

Providing onsite Training to Officers / Employees on Power BI, ChatGPT and Open AI, Artificial Intelligence at Port Management Training Centre, Mumbai Port Authority, Mumbai

Proposed Syllabus – Proposed (The Vendor/Firm may add Course Content)

1. Power BI - (5 Days)

1. Business Intelligence (BI) Concepts

Introduction to Business Intelligence, The importance of Business Intelligence , The relation between Business Intelligence and Data Warehouse , Tools and Technologies in Business Intelligence area

2. Overview of Advanced MS Excel

MS Excel Advanced Concepts, Custom and Conditional Formatting, Customizing Quick Access Toolbar, Conditional Formatting , Advanced Data Tools , Text to Column Data Validation , What-If Analysis , Duplicate Removal , Data Sanitation through excel - Sorting, Filtering

Hands-on on basic excel functions, access to shortcuts in excel , Assignments, MCQ's

3. Data Analysis

Data analysis using normal charts, formatting of charts, secondary axis use, scatter plots, Data analysis using a Pivot table and pivot charts, sparklines Running Regression in excel, ANOVA, etc. , Cover basic stats through excel – Functions like correlation, stddev, average, regression functions , Hands on and Assignment, MCQ's

4. Introduction to Microsoft Power BI

Introduction to Power BI and Overview, Understanding Power BI Architecture and Concept, Types of Licenses, Power BI Desktop, Power BI Service, Power BI Mobile , Installing Power BI Desktop, navigation, and interface overview , Sharing Dashboard Report ,Power BI in Excel , Basic Concepts - datasets, reports, and dashboards. Connecting to Data Sources – Introduction to different data sources and how to connect them with Power BI. Data Loading - Loading data from different sources (Excel, SQL Server, web, etc.) , , Hands on and Assignment, MCQ's

5. Data Transformation

Introduction to Power Query – Filtering data, cleaning data, removing duplicates, and other basic operations. Advanced Power Query - Merging and appending queries, creating calculated columns, and using advanced transformations. Introduction to Power BI Data Model and relationships, Use of Power BI Q&A, DirectQuery vs Import Data, , Hands on and Assignment , MCQ's

6. Data Modelling

Introduction to Modelling , Set up and Manage Relationship ,Cardinality and Cross Filtering Introduction to DAX - Basics of Data Analysis Expressions (DAX), creating calculated columns and measures. Intermediate DAX – Understanding context, using basic functions (SUM,AVERAGE, COUNT, etc.), creating calculated tables. Advanced DAX - Time intelligence functions, working with related tables. , Hands on and Assignment, MCQ's

7. Power BI Desktop and Data Transformation

Data Sources in Power BI Desktop Loading Data in Power BI Desktop Views in Power BI Desktop Query Editor In Power BI Transform, Clean, Shape, and Model Data Manage Data Relationship Editing a Relationship Cross Filter Direction Saving Workfile Measures , , Hands on and Assignment , MCQ's

8. Data Visualization

Building Basic Visuals - Charts, graphs, maps, slicers, Tables ,matrices, KPI's, Guages & cards ,Conditional Formatting , Visuals - Using themes, adjusting colors and styles, sorting and filtering. Advanced Visuals - Waterfall, funnel, treemap, and custom visuals. Creating Interactive Reports – Using bookmarks, drill-through, tooltips. Standalone Tiles, Data Driven Alerts , , Hands on and Assignment , MCQ's

9. Dashboards and Power BI Service

Building Dashboards - Creating and sharing dashboards, pinning visuals to dashboards. Introduction to Power BI Service - Uploading reports, quick insights, Custom Q&A. Collaboration and Publishing – Sharing , reports and dashboards, publishing to web. Course Wrap-Up - Review of key concepts, next steps for continued learning. , Hands on and Assignment , MCQ's

10. Final Project & Post Assessment , Capstone Project

2. ChatGPT and Open AI - (2 days)

1. Unveiling ChatGPT: Conversing with Superintelligence

- Introduction to Generative AI , Introduction to ChatGPT, Unleashing the Power of ChatGPT, The Applications of ChatGPT , Human-AI Collaboration and the Future , Engaging with ChatGPT, Wrapping Up and Looking Ahead , Getting started with ChatGPT and OpenAI Exploring the creative potential of ChatGPT

2. Dive into Transformer Models and GPT

Introduction to Attention Mechanisms , Transformer Models and BERT , Understanding GPT-1 and GPT-2 , Contextual Representations and Masked , Language Models , Sequence-to-Sequence Models , Working with pre-trained Transformer models using libraries like Hugging Face

