

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Virtual measuring devices		Code 1010321271010325953
Field of study Electrical Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 4 / 7
Elective path/specialty Measurement Systems in Industry and	Subject offered in: polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 1 Classes: - Laboratory: - Project/seminars: 2		No. of credits 5
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 5 100% 5 100%
Responsible for subject / lecturer: dr inż. Zbigniew Krawiecki email: zbigniew.krawiecki@put.poznan.pl tel. 616652546 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Basic knowledge in the scope of electrotechnics, electronics, computer science, and metrology
2	Skills	Ability of the efficient self-education in the area of the chosen field and speciality of study
3	Social competencies	Awareness of the competencies broadening and ability to show the readiness to cooperate as a team
Assumptions and objectives of the course: - Knowledge of the modern techniques of acquisition, processing and presentation of measuring data. - Selected examples of the realization of virtual measuring devices.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Ability to characterize the importance and application possibilities of the modern measuring systems - [K_W05 ++, K_W18 +]		
2. Ability to explain the principles and techniques of measuring signal acquisition for industrial applications - [K_W07 +]		
Skills:		
1. Ability to work independently and as a team in the design and construction companies, research laboratories, industrial centres, and medical facilities - [K_U05 +]		
2. Ability to design the measuring systems creatively, using possibilities offered by new technologies - [K_U22 +]		
Social competencies:		
1. Ability to think and act enterprisingly in the area of the measuring systems to be used in industry - [K_K01 +, K_K04 +]		
Assessment methods of study outcomes		

<p>Lectures:</p> <ul style="list-style-type: none"> - evaluation of the knowledge with tests related to the content of lectures (test, computational and problem questions), awarding marks in laboratory exercises) - continuous estimation in all classes (awarding attendance in lectures, activity and quality of perception). <p>Projects:</p> <ul style="list-style-type: none"> - continuous estimating with the tests, - awarding the skill increase, - evaluation of the knowledge and skills concerning the realization of an individual project, evaluation of the made project. 		
Course description		
<ul style="list-style-type: none"> - General characteristics of the selected environments to program and control the measuring equipment. - Metrological properties of the DAQ cards. - Functional structure of a virtual measuring device. - Realization of a device with the multi-functional DAQ card. - Principles of preparation of an user interface and program code by the use of LabVIEW environment. - The program realization of some selected functions of measuring devices. 		
Basic bibliography:		
<ol style="list-style-type: none"> 1. D. Świsulski, Komputerowa technika pomiarowa, oprogramowanie wirtualnych przyrządów pomiarowych w LabVIEW, Agenda Wydawnicza PAK, Warszawa 2005. 2. M. Chruściel, LabVIEW w praktyce, Wydawnictwo BTC, Warszawa 2008. 		
Additional bibliography:		
<ol style="list-style-type: none"> 1. R. Rak, Wirtualny przyrząd pomiarowy. Realne narzędzie współczesnej metrologii, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2003. 		
Result of average student's workload		
Activity	Time (working hours)	
1. Participation in lectures	15	
2. Participation in projects classes	30	
3. Participation in consulting with the lecturer	25	
4. Realization of projects	40	
5. Preparation to the credit	23	
Student's workload		
Source of workload	hours	ECTS
Total workload	133	5
Contact hours	70	3
Practical activities	70	3