Course Title	Course Code:	Credit Hrs:
Artificial Intelligence using Python	AE-301	2-1

Textbooks:

- Tony Gaddis, "Starting out with Python", Pearson
- Wes McKinney "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython" , O'Reilly Media
- Stuart Russell, and Peter Norvig, "Artificial Intelligence – A Modern Approach", Pearson

Reference Books/Materials:

- Kaggle Online Courses (https://www.kaggle.com/learn)
- Kaggle Online Courses at Coursera (https://www.coursera.org/courses?query=kaggle)
- Python Resource Material (https://education.python.org/resources/resource/list)

Course Objectives:

This course introduces students to the concepts and algorithms at the foundation of modern artificial intelligence, diving into the ideas that give rise to technologies like game-playing engines, handwriting recognition, and machine translation.

Course Outline:

- Python Revision. Environments: Anaconda, Jupiter, PyCharm, Spyder, VS code
- Introduction to Python Programming for AI
- Python Revision: Data Types, Conditions, Boolean, Loops, Strings
- Defining Functions and Data Type Handling for String, Tuples, Lists and Dictionaries
- Black Box and Glass Box Testing, Finding Bugs in Program, Introducing Expectations
- Constant Complexity, Logarithmic Complexity, Linear Complexity, Polynomial Complexity, Exponential Complexity, Comparison of Classes
- Classes and Object-Oriented Programming

- Designing Programing's using Abstract Data Types
- Concepts of Inheritance; Multiple Level Inheritance, Substitution Principle
- Designing Search and Sort Algorithms; Linear Search, Binary Search, Merge Sort
- Inferential Statistics and Simulation, Distributions, Hashing and Collisions
- Understanding Experimental Data and Graph Optimization Problems
- Linear Regression and Exponential Regression
- Data Processing with Machine Learning; Knapsack and Graph Optimization Problems
- OpenCV and Scikit Learn Library
- Principal Component Analysis (PCA)
- Introduction to Neural Network; Two Layered Neural Network Implementation