



**THE CYPRUS INTERNATIONAL INSTITUTE OF MANAGEMENT**  
**COURSE UNIT DESCRIPTION**

Course Unit Title	<b>Algorithms and Data Structures</b>	
Course Unit Code	AT700	
Type of Unit	Core	
Level of Course Unit	Second cycle	
Year of Study	First/second year	
Semester	On demand	
Number of ECTS Credits	6 ECTS	
Course Unit Objectives	The objective of this course is to teach students to effectively use basic data structures, such as stacks and queues, various types of lists, binary and multi-way trees, and graphs, in programs. A secondary goal is to introduce the student to the analysis of algorithms using notation such as Theta, Big- and Small-Oh, and Big- and Small-Omega.	
Learning Outcomes	On completion of this course students are expected to:	
	CILO 1	Describe types of notation for the determination of algorithm time efficiency
	CILO 2	Calculate the running time of algorithms
	CILO 3	Apply linear and non-linear data structures towards the solution of computational problems
	CILO 4	Discuss the differences between the class P and the class NP of problems.
	CILO 5	Apply various types of algorithms for the solution of computational problems
Name of Lecturer(s)	Dr. George Christou	
Mode of delivery	Face to Face	
Prerequisites or corequisites	BI420	
Course Content	Algorithm Analysis, Recursion	CILO 1, 2
	Arrays, Linked Lists, Stacks, Queues, Trees, Priority Queues, Maps, Hash Tables, Search Trees, Graphs	CILO 3
	Efficiency of the class P, NP, and distinction of NP-Complete and NP-Hard problems.	CILO 4
	Searching and Sorting, Text Processing and Pattern Matching	CILO 5
		CILO
Recommended or required reading	<p><b>Textbooks:</b> Data Structures and Algorithms in Python, Goodrich, Tamasia and Goldwasser; Data Structures and Algorithms with Python, Lee and Hubbard</p> <p><b>Optional textbook:</b></p> <p><b>Articles &amp; Journals:</b> 1. O. Amble, D. E. Knuth, Ordered hash tables, The Computer Journal, Volume 17, Issue 2, 1974, Pages 135–142</p> <p>2. Aragon, Cecilia &amp; Seidel, Raimund. (1989). Randomized Search Trees. Conference: 30th Annual Symposium on Foundations of Computer Science, Research Triangle Park, North Carolina, USA, 30 October - 1 November 1989 540-545.</p> <p><b>Online sources:</b></p>	
Planned learning activities and teaching methods	Lectures; in-class discussion and debates; in-class exercises; problem sets; team work; video case studies, team presentations, interactive online learning via Moodle (quizzes, assignments, forums)	
Assessment methods and criteria	Programming exercises, examinations, in-class exercises	
Language of Instruction	English	
Work Placement(s)	Not applicable	