Title	Code
Algorithms and Complexity	**1010331411010330614**

Field	Year / Semester
Computer Science	**1 / 1**

Specialty	Course
-	**core**

Hours	Number of credits
Lectures: **2** Classes: **-** Laboratory: **1** Projects / seminars: **1**	**4**

	Language
	polish

Lecturer:

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Status of the course in the study program:

- Obligatory course at the Faculty of Electrical Engineering, field of study Computer Science

Assumptions and objectives of the course:

-Presentation of fundamental algorithms and their computational complexities.

Contents of the course (course description):

- Problem, algorithm, time and space computational complexies; decision problem, optimisation problem. Design of efficiet algorithms: data structures (lists, stacks, queues, priority queues), set representations (list, bit vector, array), graph representations (adjacency matrix, adjacency list), binary tree, preorder, postorder and inorder, recursion, 'divide and conquer', balancing, dynamic programming, greedy algorithm, heuristics. Sorting: ordering in a set of elements and sorting, bubble sort, lexicographic sort, sorting by comparisons, heapsort, quicksort. Searching, selection. Data structures for set manipulation problems: fundamental operations on sets, sictionaries, hashing, binary search, binary search tree. Algorithms on graphs: minimum-cost spanning trees, biconnectivity, strong connectivity. matrix multiplication and related operations. Integer arithmetic. Polynomial hierarchy: models of computation, P and NP classes, NP-complete problems. Nondecidable problems.

Introductory courses and the required pre-knowledge:

-Mathematics

Courses form and teaching methods:

- Lecture, laboratory, project.

Form and terms of complete the course - requirements and assessment methods:

-Written examination based on lecture, laboratory participation, project presentation.

Basic Bibliography:

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Additional Bibliography:

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