3. Training GPT Models

Overview of the GPT Training Process , Setting Up Training Environment (Cloud GPUs, Docker, etc.) , Fine-Tuning GPT Models , Evaluating the Performance of GPT , Models Addressing Challenges and Troubleshooting in Training

4. Practical Applications and Ethics of ChatGPT

Chatbots and Conversational AI, Other Applications of GPT (Translation, Text Generation, etc.) Limitations and Bias in GPT Models Ethical Considerations when Using GPT Future of AI and GPT

5. Prompt Engineering and ChatGPT Plugins

Introduction to Prompt Engineering , Why Prompt Engineering? , What is Prompt Engineering? , Applications of Prompt Engineering , Types of Prompting , Priming Prompts , Prompt Decomposition , How to Get Better responses from ChatGPT ,ChatGPT Plugins

6. ChatGPT for Productivity

- Leveraging ChatGPT for Productivity, Mastering Excel through ChatGPT , Becoming a Data Scientist using ChatGPT, Data Analysis in PowerBI with ChatGPT , Creating a Content Marketing Plan , Social Media Marketing using ChatGPT , Keyword Search and SEO using ChatGPT , Generating Content using ChatGPT , Implementing ChatGPT for Customer Service , Email Marketing using ChatGPT , Developing a Project Management Plan using ChatGPT , Uninformed search, Informed search, Heuristics ,Hands On , MCQ's

7. ChatGPT for Developers and Exploring ChatGPT API ,

ChatGPT for Creating Programs, ChatGPT for Debugging, ChatGPT for Integrating New Features, ChatGPT for Testing, Documenting Your Code with ChatGPT , Essential Application Programming , Interface (API) Concepts , Introducing OpenAI and ChatGPT API , Hands On , MCQ's

8. Final Project and Assessment

3. Artificial Intelligence (7 Days)

1. Introduction to Python

Need for programming, Advantages of programming, Overview of python, Organizations using python, Python Applications in various domains Variables Operands and expressions Conditional Statements Loops Structural pattern matching

2. Sequences and File Operations

Accepting user input and eval function , Files input/output functions, Lists Tuples ,Strings manipulation ,Sets and set operations ,Python dictionary

3. Functions and Objectoriented Programming

User-defined functions, Function parameters, Different types of arguments, Global variables, Global keyword, Lambda functions, Built-in functions, Object-oriented concepts, Public, protected and private attributes, Class variable and instance variable, Constructor and destructor, Inheritance and its types, Method resolution order, Overloading and overriding, Getter and setter methods

4. Working with Modules and Handling Exceptions

Standard libraries, Packages and import statements, Reload function, Creating a module, Important modules in python, Sys module ,OS module ,Math module, Date-time module ,Random module, JSON module, Regular expression, Exception handling

5. Array Manipulation using NumPy

Basics of data analysis NumPy - Arrays, Array operations, Indexing, slicing, and Iterating ,NumPy array attributes ,Matrix product ,NumPy functions ,Array manipulation ,File handling using NumPy

6. Data Manipulation using Pandas

Introduction to Pandas ,Data structures in Pandas ,Series ,Data Frames, Importing and exporting files in Python, Basic functionalities of a data object, Merging of data objects, Pivoting a dataframe, Concatenation of data objects ,Types of joins on data objects, Data cleaning using Pandas, Exploring datasets

7. Data Visualization using Matplotlib and Seaborn

Why data visualization? Matplotlib library ,Seaborn, Line plots ,Multiline plots, Bar plot ,Histogram ,Pie chart, Scatter plot ,Boxplot ,Saving charts ,Customizing visualizations. Saving plots .Grids, Subplots Heatmaps

8. Web Scraping and Computer Vision using OpenCV

Beautiful Soup library, Scrapy ,Requests library ,Scrap All hyperlinks from a webpage using BeautifulSoup and Requests Plotting charts using Bokeh Plotting, scatterplots using Bokeh, Image editing using OpenCV ,Face detection using OpenCV, Motion detection and capturing video

9. Introduction to Data Science and ML using Python

Overview of Python ,The Companies using Python ,Different Applications where Python is Used, Discuss Python Scripts on UNIX/Windows, Values, Types, Variables, Operands and Expressions ,Conditional Statements ,Loops ,Command Line Arguments ,Writing to the Screen ,What is Data Science? What does Data Science involve? Era of Data Science, Business Intelligence vs Data Science, Life cycle of Data Science Tools of Data Science

10. Data Manipulation

Basic Functionalities of a data object, Merging of Data objects, Concatenation of data objects, Types of Joins on data objects, Exploring a Dataset, Analysing a dataset ,The history of AI, different approaches to AI, applications of AI , Search : Uninformed search, Informed search, Heuristics , Reasoning: Propositional logic, First-order logic, Bayesian reasoning ,Planning: Classical planning, Planning under uncertainty

