Title (Units): **COMP1007 Introduction to Python and Its AI Applications (3,2,1)**

Course Aims: This course provides an introduction to problem-solving and programming using the Python scripting language. Students will explore various practical applications of Python, including applications of artificial intelligence tools, through hands-on exercises.

Prerequisite: Nil

Anti-requisite: COMP1005 Essence of Computing, OR
COMP1025 Coding for Humanists, OR

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	Explain how problems in various application domains can be solved using Python and its AI tools.
	Professional Skill
3	Implement software programmes designed using Python to solve practical problems.

Calendar Description: This course provides an introduction to problem solving and programming using the Python scripting language. A variety of practical applications of Python will also be introduced through a series of hands-on exercises.

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 various domains, including AI fundamentals.
2-3	Students will attend programming sessions to gain practical skills on Python scripting development.
2-3	Students will work on programming exercises and assignments to enhance their understanding of Python and its applications.

Assessment:

No.	Assessment Methods	Weighting	CILOs to be addressed	Description of Assessment Tasks
1	Programming assignments	20%	1-3	Practicing a functional problem-solving approach to solve a variety of homework problems.
2	Project	20%	2-3	Group project to evaluate students' practical skill of Python programming and application of AI tools.
3	Practical test	20%	1-3	An individual assessment to evaluate the student's understanding in Python programming and AI concepts.
4	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 complex Python scripts and effectively utilize AI tools to solve a variety of problems. • Demonstrate an excellent self-learning capability.
Good (B)	• Able to design and construct useful Python scripts and apply libraries, by combining and extending examples. • Demonstrate a good understanding of Python applications and AI tools. • 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 and AI concepts.
Satisfactory (D)	• Produce less than workable Python scripts. • Able to explain the correct use of each basic programming construct and associated AI tools.
Unsatisfactory (F)	• Unable to identify and explain the basic programming constructs in Python. • Unable to create his/her own Python scripts. • Lacks understanding of essential AI concepts.

Course Content and CILOs Mapping:

Content		**CILO No.**
I	Python Fundamentals	1-3
II	Introduction to AI Tools and Libraries	1-3
III	Hands-on experience in various applications in Python	1-3

References:

• G. Ciaburro, Hands-On Simulation Modeling with Python: Develop simulation models to get accurate results and enhance decision-making processes. Birmingham, England: Packt Publishing, 2020.
• B. Lubanovic, Introducing python: Modern computing in simple packages, 2nd ed. Sebastopol, CA: O'Reilly Media, 2025.
• L. Vaughan, Impractical python projects: Playful programming activities to make you smarter. San Francisco, CA: No Starch Press, 2018.

Course Content:

Topic

I. Python Fundamentals
   1. Program control and logic
   2. Data types and structures
   3. Function
   4. Text processing
   5. Handling quantitative data

II. Introduction to AI Tools and Libraries
   1. Overview of Python libraries
   2. Lightweight AI libraries

III. Hands-on experience in various applications in Python
   The topics will be selected from, but are not limited to, the following:
   1. Finding frauds in data with Benford's law
   2. Personal product recommendation with collaborative filtering
   3. Unlock business insights with Markov chain models

4. Decision making with optimal stopping theory