

Title (Units): **COMP7035 Python for Data Analytics and Artificial Intelligence (3,2,1)**

Course Aims: This course introduces the fundamental programming constructs of the Python scripting language and its applications in data analytics and artificial intelligence. Students will develop the essential programming and problem-solving skills through a series of hands-on exercises on these two domains.

Prerequisite: Postgraduate Student Standing

Course Intended Learning Outcomes (CILOs):

Upon successful completion of this course, students should be able to:

No.	Course Intended Learning Outcomes (CILOs)
	Knowledge
1	Interpret the fundamental programming constructs of Python, including variables, expressions, functions, control structures, and lists.
2	Demonstrate how Python could be effectively applied to solve problems in the domains of data analytics and artificial intelligence.
	Professional Skill
3	Implement and understand algorithms for data collection and analysis, as well as various AI-related applications.

Calendar Description: This course introduces the fundamental programming constructs of the Python scripting language and its applications in data analytics and artificial intelligence. Students will develop the essential programming and problem-solving skills through a series of hands-on exercises on these two domains.

Teaching and Learning Activities (TLAs):

CILOs	Type of TLA
1,2	Students will attend lectures to learn the concepts of programming constructs of Python and its applications in data analytics and artificial intelligence.
2,3	Students will attend programming sessions to gain practical skills on Python scripting development.
1,3	Students will work on programming exercises and assignments to enhance what they have learnt.

Assessment:

No.	Assessment Methods	Weighting	CILOs to be addressed	Description of Assessment Tasks
1	Continuous Assessments	40%	1-3	Practicing a functional problem-solving approach to solve a variety of problems on data analytics and artificial intelligence.
2	Test(s)	20%	1-3	Individual assessment(s) will be conducted to evaluate the student's understanding in Python programming and its applications in data analytics and artificial intelligence.
3	Examination	40%	1-3	Final examination questions are designed to see how far students have achieved their intended learning outcomes.

Assessment Rubrics:

Excellent (A)	<ul style="list-style-type: none"> • Able to design and construct complicated Python scripts to solve a variety of problems in the domains of data analytics and artificial intelligence. • Demonstrate an excellent self-learning capability.
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Good (B)	<ul style="list-style-type: none"> • Able to design and construct useful Python scripts by combining and extending examples. • Demonstrate a good understanding of how Python could be used in the domains of data analytics and artificial intelligence. • Full mastery of all basic Python programming constructs.
Average (C)	<ul style="list-style-type: none"> • Able to develop Python scripts with substantial help and guidance. • Adequate knowledge on basic Python programming constructs.
Unsatisfactory (F)	<ul style="list-style-type: none"> • Unable to identify and explain the basic programming constructs in Python. • Unable to create his/her own Python scripts.

Course Content and CILOs Mapping:

Content		CILO No.
I	Python Fundamentals	1-3
II	Numerical Computing and Data Visualization	1-3
III	Exploratory Data Analysis (EDA) with Python	1-3
IV	Artificial Intelligence and Machine Learning with Python	1-3

References:

- S. K. Mukhiya and U. Ahmed, Hands-On Exploratory Data Analysis with Python: Perform EDA techniques to understand, summarize, and investigate your data. Birmingham, England: Packt Publishing, 2020.
- A. Geron, Hands-on machine learning with scikit-learn, keras, and TensorFlow: Concepts, tools, and techniques to build intelligent systems, 2nd ed. Sebastopol, CA: O' Reilly Media, 2019.
- U. M. Cakmak and M. Cuhadaroglu, Mastering Numerical Computing with NumPy: Master scientific computing and perform complex operations with ease. Birmingham, England: Packt Publishing, 2018.
- Barry, P. Head first Python: A brain-friendly guide. O'Reilly Media, Inc, 2016.

Course Content:

Topic

- I. Python Fundamentals
 - A. Program control and logic
 - B. Data types and structures
 - C. Function
 - D. File I/O

- II. Numerical Computing and Data Visualization

Tools and libraries such as

 - A. NumPy
 - B. Matplotlib
 - C. Seaborn

- III. Exploratory Data Analysis (EDA) with Python

Tools and libraries such as

 - A. Panda
 - B. Sweetviz

- IV. Artificial Intelligence and Machine Learning with Python

Tools and libraries such as

 - A. Keras
 - B. Scikit-learn