Infosys Springboard Offerings for Naan Mudhalvan Arts and Science – July 2023

Course Code	ARTIFICIAL INTELLIGENCE & APPLICATIONS	L	T	P	C
		2	0	1	2

COURSE OBJECTIVE

The objective of this course is to provide an insight into the Artificial Intelligence domain and the various applications. It also lays focus on the generative AI / GPT which is the order of the day. This course introduces Artificial intelligence to learners using various use cases and real life examples. It also provides a brief overview of the various aspects of AI and delves deeper into various Machine learning concepts that form the fundamental building blocks. The course also introduces deep learning techniques, how computer vision uses AI and the AI-First strategy in the industry. Learners also get a point of view of the ethics to be followed and how prompt engineering has emerged as part of generative AI.

UNIT-I	Introduction to Artificial Intelligence	7 hours
Introduction to Artificial Intelligence(AI)- Need – The What of AI- Types – Introduction to supervised/unsupervised learning, reinforcement learning-Timeseries forecasting- AI architecture - -Applications of AI(Business – Retail, banking, Energy, manufacturing), -AI in platforms, Auto encoders, Vision	

UNIT-II	Introduction to Deep Learning	5 hours
Deep Learning - Evolution and Business Potential - Introduction to Artificial Neural Network - Convolution Neural – Networks Recurrent Neural Networks – Autoencoders - Deep Learning & Business - Deep learning Frameworks and Products - Course Summary - Self-Assessment - Deep Learning	

UNIT-III	Computer Vision & Ethical AI	9 hours
Prelude - Concepts and Techniques in Computer Vision - Computer Vision Tools and Platforms –AI and Ethics - Guidelines, Regulations & Standards for Ethical AI - Building Blocks of Responsible AI - Core Ethical Requirements of AI Systems	

UNIT-IV	AI-First approach to Software Engineering & OpenAI GPT Models	10 hours
AI First – a paradigm shift - AI-First Interpretations - AI First SDLC Phases -Limitations of Large Language Models – generative vs. discriminative models – Language, transformer, pre-trained models – GPT, use case, applications -Code demo	

UNIT-V	NLP, Prompt Engineering	11 hours
NLP & its applications – Challenges – NLP pipeline – Deep learning for NLP – Tools & platforms - Generative Pre-trained Models -Large Language Models - Need for Prompt Engineering - Prompt Engineering Guidelines - Text Completion - Code Completion -Troubleshooting - Limitations of Large Language Models - Chat GPT - Language Model Applications	

Total : 42 Periods

COURSE OUTCOMES
On completion of the course, students will be able to:

CO1 :	Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.

CO2 :	Comprehend the applications of AI in in business and real world use case scenarios
CO3 :	Comprehend the OpenAI and generative models with their applications
CO4 :	Gain awareness of usage of AI in computer vision related applications

FOR FURTHER READING	
1	Saroj Kaushik, Artificial Intelligence, Cengage learning, 2014
2	Elaine Rich, Kevin Knight, Artificial Intelligence, Tata McGraw Hill
3	Nils J. Nilsson, Principles of Artificial Intelligence, Elsevier, 1980
4	StaurtRussel, Peter Norvig, Artificial Intelligence: A Modern Approach, Pearson Education, 3rd Edition,2009

REFERENCE	
	Curriculum related:
1	Introduction to Artificial Intelligence
2	Introduction to Deep Learning
3	Computer Vision
4	AI-First approach to software engineering
5	Ethical AI
6	Introduction to OpenAI GPT Models
7	Natural Language processing
	Further reading:
1	Generative models for developers

SOFTWARE REQUIREMENT
• TensorFlow, Python

HARDWARE REQUIREMENT
• Windows 10+, Linux 8+, Mac 10+
• Operating system with 8 GB RAM

INDUSTRY SCOPE
On Completion of these courses students will be able to gain awareness on Artificial intelligence and its various applications.

Mode of Delivery	Online (Self-Learning)
Course Evaluation	Online Assessment
Multiple Hybrid Branch of Students	Applicable for All Branches of Engineering (7th semester)
NOS Alignment	Yes- Infosys Industry Standard
Train-the-Trainer	Faculty Enablement Program
Commercials	Free of Cost

Course Code	MACHINE LEARNING USING PYTHON	L	T	P	C
		2	0	1	2

COURSE OBJECTIVE

The objective of this course is to provide a view of data science, machine learning, basic implementation using Python and how machine learning is applied in various domains in the industry. The course outlines the importance of data engineering, data and its analysis, in today's business world. It also enables the participants to comprehend various scenarios where data science can be applied to solve business problems. The participants will also learn how a typical data science project is implemented.

PRE-REQUISITE KNOWLEDGE :
Learners who undergo this course would need to understand the following pre-requisites to be able to appreciate and undergo the contents:
- Python programming language
- Probability and statistics using Python

UNIT-I	Introduction to Data Science	4 hours
Data Science: The Data Revolution - Components of Data Science - Data Science in Action		
UNIT-III	Python for Data Science	16 hours
Why Python Libraries – NumPy - Introduction to NumPy - Operations on NumPy – Pandas – Introduction to Pandas – Introduction to Pandas Object – Working with datasets – Pandas Plots - Matplotlib – Introduction to Matplotlib – Types of Plots – Scikit-learn – Machine Learning using sklearn. [Practical hands-on exercises using NumPy, Pandas, Matplotlib]		
UNIT-II	Explore Machine Learning Using Python	17 hours
Introduction to Machine Learning – Types of Machine Learning – Machine Learning Process - Regression – Classification – Clustering – Introduction to Artificial Neural Network- Capstone project		
UNIT-IV	Data visualization Using Python	9 hours
Data visualization using Python: Data Visualization: Developing insights from data using Basic Plots using Matplotlib (Box, Scatter, Line, Bar, Pie, Histogram), Statistical analysis using Heatmap, Kernel Density plot using Seaborn, Network Graphs, Choropleth Map Using Ploty, Word Cloud. [Practical hands-on exercises for creating charts]		
UNIT-V	Exploratory Data Analysis	7 hours
Collecting and Organizing Data - Importing Data – Pre-processing Data -Exploring and Summarizing Data - Exploring and Summarizing Data – Developing Insights from Data - Capstone Project		

Total : 53 Periods

COURSE OUTCOMES	
On completion of the course, students will be able to:	
CO1 :	Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
CO2 :	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.

CO3 :	Assess and select appropriate data analysis models for solving real-world problem.
CO4 :	Demonstrate the importance of data visualization, design, and use of visual components.

FOR FURTHER READING

1	Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems by Aurelien Geron
2	Machine Learning using Python by Manaranjan Pradhan and U Dinesh Kumar

REFERENCE

	Curriculum related:
1	Introduction to Data Science
2	Python for Data Science
3	Explore Machine Learning using Python
4	Exploratory Data Analysis
	Further reading:
1	Regression Analysis
2	Clustering using Python

SOFTWARE REQUIREMENT

- Python software

HARDWARE REQUIREMENT

- Windows 10, 16GB RAM

INDUSTRY SCOPE

On Completion of this course students will be able to apply various approach in ML and provide real life solutions to problems. They will be able to identify, predict and suggest probable outcome based on historic data.

Mode of Delivery	Online (Self-Learning)
Course Evaluation	Online Assessment
Multiple Hybrid Branch of Students	Applicable for All Non-Computer science Branches of Engineering (7th semester)
NOS Alignment	Yes- Infosys Industry Standard
Train-the-Trainer	Faculty Enablement Program
Commercials	Free of Cost