skills required to write a scientific publication.
C6 To gain skills required to prepare applications for research funding and scholarships from various sources of funding.
C7 To gain skills of scientific cooperation in research teams, including international cooperation.
C8 To gain basic knowledge on the knowledge transfer and commercialization of research results.
C9 To gain a fundamental knowledge in a range of:
C.9.1 Methods of planning and realization of the experiments
C9.2 Computer tools dedicated for planning and realization of the experiments
C9.3 Formulation and implementation of the physical-mathematical models
C9.4 Formulation and implementation of the empirical models
C9.5 Computer implementation of the model, its simulation and validation in reference to the requirements formulated by the project scope, the research objective and the data science rules

Form of classes – lecture (Lec)		Number of hours
Lec1	Overview of the scope of the lecture and the rules of evaluation. Education of Ph.D. students - legal aspects.	1
Lec 2	PhD thesis, research career, contribution to science and economy / society.	2
Lec 3	The research topic selection and definition, realization of the research.	2
Lec 4	Searching for the knowledge required to meet the objectives of the Ph.D. project.	2
Lec5	Financial resources dedicated for realization of the research and the development tasks.	2
Lec 6	Research team, scientific collaboration.	2
Lec 7	Popularization of research results and IP rights protection. Preparation of scientific publications, including a Ph.D. dissertation.	2
Lec 8	Final presentations.	2
	Total hours	15

Form of classes – mixed forms (Mix)		Number of hours
Mix1	The acts of observation and measurement. Planning and conducting the experiment.	1
Mix2	Measurement data, information, knowledge.	1
Mix3	Computer tools dedicated to the planning and realization of the experiment.	1
Mix4	Description of systems and processes, algorithmization of scientific and technical problems. The direct and the inverse problem.	2
Mix5	Formulation and implementation of empirical and physical-mathematical models. Classification and regression.	2
Mix6	System identification.	2
Mix7	Model validation.	2
Mix8	Simulation studies. Digitalization and automation of systems and processes.	2
Mix9	Summary on planning experiments using computer tools and methods of experimental data exploration.	2
	Total hours	15

TEACHING TOOLS USED
N1. Interactive lecture, using multimedia presentations and computer with installed the Matlab /Simulink software N2. Solving problems N3. Discussion with course participants N4. Self-studies and revision of the lecture content

ACHIEVED SUBJECT LEARNING OUTCOMES		
Type of learning outcome	Code of learning outcome	Assessment of learning outcome
Knowledge	P8S_WG	Report
Knowledge	P8S_WK	Report, Presentation
Skills	P8S_UW	Report
Skills	P8S_UK	Report, Presentation
Skills	P8S_UO	Report
Social competence	P8S_KO	Report, Presentation
Social competence	P8S_KR	Report

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Z. Hajduk, „*Metodologia nauk przyrodniczych*" Katolicki Uniwersytet Lubelski, Lublin 2002
[2] R. Snieder, K. Larner, "*A Guide for Graduate Students and Their Mentors*", Cambridge University Press 2009
[3] R. E. Berger, "*A Scientific Approach to Writing for Engineers and Scientists*", Wiley-IEEE Press 2014
[4] N. Patel, "*Technical Presentations*", IEEE Books
[5] J. Gajda, M. Szyper, „*Modelowanie i badania symulacyjne systemów pomiarowych*", Firma Jartek s.c., Kraków 1998.
[6] S. Osowski, „*Modelowanie układów dynamicznych z zastosowaniem języka Simulink*", Oficyna Wydawnicza Politechniki Warszawskiej. Warszawa 1997.

SECONDARY LITERATURE:

[1] M. Heller, „*Jak być uczonym*", Znak, 2013
[2] F.E. Cellier. "*Continous System Modeling*". Springer-Verlag, New York 1991.

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

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