MODULE DESCRIPTION

Module code	**ID1PE1**
Module name	**Podstawy elektroniki**
Module name in English	**The Fundamentals of Electronics**
Valid from academic year	**2012/2013**

MODULE PLACEMENT IN THE SYLLABUS

Subject	**Computer Science**
Level of education	**1st degree** *(1st degree / 2nd degree)*
Studies profile	**General** *(general / practical)*
Form and method of conducting classes	**Full-time** *(full-time / part-time)*
Specialisation	
Unit conducting the module	**The Department of Electronics and Intelligent Systems**
Module co-ordinator	**Dorota Wiraszka, PhD, Eng.**
Approved by:	

MODULE OVERVIEW

Type of subject/group of subjects	**Basic** *(basic / major / specialist subject / conjoint / other HES)*
Module status	**Compulsory** *(compulsory / non-compulsory)*
Language of conducting classes	**Polish**
Module placement in the syllabus - semester	**1st semester**
Subject realisation in the academic year	**Winter semester** *(winter / summer)*
Initial requirements	**No requirements** *(module codes / module names)*
Examination	**No** *(yes / no)*
Number of ECTS credit points	**4**

Method of conducting classes	Lecture	Classes	Laboratory	Project	Other
Per semester	**30**		**15**		

TEACHING RESULTS AND THE METHODS OF ASSESSING TEACHING RESULTS

Module target	The aim of the module is to familiarise students with basic electronic elements, the selected analogue electronic systems, testing methods of such elements, systems with the use of instruments measuring electrical values and a digital oscilloscope to observe electrical waveforms in characteristic points of an electronic system.

Effect symbol	Teaching results	Teaching methods *(l/c/l/p/other)*	Reference to subject effects	Reference to effects of a field of study
W_01	A student has systematised and comprehensive theoretical knowledge as regards physicochemical fundamentals of operation of semiconductors (indispensable in understanding basic phenomena occurring in electronic elements and systems).	l	K_W04 K_W05	T1A_W01 T1A_W02
W_02	A student is acquainted with the structure, principle of operation, parameters, and characteristics of basic electronic elements: diodes, bipolar and unipolar transistors.	l/l	K_W04 K_W05	T1A_W01 T1A_W02
W_03	A student knows the principle of operation, parameters, and characteristics of simple analogue electronic systems.	l/l	K_W04 K_W05	T1A_W01 T1A_W02
U_01	A student is able to efficiently use instruments measuring electrical values as well as a digital oscilloscope in order to examine an electronic element or system.	l	K_U11	T1A_U07
U_02	A student is able to connect an electronic system, test it, and prepare test results.	l	K_U03 K_U11	T1A_U03 T1A_U07
K_01	A student can co-operate and work in a team.	l	K_K03	T1A_K03

Teaching contents:

Teaching contents as regards lectures

Lecture number	Teaching contents	Reference to teaching results for a module
1	Atom structure, Bohr's postulates, and covalent bonds. Atomic structure of silicon and germanium. Energetic-band structure of a semiconductor.	W_01
2	The assumptions of the n-type and p-type conducting theory of semiconductors. Intrinsic and doping semiconductors.	W_01
3	P-n junction: the mechanism of forming a potential barrier, forward and reverse bias. A current-voltage characteristic of the p-n junction. P-n junction breakdown: reversible (Zener and avalanche) and irreversible.	W_01
4	Junction diodes: rectifying, universal, Zener, Schottky, electroluminescent, photodiodes, and varicap diodes – their structure, operation, parameters, and characteristics.	W_02
5	Half-wave and full-wave rectifiers – schemata, the principle of operation, time waveform, and parameters.	W_03
6	Voltage filtration in rectifier systems. Capacitor filters.	W_03
7	A stabiliser with a Zener diode – a graphical analysis.	W_03
8	A bipolar transistor – the structure, operation, parameters, and characteristics. The polarisation of n-p-n and p-n-p transistors. A hybrid alternative diagram of a bipolar transistor.	W_02
9	An amplifier on a bipolar transistor – small-signal analysis.	W_03

10	An amplifier on a bipolar transistor – constant-current analysis.	W_03
11	Junction Field-Effect Transistor (JFET) – its structure, the principle of operation, parameters, and characteristics. The conditions of polarisations.	W_02
12	Small-signal and constant-current analysis of an amplifier on JFET.	W_03
13	N-channel Metal-Oxide Semiconductor Field Effect Transistor (MOSFET) – depletion and enhancement mode – its structure, the principle of operation, parameters, and characteristics.	W_02
14	Operational amplifier: a block diagram, properties and parameters. Basic operation systems of an operational amplifier.	W_03
15	Obtaining a credit for the lectures (a written test)	W_01 W_02 W_03

Teaching contents as regards laboratory classes

Laboratory class number	Teaching contents	Reference to teaching results for a module
1	Introduction to laboratory classes. Familiarising students with the organisation of work in the laboratory, presenting laboratory instructions, determining the conditions as regards obtaining a credit.	U_01 U_02 K_01
2	The characteristics and parameters of semiconductor diodes.	W_02 U_01 U_02 K_01
3	Examining unstabilised power adapter.	W_03 U_01 U_02 K_01
4	Examining a bipolar transistor.	W_02 U_01 U_02 K_01
5	Examining a JFET.	W_02 U_01 U_02 K_01
6	An amplifier on a FET.	W_03 U_01 U_02 K_01
7	Obtaining a credit for laboratory classes.	W_02 W_03 U_01 U_02
8	Obtaining a credit for the subject.	W_02 W_03 U_01 U_02

The methods of assessing teaching results

Effect symbol	Methods of assessing teaching results *(assessment method, including skills – reference to a particular project, laboratory assignments, etc.)*

W_01	Obtaining a credit for the lectures (a written test)
W_02	Obtaining a credit for the lectures (a written test) Short tests before every laboratory class.
W_03	Obtaining a credit for the lectures (a written test) Short tests before every laboratory class.
U_01	Correct completion laboratory class assignments by a team – protocols from the conducted tests.
U_02	Correct completion laboratory assignments by a team and preparing a report.
K_01	Correct completion laboratory class assignments by a team – protocols from the conducted tests.

STUDENT'S INPUT

ECTS credit points		
	Type of student's activity	**Student's workload**
1	Participation in lectures	**30**
2	Participation in classes	
3	Participation in laboratories	**15**
4	Participation in tutorials (2-3 times per semester)	**5**
5	Participation in project classes	
6	Project tutorials	
7	Participation in an examination	
8		
9	**Number of hours requiring a lecturer's assistance**	**50** *(sum)*
10	**Number of ECTS credit points which are allocated for assisted work** *(1 ECTS credit point=25-30 hours)*	**2**
11	Unassisted study of lecture subjects	**10**
12	Unassisted preparation for classes	
13	Unassisted preparation for tests	**10**
14	Unassisted preparation for laboratories	**15**
15	Preparing reports	**15**
16	Preparing for a final laboratory test	
17	Preparing a project or documentation	
18	Preparing for an examination	
19	Preparing questionnaires	
20	**Number of hours of a student's unassisted work**	**50** *(sum)*
21	**Number of ECTS credit points which a student receives for unassisted work** *(1 ECTS credit point=25-30 hours)*	**2**
22	**Total number of hours of a student's work**	**100**
23	**ECTS credit points per module** *1 ECTS credit point=25-30 hours*	**4**
24	**Work input connected with practical classes** *Total number of hours connected with practical classes*	**55**
25	**Number of ECTS credit points which a student receives for practical classes** *(1 ECTS credit point=25-30 hours)*	**2.2**