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
1-3	Students will attend lectures to learn the concepts of programming constructs of Python and its applications in data analytics and artificial intelligence.
1-3	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)	• 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.

Good (B)	• 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)	• Able to develop Python scripts with substantial help and guidance. • Adequate knowledge on basic Python programming constructs.
Unsatisfactory (F)	• 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.	Hours
I	Python Fundamentals	1-3	12
II	Numerical Computing and Data Visualization	1-3	9
III	Exploratory Data Analysis (EDA) with Python	1-3	9
IV	Artificial Intelligence and Machine Learning with Python	1-3	9

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.

Course Content:

Topic	**Hours**

I.   Python Fundamentals   12
    A. Program control and logic
    B. Data types and structures
    C. Function
    D. File I/O

II.   Numerical Computing and Data Visualization   9
    Tools and libraries such as
    A. NumPy
    B. Matplotlib
    C. Seaborn

III.   Exploratory Data Analysis (EDA) with Python   9
    Tools and libraries such as
    A. Panda
    B. Sweetviz

IV.   Artificial Intelligence and Machine Learning with Python   9
    Tools and libraries such as
    A. Keras
    B. Scikit-learn

[Approved by Department Circulation on 22/11/2021]
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