Kielce University of Technology

FACULTY OF MECHATRONICS AND MECHANICAL ENGINEERING

Annex 9
to the Rector's Ordinance No. 35/19
of 12 June 2019

COURSE SPECIFICATION

Course code	**M#1-S1-ME-208**
Course title in Polish	**Podstawy Elektroniki**
Course title in English	**Fundamentals of Electronics**
Valid from (academic year)	**2019/2020**

GENERAL INFORMATION

Programme of study	**MECHANICAL ENGINEERING**
Level of qualification	**first-cycle**
Type of education	**academic**
Mode of study	**full-time**
Specialism	**all**
Department responsible	**Department of Automation and Robotics**
Course leader	**Dr inż. Adam Szcześniak**
Approved by	

COURSE OVERVIEW

Course type	**basic**
Course status	**compulsory**
Language of instruction	English
Semester of delivery	**semester 2**
Pre-requisites	**mathematics, physics, electrical engineering**
Examination required (YES/NO)	NO
ECTS value	**2**

Mode of instruction	**lecture**	**class**	**laboratory**	**project**	**seminar**
No. of hours per semester	**15**	**-**	**15**	**-**	**-**

LEARNING OUTCOMES

Category of outcome	Out-come code	Course learning outcomes	Corresponding programme outcome code
Knowledge	W01	Have knowledge of basic elements used in the construction of electronic devices.	MiBM1_W06
	W02	Have knowledge of the principle of operation and characteristics of basic electronic components.	MiBM1_W06
	W03	Have knowledge of the principle of operation of basic electronic circuits.	MiBM1_W06
	W04	Have knowledge of the rules of working with instruments for measuring electrical quantities, including an oscilloscope.	MiBM1_W06
Skills	U01	Have a basic practical knowledge of using electronic devices for measuring electrical quantities, including an oscilloscope	MiBM1_U11
	U02	Have a basic practical knowledge of a simple electronic system and determine its parameters on the basis of measurements of electrical quantities at characteristic points.	MiBM1_U11
	U03	Know how to choose the values of the elements of a simple electronic system to obtain the given parameters	MiBM1_U11
	U04	Know how to develop documentation concerning the conducted research	MiBM1_U04
Competence	K01	Know the latest and upcoming trends in the field of electronics due to the extremely rapid development of this field of technology.	MiBM1_K01

COURSE CONTENT

Type of instruction*	Topics covered
lecture	Definition of electronics, atomic structure, doped and undoped semiconductors.
	N-p junction, operating states of n-p junction.
	Semiconductor diodes: switching, rectifying, capacitive, Zener, Shottky, tunnel. Characteristics, operation, application.
	Bipolar transistors, characteristics, basic work circuits. Darlington system.
	Unipolar junction and insulated gate transistors, characteristics, basic layout circuits.
	Uncontrolled rectifiers. Thyristors and triacs. Converters.
	Small-signal transistor amplifiers. Transistor bias circuits. Interstage couplings.
	Feedback in transistor amplifiers. Small signal selective amplifiers.
	Differential amplifier, power amplifiers.
	Operational amplifier. Basic linear circuits with an operational amplifier.

	Power systems: parametric stabilizers, feedback stabilizers, impulse stabilizers.
laboratory	Introductory classes. Instruction in the operation of laboratory equipment (multimeters, oscilloscopes, generators). Health and safety training.
	Testing of uncontrolled and controlled rectifier systems. Voltage multiplier.
	Testing voltage stabilizers with continuous and impulse action.
	Bipolar transistors in basic electronic circuits. Single-stage amplifier of variable signals, multi-stage amplifier, control of the electromagnetic relay with a transistor key.
	Push-pull amplifier with a differential amplifier in the driving stage.
	Application of operational amplifiers in linear electronic circuits. Summing amplifier, one-pole filter, active filter with multiple feedback.

*) Please delete rows in the table above that are not applicable.

ASSESSMENT METHODS

Outcome code	Methods of assessment *(Mark with an X where applicable)*					
	Oral examination	Written examination	Test	Project	Report	Other
W01 – W04			X			
U01 – U03						X
U04					X	
K01						X

ASSESSMENT TYPE AND CRITERIA

Mode of instruction*	Assessment type	Assessment criteria
lecture	non-examination assessment	The pass mark is a minimum of 50% for the final in-class test.
laboratory	non-examination assessment	Regular class attendance. The pass mark is a minimum of 50% for the final in-class test and each post-lab report.

*) Please delete rows in the table above that are not applicable.

OVERALL STUDENT WORKLOAD

ECTS weighting								
	Activity type	**Student workload**					**Unit**
1.	Scheduled contact hours	L	C	Lab	P	S	h
		15		15			
2.	Other contact hours (office hours, examination)	2		2			h
3.	**Total number of contact hours**	**34**					h
4.	**Number of ECTS credits for contact hours**	**1,4**					ECTS
5.	**Number of independent study hours**	**16**					h
6.	**Number of ECTS credits for independent study hours**	**0,6**					ECTS
7.	**Number of practical hours**	**25**					h
8.	**Number of ECTS credits for practical hours**	**1,0**					ECTS
9.	**Total study time**	**50**					h
10.	**ECTS credits for the course** *1 ECTS credit = 25-30 hours of study time*	**2**					ECTS

READING LIST

1. Thomas L. Floyd - Electronic Devices.
2. Robert Boylestad, Louis Nashelsky - Electronic Devices and Circuit Theory
3. Thomas F. Schubert, Ernest M. Kim - Fundamentals of Electronics Book 1 – 4
4. Paul Horowitz - The Art of Electronics