AI CERTs™

AI+ Business Intelligence (5 Days)

Program Detailed Curriculum

Executive Summary

The AI+ Business Intelligence (BI) course provides a comprehensive five-day curriculum designed for professionals interested in leveraging AI and BI tools to enhance data-driven decision-making. The program covers fundamental AI and BI concepts, data preparation, machine learning, and advanced AI techniques like deep learning and generative AI. Participants will gain hands-on experience using Python, Power BI, Tableau, and other BI platforms, focusing on data visualization, statistical analysis, and predictive modeling. The course also includes practical applications of AI in real-world business scenarios, culminating in a capstone project

Course Prerequisites

- **Basic Computer Skills**: Familiarity with software applications.
- **Foundational Data Concepts**: Basic knowledge of data analysis (beneficial, not mandatory).
- **Open to All**: Suitable for all expertise levels, with an interest in AI, ML, and BI.

Module 1

Introduction to AI and BI Fundamentals

1.1 Overview of AI and BI Integration

- **Understanding AI: Key Concepts and Definitions**: Gain insights into fundamental AI concepts, exploring its definitions, key components, and role in transforming industries.
- **Evolution of Business Intelligence: Traditional BI to AI-Driven BI**: Discover the progression from traditional BI tools to the integration of AI, enhancing data analysis, decision-making, and business outcomes.
- **Real-World Applications: Industry Use Cases for AI in BI**: Examine practical AI-driven BI use cases across industries, such as retail demand forecasting, improving supply chain efficiency and customer insights.

1.2 Core Concepts in Business Intelligence

- **BI Framework: Data Collection, Transformation, and Visualization**: Learn the processes involved in data collection, transformation, and visualization to enhance business intelligence and decision-making.
- **Key BI Tools: Power BI, Tableau, and Looker**: Explore the capabilities of Power BI, Tableau, and Looker to effectively analyze, visualize, and present data for better insights.

1.3 Data Analysis Process and AI's Role

- **Steps in Data Analysis: Problem Definition, Data Preparation, and Reporting**: Understand the critical steps in data analysis, including problem definition, data preparation, and reporting for accurate insights.
- **Integration of AI: Enhancing Data Quality, Insights, and Decision-Making**: Learn how AI integration improves data quality, generates valuable insights, and supports better decision-making processes.

1.4 BI Trends and Challenges

- **Emerging Trends: Self-Service Analytics, Real-Time BI, Embedded BI**: Explore the latest trends in BI, such as self-service analytics, real-time BI, and embedded BI, revolutionizing data access and decision-making.
- **Challenges in BI: Data Silos, Scalability, and Security**: Understand the common challenges in BI, including data silos, scalability issues, and security concerns that impact data management and analysis.

1.5 Case Study

- **Explore the Impact of AI-Enhanced BI Solutions in a Specific Industry (e.g., Healthcare for Predictive Analytics)**: Analyze how AI-driven BI solutions in healthcare enable predictive analytics to improve patient outcomes, optimize resource allocation, and enhance decision-making.

1.6 Hands-On Activity

- **Case Study Analysis: Analyze a Real-World Example of AI-Enhanced BI Solutions**: Investigate a real-world case where AI-enhanced BI solutions have been successfully implemented, highlighting their impact on business performance and decision-making.

Module 2

Python for AI-Driven Business Intelligence

2.1 Python Programming Fundamentals

- **Benefits of Python in AI-Driven BI**: Understand how Python enhances AI-driven BI by providing powerful libraries and tools for data analysis, machine learning, and automation.
- **Basic Syntax & Data Structures: Lists, Tuples, Dictionaries**: Learn the foundational Python syntax and key data structures like lists, tuples, and dictionaries essential for effective programming.
- **Object-Oriented Programming: Classes, Inheritance, and Modules**: Explore the principles of object-oriented programming in Python, focusing on classes, inheritance, and modules to organize and structure code.

2.2 Advanced Python Libraries for BI

- **Key Python Libraries: Pandas, NumPy, Scikit-learn, TensorFlow, Keras**: Discover essential Python libraries such as Pandas, NumPy, Scikit-learn, TensorFlow, and Keras for data manipulation, machine learning, and deep learning applications.

2.3 Visualization with Python

- **Libraries: Matplotlib, Seaborn, and Plotly**: Learn how to use Matplotlib, Seaborn, and Plotly for data visualization, enabling the creation of informative and interactive charts and graphs.

2.4 Hands-On Activity

- **Perform AI-Driven Data Visualization Using Python and the Libraries Discussed**: Apply Python and libraries like Matplotlib, Seaborn, and Plotly to create AI-powered visualizations that enhance data interpretation and decision-making.

