Course Unit Descriptor

Study Programme: Computing and Control Engineering

Course Unit Title: Algorithms and Data structures

Course Unit Code: 12 - SE0008

Name of Lecturer(s): Branko Milosavljević

Type and Level of Studies: Bachelor level

Course Status (compulsory/elective): compulsory

Semester (winter/summer): summer

Language of instruction:english

Mode of course unit delivery (face-to-face/distance learning): face-to-face

Number of ECTS Allocated:

Prerequisites: none

Course Aims:

Introduce students to concepts of in-memory data structures and their use in program development

Learning Outcomes:

Upon successful course completion, student is familiar with abstract data types and capable of handling linear data structures - arrays, sets, maps, lists, stacks, queues; Student is also familiar with basic concepts of program efficiency analysis; Student is capable of using search and sort methods on data structures; Student understands the concept of recursiond and its use in program development; Student understands and use hash tables as well as tree structures.

Syllabus:

Abstract data types: concept of abstract data type; new type definition. Arrays: concept of an array, operations on arrays, efficency analysis for operations on arrays, matrix, operations on matrices. Sets and maps: concept od data set, set impelementation, concept of map, map implementation, multidimensional arrays and operations on them. Algorvišedimenzionalni nizovi i operacije nad njima. Algorithm analysis: O notation, Pzthon list analysis. Searching and sorting: lienar and binary search, sorting alhorithms, operations on sorted arrays.List, stack and queue: linked lists, use of linked lists, operations on linked lists; double linked lists; stack - concept and operations; queue - concept and operation. Stack and Queue implementation; Multiplelinked lists. Recursion - concept and features. recursion implementation and usage. Hash tables: hash functions, hash tables - concept and operations, hash usage. Trees: binary trees - concept and operation; N-Trees; Search trees.

Required Reading: Relevant literature in English TBD

Weekly Contact Hours:2	**Lectures:2**	**Practical work:0**

Teaching Methods:

Lectures, Computer exercises; Consultations. The exam is oral. Assessment and final marks are based on the success of the laboratory exercises and an oral exam.

Knowledge Assessment (maximum of 100 points):100

Pre-exam obligations	points	**Final exam**	points
Group Assignment		Examination Assignment	
Exercises			
Test			
Test			

The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.