Level 6 Advanced Diploma in Data Science & Business Analytics(952) 210 Credits

Unit: Python Programming for Data Science	**Guided Learning Hours:** 300
Exam Paper No.: 4	**Number of Credits:** 30
Prerequisites: Computer knowledge and use of Excel.	**Corequisites:** A pass or higher in Diploma in Diploma in Analytics or equivalence.
Aim: Python programming introduce learners to python basics; from mathematical operation application, data structures, control flow statements, one/two dimensional to APIs and Data Collection. This course give basic but vital Python programming which paves way to intermediate and advanced analytics in Python tools such as Pandas, Web Scraping, visualisation and machine learning..	
Required Materials: Recommended Learning Resources.	**Supplementary Materials:** Lecture notes and tutor extra reading recommendations.
Special Requirements: The unit requires a combination of lectures, demonstrations, discussions, and hands-on labs.	

Intended Learning Outcomes:	Assessment Criteria:
1. Understand the different types of data ranging from integers, real numbers, strings and boolean; including mathematical operations and data variables.	1.1 Describe different Python data types. 1.2 Demonstrate using mathematical operations. 1.3 Describe the difference between // and / division. 1.4 Explain mathematical expression order. 1.5 Be able to assign variables. 1.6 Demonstrate using string operations and string methods
2. Understand Python data structures (lists and tuples); how they store collections of data; and also the functions of data dictionaries and Python sets.	2.1 Describe tuples data structure. 2.2 Describe lists data structure. 2.3 Demonstrate using dictionaries. 2.4 Be able to create and operate Python sets. 2.5 Describe Python Venn Diagram sets
3. Understand the concepts of conditional statements, loops and purpose of functions in programming; how errors are handled and the implementation of classes in creating objects.	3.1 Describe comparison operators. 3.2 Demonstrate how to branch using IF, ELSE and ELSEIF. 3.3 Be able to use the NOT, OR and AND logic operators. 3.4 Demonstrate using for, enumerate and while loops. 3.5 Demonstrate the use of built-in and user-defined functions. 3.6 Explain local and global variable scope. 3.7 Be able to demonstrate the use of exception handing. 3.8 Explain objects and classes
4. Understand how Python process data files (read, writing and appending) functions; using Pandas library and the NumPy library when working with both single and multi-dimensional arrays.	4.1 Demonstrate ability to use different file commands; reading, writing and appending 4.2 Be able to use import and implement pandas library. 4.3 Demonstrate how to save dataframes to a csv file. 4.4 Describe and be able to implement one-dimensional array. 4.5 Describe vector addition and subtraction. 4.6 Explain array multiplication with a Scalar. 4.7 Describe Hadamard and Dot products.

	4.8	Demonstrate 2D NumPy arrays
5. Understand the different ways of collecting data using APIs and Webscraping; including how different file formats are dealt with and processed.	5.1 5.2 5.3 5.4 5.5	Define what an API is Explain API libraries Define Representational State Transfer (REST) Describe API that uses Artificial Intelligence Describe webscraping

Methods of Evaluation: A 3-hour essay written paper with 5 questions, each carrying 20 marks. Candidates are required to answer all questions. Candidates also undertake project/coursework in **Python Programming for Data Science**, with a weighting of 100%.

Recommended Learning Resources: Python Programming for Data Science

Text Books	• Python Programming for Beginners by Philip Robbins. ISBN-13 : 979-8376161821 • Python Programming For Beginners by Jeremy Plasner. ISBN-13 : 979-8360001904 • Hands-On Data Analysis with Pandas by Stefanie Molin. ISBN-13 : 978-1800563452 • Data Engineering with Python Data Engineering with Python. ISBN-13 : 978-1839214189
Study Manuals	BCE produced study packs
CD ROM	Power-point slides
Software	Python Jupyter Notebook