

THE CYPRUS INTERNATIONAL INSTITUTE OF MANAGEMENT

COURSE UNIT DESCRIPTION

Course Unit Title	Python Programming	
Course Unit Code	BI420	
Type of Unit	Core	
Level of Course Unit	Second cycle	
Year of Study	First/second year	
Number of ECTS Credits	6.0 ECTS	
Class Contact Hours	28	
Minimum Learning Effort (In Hours)	150	
Course Unit Objectives	<p>This course will introduce the students to the world of programming and teach them the fundamentals underpinning the theory of algorithms, programming and data structures. It includes a fast-paced introduction to the fundamentals of a scripting language (e.g., Python) which is widely used in the area of data science. During the class a lot of emphasis will be given on programming from scratch of well-known machine learning algorithms, for both clustering and classification, as used in data-science.</p> <p>By completion of this course students will be in a position to use the programming language they learned to develop programs in order to perform specific tasks. For example, mine, clean, analyze and visualize datasets and thus solve business-oriented problems efficiently.</p>	
Learning Outcomes	The students completing the course should be able to	
	CILO 1	Understand how to characterize data in terms of quality in the context of data-driven decision making.
	CILO 2	Learn to program efficiently in a scripting language (e.g., Python) widely used in data science for both mining and visualization purposes.
	CILO 3	Understand the basic concepts used in programming and algorithms.
	CILO 4	Demonstrate an understanding of how to select appropriate data structures and algorithmic procedures for addressing a problem of interest.
	CILO 5	Understand how to scrape, cleanse and de-dupe data making them suitable for analysis using techniques such as regular expressions.
	CILO 6	Program from scratch fundamental data-science classification algorithms such as Naive Bayes, Simple Linear Regression, Multiple Regression, Logistic Regression etc.
	CILO 7	Program of clustering algorithms such as k-Nearest Neighbours.
Name of Lecturer(s)	Dr Christodoulos Efstathiades	

Mode of delivery	Face to Face	
Prerequisites or co-requisites	None	
Course Content	1. Introduction to data types and data science; data quality and analysis problems.	CILO 1.4
	2. Introduction to algorithms and computational complexity	CILO 1,3
	3. Scripting language fundamentals: modules, arithmetic, functions, strings, exceptions	CILO 2,3
	4. Data structures: lists, tuples, dictionaries, sets, hashtables	CILO 2,3
	5. Control Flow Statements: for, while, if-else	CILO 2,3
	6. Data Visualization using Python	CILO 2,3
	7. The gradient descent algorithm for data science	CILO 6,7
	8. Machine learning. Problems of over-fitting, under-fitting, correctness, bias-variance trade-off	CILO 1,5
	9. Python Task 1: k-Nearest neighbors	CILO 7
	10. Python Task 2: Simple and Multiple Regression	CILO 6
Recommended or required reading	<p>Required Reading:</p> <ol style="list-style-type: none"> Joel Grus. <i>Data Science from Scratch</i>. O'Reilly, 1st edition, 2015. <p>Recommended Reading:</p> <ol style="list-style-type: none"> Wes McKinney. <i>Python for Data Analysis</i>. O'Reilly, 1st edition, 2012. Luciano Ramalho. <i>Fluent Python</i>. O'Reilly 1st edition, 2015. 	
Planned learning activities and teaching methods	lectures, group work, lab work, role playing, project-based learning, homework	
Assessment methods and criteria	Class participation: 10% Assignments: 50% In-class examination: 40%	
Language of Instruction	English	
Work Placement(s)	Not applicable	