

ITEM CARD (SYLLABUS)

Item description

Code course		course name	Systemy akwizycji danych	
RA/O/I/ST/C.6a			Data acquisition systems	
language		Angielski		
Academic year		2026/2027		
Direction of study		Robotics and automatization of processes		
Specialization		-		
Level of education (study)		studia pierwszego stopnia		
Profile of education (study)		Ogólnoakademicki		
Form of study		studia stacjonarne		
Semester / semester		5		
Belonging to a course groups		Grupa zajęć kierunkowych		
Course status		Do wyboru		
Form of classes, hours, points ECTS		form of classes	number of hours	number of points ECTS
		Lecture	15 [h]	4 ECTS
		Exercise	0 [h]	
		Lab	30 [h]	
Relationship subject	z profilem studiów	związany z prowadzoną działalnością naukową w dyscyplinie inżynieria mechaniczna do której przyporządkowany jest kierunek studiów		4 ECTS
	z uprawnieniami	służy zdobywaniu przez studenta kompetencji inżynierskich		4 ECTS
	z dyscypliną	Inżynieria mechaniczna		4 ECTS
Form of teaching		traditional - classes organized at the University / classes carried out with the use of distance learning methods and techniques		
Prerequisites		knowledge of mathematics, mechanics, mechatronics		
Conducting unit		URad, Katedra Mechaniki Stosowanej i Mechatroniki		
Coordinator		dr inż. Krzysztof Olejarczyk		
Faculty WWW address		http://wm.uniwersytetradom.pl		
mail, phone number of coordinator		k.olejarczyk@urad.edu.pl		

COURSE OUTCOMES, METHODS OF TEACHING AND VERIFICATION OF THE EFFECTS OF EDUCATION

Purpose of the course:	C1 - Acquainting with the methods of computer recording of measurements from various sensors C2 - Mastering the ability to build simple acquisition and signal generation systems
Course teaching content:	Lecture Content: Basic parameters of a DAQ system: resolution, range, measurement speed, Nyquist sampling theorem, aliasing, and ghosting. Main components of measurement equipment: sensors, analog-to-digital (A/D) converters, digital-to-analog (D/A) converters, signal conditioning, and data acquisition software. Overview of a sample compact DAQ system. Lab Content: Measurement of rotational speed with a tachometer and analysis of the recorded signal. Analysis of degradation of a sample object using the synchronous time averaging (TSA) method in run-to-failure (RTF) tests. Construction of a system for data acquisition using accelerometers and signal analysis. Construction of a system for data acquisition for modal analysis. Construction of a system for data acquisition using strain gauges and signal analysis.
Method of teaching:	informative lecture combined with a power-point presentation; programmed methods (using a computer to build software for measurement systems), practical methods (construction of measuring stands with the use of computers, measuring cards, sensors)
The rigor of passing, the criteria for assessing the learning outcomes achieved, the method of calculating the final grade:	Lecture pass requirement: passing the written test. Laboratory pass requirement: passing all lab exercises.

Education effects for the course in relation to the direction effects and form of classes				Verification methods of learning outcomes	
number of education effect	Description effects of education for the subject Student who has completed the course (W) know/(U) be able/(K) can:	Directional learning effect (EKK)	Form of realization of teaching	examination form	Form check
W1	He knows the rules of application of measuring devices and systems in various technical facilities. Has detailed knowledge of the characteristics of analog and digital signals and their parameters.	K_W10	lecture	Written tests	Assessment of the exam
U1	He has practical skills in setting up measuring equipment and carrying out measurements with the use of computer systems	K_U05	laboratory classes	Written tests	Assessment of written tests, assessment reports
U2	Can speak English sufficiently to read and understand catalog cards, application notes, team and teacher communication, documentation of acquisition systems development	K_UK16	laboratory classes	Observation, conversation, report	Verbal evaluation, report evaluation
K1	Is aware of responsibility for their own work and readiness to submit to the principles of teamwork and responsibility for jointly performed tasks.	K_U17	laboratory classes	Written tests	Assessment of the test

Recommended reading, literature supplement, teaching aids	
1.	Richard G. Lyons: Understanding Digital Signal Processing, Pearson; 3rd edition (November 1, 2010)
2.	Presentation of the lectures in pdf format.
3.	National Instruments information materials from the website https://www.ni.com/pl-pl.html
4.	Instructions for design tasks

Student workload - the balance of ECTS credits			
Participation in classes, activities	student load [h]		
	Other hours. Contact (IGK)	Classes without a teacher (ZBN)	classes
Udział w wykładach/ćwiczeniach/laboratorium	X	X	15[h]/30[h]/0[h]
Udział w konsultacjach	5 [h]	X	X
Przygotowanie do wykładów/ćwicz/lab Przygotowanie do zaliczenia/egzaminu	X	38 [h]	X
Sumaryczne obciążenie pracą studenta	5 [h]/ 0,2 ECTS	38 [h]/ 1,8 ECTS	45 [h]/ 2,0 ECTS
Punkty ECTS za przedmiot	4 ECTS		

Remarks
W przypadku studentów ze szczególnymi potrzebami, w tym: z niepełnosprawnością, przewlekłe chorych, określone powyżej (w karcie) metody i formy weryfikacji efektów uczenia się dostosowuje się odpowiednio do indywidualnych potrzeb tych studentów.
Szczegółowe zasady i formy wsparcia studentów ze szczególnymi potrzebami: w tym z niepełnosprawnością, przewlekłe chorych podczas zajęć, zaliczeń i egzaminów określono w: Regulaminie Studiów, Zasadach Studiowania, Procedurze dotyczącej zapewnienia dostępności procesu kształcenia studentom ze szczególnymi

potrzebami, w tym: z niepełnosprawnością, przewlekle chorych.