MODULE DESCRIPTION

Module code	**ID1UAL1**
Module name	**Układy arytmetyczno-logiczne**
Module name in English	**Arithmetic and Logic Systems**
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	**Adam Głuszek, PhD, Eng.**
Approved by:	

MODULE OVERVIEW

Type of subject/group of subjects	**Major** *(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	**Yes** *(yes / no)*
Number of ECTS credit points	**6**

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

TEACHING RESULTS AND THE METHODS OF ASSESSING TEACHING RESULTS

Module target	The aim of the module is to familiarise students with fundamental issues concerning digital technology through presenting elementary description, analysis, design (synthesis), and testing methods of simple combinatory and sequential digital systems.

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 knows and understands basic notions as regards digital technology, including indispensable theoretical issues (Boolean algebra, numerical codes, the elements of binary arithmetic, finite state machines, etc.).	l/c	K_W05 K_W08	T1_W02 T1_W03 T1_W04
W_02	A student can describe the principle of operation and structure of basic digital elements (gates and flip-flops) as well as digital functional blocks.	l/c/	K_W05 K_W08	T1_W02 T1_W03 T1_W04
W_03	A student is familiar with synthesis methods of combinatory and sequential systems.	l/	K_W05 K_W08	T1_W02 T1_W03
U_01	A student can analyse the methods of functioning as well as structure of combinatory and sequential systems.	l/c/l	K_U10 K_U11 K_U14	T1_U08 T1_U09 T1_U13
U_02	A student can design and realise simple combinatory and sequential systems.	l/c/l	K_U10 K_U11 K_U14	T1_U08 T1_U09 T1_U14
U_03	A student has basic skills as regards utilising software to design and test digital systems.	l	K_U01 K_U10 K_U11 K_U14	T1_U08 T1_U09 T1_U15 T1_U16
K_01	A student can develop his/her knowledge and skills through independent searching and utilising source materials.	l	K_K01	T1_K01
K_02	A student can co-operate in a team as regards particular assignments according to the arranged schedule.	l	K_K03 K_K05	T1_K03 T1_K04 T1_K06

Teaching contents:

Teaching contents as regards lectures

Lecture number	Teaching contents	Reference to teaching results for a module
1	Basic notions as regards digital technology.	W_01
2	Boolean algebra – theoretical fundamentals of describing digital systems.	W_01
3	Basic numerical codes. The elements of binary arithmetic.	W_01
4	Basic digital elements – gates and flip-flops.	W_02
5	Digital functional blocks.	W_02
6	The synthesis of combinatory systems using small scale of integration. The minimisation of logical functions with the Karnaugh map method.	W_01 W_03
7	The synthesis of combinatory systems using the elements of medium scale of integration.	W_01 W_02 W_03
8	Iterative systems.	W_03

9	Theoretical fundamentals of operation concerning sequential systems (description methods, encoding internal states, minimising their number, and the structure of synchronic sequential systems).	W_01 W_03
10	The synthesis of synchronic sequential systems with the input/output array/table method.	W_02 W_03
11	The examples of designing synchronous sequential systems (meters, even parity check systems, serial adders and comparators, sequence detection, simple automation systems, etc.).	W_01 W_03
12	Introduction to the subject matter concerning programmable logic.	W_03 U_01 K_01
13	Microprogrammed systems.	W_03 U_01 U_02
14	The methods of realising modern digital systems – electronic and technological aspects. Introduction to methods of computer designing and testing as regards digital systems.	W_03 U_01 K_01
15	The applications of digital technology to realise information processing systems.	U_01 K_01

Teaching contents as regards classes

Class number	Teaching contents	Reference to teaching results for a module
1	Boolean algebra – theoretical fundamentals of describing digital systems.	W_01
2	Basic numerical codes. The elements of binary arithmetic.	W_01
3	Utilising basic digital elements – gates and flip-flops.	W_02 U_01
4	The synthesis of combinatory systems using the elements of a small scale of integration. The minimisation of logical functions with the Karnaugh map method.	W_03 U_01 U_02
5	The synthesis of combinatory systems using the elements of a medium scale of integration.	W_02 W_03 U_02
6	Designing iterative systems.	W_03 U_02
7	Description and synthesis methods of synchronous sequential systems.	W_03 U_01 U_02
8	The examples of designing synchronous sequential systems.	W_03 U_02

Teaching contents as regards laboratory classes

Laboratory class number	Teaching contents	Reference to teaching results for a module
1	Acquainting students with a sample computer system which supports designing and testing digital systems.	U_03
2	The simulations of basic digital elements of small scale of integration – gates and flip-flops.	W_02 U_03 K_02
3	The simulations of digital functional blocks.	W_02 U_01 U_03 K_02

4	The synthesis of combinatory systems using the elements of a small scale of integration – the simulations of the designed systems.	U_01 U_02 U_03 K_02
5	The synthesis of combinatory systems using the elements of a medium scale of integration – the simulations of the designed systems.	U_01 U_02 U_03 K_02
6	Iterative systems – designing and simulations.	U_01 U_02 U_03 K_02
7	The synthesis of combinatory systems using the elements of a small scale of integration – the simulations of the designed systems.	U_01 U_02 U_03 K_02
8	The synthesis of combinatory systems using the elements of a medium scale of integration – the simulations of the designed systems.	U_01 U_02 U_03 K_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	A written examination, tests during the classes, and tests during laboratory classes.
W_02	A written examination, tests during the classes, and tests during laboratory classes.
W_03	A written examination, tests during the classes, and tests during laboratory classes.
U_01	A written examination, tests during the classes, tests during laboratory classes, and obtaining a credit for laboratory classes.
U_02	A written examination, tests during the classes, tests during laboratory classes, and obtaining a credit for laboratory classes.
U_03	A written examination, tests during the classes, tests during laboratory classes, and obtaining a credit for laboratory classes.
K_01	Preparing reports from the conducted laboratory classes.
K_02	Obtaining a credit for laboratory classes, preparing reports on the conducted laboratory classes.

STUDENT'S INPUT

ECTS credit points		
	Type of student's activity	**Student's workload**
1	Participation in lectures	**30**
2	Participation in classes	**15**
3	Participation in laboratories	**15**
4	Participation in tutorials (2-3 times per semester)	**3**
5	Participation in project classes	**–**
6	Project tutorials	**–**
7	Participation in an examination	**2**
8		

9	**Number of hours requiring a lecturer's assistance**	**65** *(sum)*
10	**Number of ECTS credit points which are allocated for assisted work** *(1 ECTS credit point=25-30 hours)*	**2.17**
11	Unassisted study of lecture subjects	**30**
12	Unassisted preparation for classes	**15**
13	Unassisted preparation for tests	**15**
14	Unassisted preparation for laboratories	**10**
15	Preparing reports	**15**
16	Preparing for a final laboratory test	**15**
17	Preparing a project or documentation	**–**
18	Preparing for an examination	**15**
19	Preparing questionnaires	
20	**Number of hours of a student's unassisted work**	**115** *(sum)*
21	**Number of ECTS credit points which a student receives for unassisted work** *(1 ECTS credit point=25-30 hours)*	**3.83**
22	**Total number of hours of a student's work**	**180**
23	**ECTS credit points per module** *1 ECTS credit point=25-30 hours*	**6**
24	**Work input connected with practical classes** *Total number of hours connected with practical classes*	**45**
25	**Number of ECTS credit points which a student receives for practical classes** *(1 ECTS credit point=25-30 hours)*	**1.5**