

COURSE TITLE: INTRODUCTION TO ALGORITHMS AND DATA STRUCTURES**Institute/Division: Faculty of Electrical and Computer Engineering, E-1****Number of contact hours: 45****Course duration: 1 semester****ECTS: 6****Course description:**

The course comprises lectures, laboratories and a project. It covers the design, analysis and implementation of basic algorithms and data structures. The topics include: Fundamentals of algorithms, data structures and analysis of algorithms. Sorting algorithms (selection sort, insertion sort, bubble sort, merge sort, quicksort, counting sort, radix sort) – implementation, analysis and comparison. Selected string matching algorithms. Elementary data structures (linked lists, stacks, queues, trees) – operations, implementation, analysis and evaluation. Binary Search Tree – properties, operations, analysis and implementation. Heap – definition, properties, operations, analysis, implementation and applications. Graphs – fundamental terms, basic representations, traversal algorithms (BFS, DFS), selected shortest path algorithms. Hash tables – main concepts, hash functions, collision problem and its resolving techniques. Basic algorithms design techniques – divide-and-conquer, greedy algorithms, dynamic programming. On completing the course students should be able to understand, implement, compare and use fundamental algorithms and data structures.

Literature:	T.H. Cormen, C.E. Leiserson, R.L. Rivest, C. Stein: Introduction to Algorithms. MIT Press, 2009
Course type:	Lectures (20h), computer laboratories (20h) and project (5h)
Prerequisites:	C++ programming skills
Assessment method:	Project, laboratory assignments and written tests
Target group:	Students in Computer Science, Control and Electrical Eng.
Contact Person:	dr inż. Joanna Strug, e-mail: joanna.strug@pk.edu.pl