(faculty stamp) **COURSE DESCRIPTION**

1. Course title: PARALLEL COMPUTING	**2. Course code:** PC
3. Validity of course description: 2018/2019	
4. Level of studies: 1st cycle of higher education	
5. Mode of studies: intramural studies	
6. Field of study: Informatics	
7. Profile of studies: general academic	
8. Programme: -	
9. Semester: IV	
10. Faculty teaching the course: Institute of Informatics	
11. Course instructor: dr inż. Jacek Widuch	
12. Course classification: common courses	
13. Course status: obligatory	
14. Language of instruction: English	
15. Pre-requisite qualifications: Prerequisites: Basics of computer programming, Algorithms and data structures I	
16. Course objectives: The aim is to introduce students into the basic issues of parallel computing	

17. Description of learning outcomes:

Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1	Student possesses knowledge of parallel algorithms	Written test	Lectures	K1A_W11
2	Student possesses knowledge of metrics for parallel algorithms	Written test	Lectures	K1A_W11
3	Student possesses knowledge of parallel computing models	Written test	Lectures	K1A_W11
4	Student possesses knowledge of models with distributed memory	Written test	Lectures	K1A_W11
5	Student is able to design parallel algorithms	Written test	Lectures	K1A_U08

18. **Teaching modes and hours**
Lecture: 30 h., **Class: -**, **Laboratory: -**.

19. Syllabus description:

As part of the lecture the following issues are presented:

I. Basic concepts
   1. Concurrency vs parallelism
   2. Definition of concurrent processes
   3. Physical and virtual processors

II. Metrics for parallel algorithms
   1. Worst-case computational complexity
   2. Speedup

3. Cost of parallel computation
4. Efficiency, or processor utilization

III. Elementary parallel algorithms
1. Finding the minimum in O(log n) and O(1) time
2. Sorting in O(log n) time

IV. Models of parallel computation
1. PRAM model
2. Versions of PRAM: EREW, CREW, CRCW
3. MIMD computers
4. SIMD computers

V. Distributed memory models
1. Interconnection networks: mesh, cube, butterfly
2. Comparison criteria of interconnection networks

VI. Designing parallel algorithms
1. Problem decomposition (data decomposition, functional decomposition, others)
2. Analysis of computation granularity
3. Distribution of input, intermediate and output data
4. Assigning tasks to processors

20. Examination: no

21. Primary sources:

1. Czech Z.: „Wprowadzenie do obliczeń równoległych". Wydawnictwo Naukowe PWN, Warszawa 2013.
2. Czech Z.: „Introduction to parallel computing". Cambridge University Press, Cambridge, UK, 2016.

22. Secondary sources:

23. Total workload required to achieve learning outcomes

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

24. Total hours: 60

25. Number of ECTS credits: 2

26. Number of ECTS credits allocated for contact hours: 1

27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 0

26. Comments: -

Approved:

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(date, Instructor’s signature)

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(date, the Director of the Faculty Unit signature)