(*faculty stamp*) **COURSE DESCRIPTION**

1. Course title: Theory of Logic Circuits	**2. Course code** TLC
3. Validity of course description: 2017/2018	
4. Level of studies: BA, BSc programme ~~/ MA,MSc programme lub 1st cycle / 2nd cycle of higher education~~	
5. Mode of studies: intramural studies ~~/ extramural studies~~	
6. Field of study: Interdisciplinary Studies: Automatic Control and Robotics, Electronics and Telecommunications, Computer Science	(FACULTY SYMBOL) RAU
7. Profile of studies: general	
8. Programme: all	
9. Semester: 1,2	
10. Faculty teaching the course: Faculty of Automatic Control, Electronics and Computer Science, Institute of Informatics	
11. Course instructor: Prof. Krzysztof Cyran, PhD DSc	
12. Course classification: common courses	
13. Course status: compulsory ~~/elective~~	
14. Language of instruction: English	
15. Pre-requisite qualifications: none	
16. Course objectives: Theory of Logic Circuits presents to the audience a complete course covering wide aspects of modern digital system design (combinational, sequential, microprogrammable, programmable), it's analysis and review. Students are presented step-by-step course on general two-value logic, numeric systems, algebra and arithmetic of digital devices, various synthesis and analysis methods related to the digital circuits along with review of digital devices and their utility.	
17. Description of learning outcomes:	

Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1.	Knows various number systems and its arithmetic.	Written test	Lecture and classes	K1A_W4 KIA_W10
2.	Knows algorithms for basic arithmetic operations.	Written test	Lecture and classes	KIA_W10 KIA_W3
3.	Knows how to convert number between various numeric systems.	Written test	Lecture and classes	KIA_W10 KIA_W3
4.	Knows Boole algebra, digital circuits structures, knows methodology on digital circuit synthesis and analysis.	Written test	Lecture, classes and laboratory	KIA_W1 K1A_W4 KIA_W10
5.	Is capable to implement combinational and sequential digital circuits in various models and solutions.	Classes: Written test Labs: Evaluation of the circuit implemented, report.	Lecture, classes and laboratory	KIA_W10
6.	Is capable to analyze theoretically and practically various circuits according to its correctness. Is capable to propose corrections and improvements for faulty and non-optimal circuits.	Classes: Written test Labs: Evaluation of the circuit implemented, report.	Lecture, classes and laboratory	KIA_U7 KIA_U12
7.	Performs seamlessly teamwork.	Classes: Written test Labs: Evaluation of the circuit implemented, report.	Lecture, classes and laboratory	KIA_K3

18. Teaching modes and hours

Lecture / BA /MA Seminar / Class / Project / Laboratory

Sem 1 - 60 h., Sem 2 - 30 h

19. Syllabus description:

Semester 1 :

Lecture:

- Numeric systems.
- Converting numbers between different numeric systems.
- Binary forms of numbers and it's representation in digital systems.
- Fixed point arithmetic.
- Information and communication – digital vs analogue world.
- Digital devices, circuits and systems.
- Boolean algebra, gates and binary operators.
- System functionally complete.
- Digital systems classification.
- Combinational circuits design.
- Synthesis and analysis of combinational circuits.
- Iterative circuits.
- Sequential digital systems.
- Asynchronous sequential systems design.
- Synchronous sequential systems design.
- Dynamics of sequential systems.
- Microprogrammable circuits design.
- Programmable logic devices.

Classes:

Classroom exercises cover practice of the subjects that are closely related to the lecture, particularly insisting on real problem analysis and solution.

Semester 2:

Laboratory:

Laboratory course covers systems design on digital systems and computer systems. Students are creating and analyzing real digital systems, built of various operators and medium scale integration devices(including sequential-related components and microprogrammable related memory components).

20. Examination: none

21. Primary sources:

U. Stańczyk, K. Cyran, B. Pochopień, Theory of Logic Circuits, vol. I – Fundamental issues, Publishers of the Silesian University of Technology, Gliwice 2007.
U. Stańczyk, K. Cyran, B. Pochopień, Theory of Logic Circuits, vol. II – Circuit design and analysis, Publishers of the Silesian University of Technology, Gliwice 2007.

22. Secondary sources:

M. Adamski, A. Barkalov, Architectural and sequential synthesis of digital devices. University of Zielona Góra, 2006.

23. Total workload required to achieve learning outcomes

Lp.	Teaching mode :	Contact hours / Student workload hours
1	Lecture	30/45
2	Classes	30/45
3	Laboratory	30/30
4	Project	/
5	BA/ MA Seminar	/
6	Other	/
	Total number of hours	90/120

24. Total hours:210

25. Number of ECTS credits: 7

26. Number of ECTS credits allocated for contact hours: 3

27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects):2

26. Comments:

Approved:

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(date, Instructor's signature)

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(*date , the Director of the Faculty Unit signature)*