Syllabus

Artificial Intelligence Application Developer

S No.	NOS/Module Name	Topics	Duration (Hours)		Learning Outcomes
			Theory	Lab	
1	Programming with Python	• Installing and configuring programming environment for python • Writing basic programs and understanding datatypes, operators, looping constructs, functions • Exploring various data structures • Learn to work on modules and packages	20	40	• Students will be able to learn to install and configure the python IDE and learn about working on collaborative cloud interface required for programming • Students will understand the basics of Python Language and will be able to recognize Python syntax • Students will understand and write programs in python language, compile, debug and handle exceptions • Student will have an understanding of working with top down or bottom up approach by making functions. • Students will come to know about benefits of modular programming by defining and calling various functions. • Students will be able to explain various ways of passing the parameters to functions and difference between all the ways. • Students will learn the working of different data structures which allow to organize and store data. • Students will learn to apply algorithms to process data in various data structures in a meaningful way. • Student will learn algorithms which will help in becoming a better programmer by writing code that is more efficient and more reliable.

2	Conceptualizing Data Science with python	• Concept of Data Science and tools used • Pre- Processing Concepts in Data Science • Introduction to Numpy and Working on N-d arrays • Learning Analysis on Numpy • Exploring Image handling using Numpy	24	36	• Students will learn about the concept of Data Science that relies on mathematical and statistical formulas to extract data and make sense of it. • Students will learn about unstructured and raw data and how to convert that into meaningful form. • Students will learn about how data can be converted into assets to help improve revenue by improving customer experience, and more. • Students will learn about various tools used for processing volumes of data. • Students will learn about techniques to pre-process the data to make it ready for analysis. • Students will learn about the library which deals with n-dimensional arrays. • Students will work on the library to perform a wide variety of mathematical operations on arrays. • Students will explore generating efficient calculations with arrays and matrices using mathematical functions available in library. • Students will learn to optimize the code with Numpy library. • Students will put to use Numpy library features along with Data Science, and Data Analysis. • Students will learn the storage of images in the Nd-arrays of Numpy and manipulating the images.

3	Data analysis and Visualization	• Introduction to Pandas • Exploring Data Frames and Series • Learning EDA and Data Analysis • Performing Analysis on datasets • Introduction to Visualization and Learning Tools for making Graphs and plots • Exploring analysis through visualization	34	56	• Student will be able to recognize Python Library Pandas which is the most widely used for Data Analysis/Data Science in machine learning tasks. • Student will be able to distinguish the differences between Numpy and Pandas. • Students will be able to analyze Big Data and make conclusions based on statistical theories. • Students will learn to represent data in way that will facilitate better results for data science projects. • Students will learn to use Pandas for cleaning messy datasets, and make them readable and relevant through huge set of commands and features. • Students will learn to filter, segment, merge and segregate the datasets. • Students will be able to demonstrate the role of Pre-processing, Analysis and Data science through guided case study and exercise • Student will learn how business problems can be understood by using Visualization techniques. • Students will learn the tools to make numerous and diverse plot types. • Students will learn Matplotlib, the widely-used Python package for creating advanced data visualizations • Students will make graphs using Matplotlib and Seaborn which are the backbone of data visualization through Python. • Students will learn how Data visualization helps to understand data better by depicting into a form easier to understand and highlighting the trends and outliers.
4	Fundamentals of Machine Learning	• Introduction to Machine Learning • Learning various ML categories • Learning to build models on datasets	12	18	• Students will learn the concept of Machine Learning and its various categories and its application. • Students will be able to understand the difference between Supervised, unsupervised, and reinforcement learning • Students will be able to understand different paths of Machine Learning, i.e., Computer Vision, Predictive Analysis, Natural Language Processing and other applications. • Student will be able to implement ML models using various Classification and Regression algorithms. • Students will be able to understand the complete cycle of AI Project. • Student will be applying models using various algorithms in Scikit-learn library. • Students will be able to implement various examples using different data sets to understand the working of ML models.

5	Performance and Accuracy of Machine Learning models.	• Implement Predictive Analysis using various Regression and Classification algorithms • Learn and apply statistics used in Machine Learning • Using various metrics and Feature Engineering techniques. • Develop and Implement Project in Predictive Analysis using ML	35	55	• Students will be able to make predictions about future events by applying various Regression algorithms and Classification algorithms. • Students will learn to apply ML models to analyze historical data with the goal of identifying trends or patterns and then using those insights to predict future outcomes. • Students will apply various statistics techniques like Correlation, hypothesis, Normal Distribution etc. to build a good predictive model. • Students will learn to measure predictive validity by applying various metrics of classification and regression. • Students will enhance predictive models by using Feature Selection, highlighting patterns and bringing domain expertise. • Students will learn how good metrics measure progress and bring improvement with respect to the business problem. • Student will apply feature engineering leading to greater accuracy by performing manipulation on data- addition, deletion, combination, mutation to improve machine learning model training. • Students will understand and develop ML Projects in different domains giving good accuracy after applying the concepts of Metrics, Statistics and Feature Engineering.
6	Fundamentals of Deep Learning	• Understand and implement Deep Learning using Neural Networks • Work in Computer Vision using CNN and implement Image based models • Understand NLP and implement Natural Language Processing algorithms	25	35	• Students will learn the concept of Artificial Neural Networks and Deep Learning, their inter-connected structure of layers and the architecture. • Students will learn how ANN can model complex function consisting of several processing elements that work on predefined activation functions. • Students will learn the concept of Convolutional Neural Network, its architecture, concept of filters, pooling and activation functions. • Students will learn and apply CNN model for image recognition and tasks that involve the processing of pixel data. • Students will implement projects on non-linear and complex relationships on problems of Classification using CNN . • Students will learn the concept of Natural Language Processing and its various tools and libraries like NLTK. • Students will learn Feature Engineering, Data Cleaning, Feature Extraction and Data Visualization for NLP. • Students will learn Text Classification, Semantic and Sentiment Analysis and make text analysis models. • Students will be able to build models like Spam Detector and Sentiment Analyzer using Neural Networks.
Sub Total = 390 hours			150	240	

7	Employability Skills	60	Students will be able to get the additional skills apart from the technical skills, to be job ready
8	OJT/Project	90	Students will be able to learn the working in a job.
Total Duration		**540**	