11. Introduction to Machine Learning with Python

What is Machine Learning? Machine Learning Use-Cases, Machine Learning Process Flow, Machine Learning Categories, Linear regression, Gradient descent , Understanding neural networks and deep learning, Neural network architectures., Training techniques, optimization algorithms, Understanding the transformer architecture, which is a key component of models like GPT. Attention mechanisms and self-attention. Basics of Recurrent Neural Networks (RNNs) and their applications in sequential data processing, Concepts of pre-training and fine-tuning in machine learning.

12. Supervised Learning

What are Classification and its use cases? What is Decision Tree? Algorithm for Decision Tree Induction, Creating a Perfect Decision Tree ,Confusion Matrix ,What is Random Forest? , What is Naïve Bayes? How Naïve Bayes works? Implementing Naïve Bayes Classifier ,What is Support Vector Machine? Illustrate how Support

Vector Machine works? Hyperparameter ,Optimization Grid Search vs Random Search ,Implementation of Support Vector Machine for Classification

13. Unsupervised Learning

What is Clustering & its Use Cases? What is K-means Clustering? How does K-means algorithm work? How to do optimal clustering What is C-means Clustering? What is Hierarchical Clustering? How Hierarchical Clustering works?

14. Dimensionality Reduction

Introduction to Dimensionality, Why Dimensionality Reduction ,PCA ,Factor Analysis, Scaling dimensional model , LDA

15. Association Rules Mining and Recommendation Systems

What are Association Rules? Association Rule Parameters, Calculating Association Rule Parameters ,Recommendation Engines ,How does Recommendation Engines work? Collaborative Filtering, Content-Based Filtering

16. Reinforcement Learning

What is Reinforcement Learning Why Reinforcement Learning Elements of Reinforcement Learning Exploration vs Exploitation dilemma Epsilon Greedy Algorithm Markov Decision Process (MDP) Q values and V values Q – Learning α values

17. Time Series Analysis

What is Time Series Analysis? Importance of TSA, Components of TSA , White Noise, AR model, MA model ,ARMA model ,ARIMA model ,Stationarity ACF & PACF

18. Model Selection and Boosting

What is Model Selection? The need for Model Selection Cross-Validation What is Boosting? How Boosting Algorithms work? Types of Boosting Algorithms , Adaptive Boosting

19. Statistical Foundations

What is Exploratory Data Analysis? EDA Techniques ,EDA Classification , Univariate Non-graphical EDA ,Univariate Graphical EDA ,Multivariate Non-graphical EDA , Multivariate Graphical EDA, Heat Maps

20. Introduction to Text Mining and NLP

Overview of Text Mining, Need of Text Mining, Introduction to NLP concepts and applications, Natural Language Processing (NLP) in Text Mining, Applications of Text Mining, OS Module Reading, Writing to text and word files, Setting the NLTK Environment, Accessing the NLTK Corpora , Language modelling, Part-of-speech

tagging, Named entity recognition, Machine translation, Tokenization, text pre-processing, and language representation.

21. Extracting, Cleaning and Pre-processing Text

Tokenization, Frequency Distribution, Different Types of Tokenizers, Bigrams, Trigrams & Ngrams, Stemming, Lemmatization, Stopwords, POS Tagging, Named Entity Recognition, Text Pre-processing, language representation

22. Analyzing Sentence Structure

Syntax Trees, Chunking, Chinking, Context Free Grammars (CFG), Automating Text Paraphrasing

23. Text Classification

Machine Learning: Brush Up, Bag of Words, Count Vectorizer, Term Frequency (TF), Inverse Document Frequency (IDF)

24. Introduction to Deep Learning

What is Deep Learning? Curse of Dimensionality, Machine Learning vs. Deep Learning, Use cases of Deep Learning, Human Brain vs. Neural Network, What is Perceptron? Learning Rate, Epoch Batch Size, Activation Function, Single Layer Perceptron

25. Getting Started with TensorFlow 2.0

Introduction to TensorFlow 2.x, Installing TensorFlow 2.x, Defining Sequence model layers, Activation Function, Layer Types, Model Compilation, Model Optimizer, Model Loss Function, Model Training, Digit Classification using Simple Neural Network in TensorFlow 2.x, Improving the model, Adding Hidden Layer, Adding Dropout Using Adam Optimizer

26. Considerations for ethical AI development, Addressing bias and fairness in AI models., Understanding safety measures in the development and deployment of AI models.