Module 3

Data Preparation and Feature Engineering with AI

3.1 Data Collection Techniques

- **Types of Data Sources: Structured, Semi-Structured, and Unstructured Data**: Understand the different types of data sources, including structured, semi-structured, and unstructured data, and their role in data analysis.
- **Data Gathering Methods: Databases (SQL, NoSQL), APIs, and Web Scraping Tools**: Learn various data gathering methods, including SQL, NoSQL databases, APIs, and web scraping tools, to efficiently collect data.
- **Real-Time Data Collection: Using Tools Like Kafka and Spark**: Explore how tools like Kafka and Spark facilitate real-time data collection and processing for immediate insights and analysis.
- **Ethical Considerations: Privacy, Compliance, and Data Governance**: Examine ethical considerations in data handling, including privacy concerns, compliance with regulations, and best practices for data governance.
- **Use-Case: Real-Time Data Collection in an E-Commerce Environment Using Kafka**: Analyze the application of real-time data collection using Kafka in an e-commerce setting to improve operational efficiency and customer experience.

3.2 Data Quality & Evaluation

- **Assessing Data Quality: Accuracy, Completeness, and Consistency**: Evaluate data quality by measuring its accuracy, completeness, and consistency to ensure reliable insights and decision-making.
- **AI Tools for Data Profiling: Identifying Anomalies, Duplicates, and Missing Data**: Leverage AI tools for data profiling to detect anomalies, identify duplicates, and handle missing data efficiently.
- **Cleaning Techniques: Imputation, Outlier Removal, and Redundancy Handling**: Apply data cleaning techniques such as imputation, outlier removal, and redundancy handling to improve data quality for analysis.

3.3 Advanced Data Preparation

- **Transformation Techniques: Standardization, Normalization, and Encoding**: Learn transformation techniques like standardization, normalization, and encoding to prepare data for analysis and machine learning models.
- **Feature Engineering with AI: Feature Selection, Dimensionality Reduction (PCA, t-SNE)**: Explore feature engineering with AI, focusing on feature selection and dimensionality reduction methods such as PCA and t-SNE.
- **Handling Imbalanced Datasets: Oversampling, Undersampling, and SMOTE**: Understand techniques for handling imbalanced datasets, including oversampling, undersampling, and SMOTE, to improve model performance.
- **Case Study: Data Cleaning for a Predictive Model in Finance Using Imputation and Outlier Handling**: Analyze a case study on data cleaning for a predictive finance model, focusing on imputation and outlier handling to improve model accuracy.

3.4 Hands-On Activity

- **Build an AI-Driven Data Preparation Pipeline Using Python and Scikit-learn**: Learn how to construct an AI-driven data preparation pipeline using Python and Scikit-learn, automating tasks like data cleaning, transformation, and feature engineering for machine learning models.

Module 4

Machine Learning (ML) for Business Intelligence

4.1 ML Models for BI

- **Supervised Learning: Regression, Classification**: Understand supervised learning techniques like regression and classification to predict outcomes and categorize data based on labeled examples.
- **Unsupervised Learning: Clustering, Anomaly Detection**: Explore unsupervised learning methods such as clustering and anomaly detection to find patterns and detect outliers in unlabeled data.
- **Reinforcement Learning: Optimization and Decision-Making**: Learn the principles of reinforcement learning for optimization and decision-making, where an agent learns to make decisions through trial and error.
- **Use-Case: Applying Regression Models for Sales Forecasting in Retail**: Analyze the use of regression models for sales forecasting in retail, predicting future sales based on historical data.

4.2 Hands-On Activity

- **Build and Evaluate an ML Model Using AI Tools Like Scikit-learn and Evaluate Its Performance on a Real-World Dataset**: Learn how to build and evaluate machine learning models using Scikit-learn, applying them to real-world datasets to assess performance and accuracy.

Module 5

Advanced AI and Generative AI for BI

5.1 Deep Learning and Neural Networks for BI

- **Applications: Scenario Planning, Data Generation, and Predictive Modeling**: Explore how scenario planning, data generation, and predictive modeling enhance decision-making and strategy formulation in various industries.
- **Deep Learning and Neural Networks for BI**: Learn the role of deep learning and neural networks in business intelligence, providing advanced capabilities for data analysis and decision-making.
- **Artificial Neural Networks (ANNs): Concept and Applications in BI**: Understand the concept of ANNs and their applications in BI, such as pattern recognition and decision support.
- **Convolutional Neural Networks (CNNs) for Image Data and Visualization**: Discover how CNNs are used for processing image data and generating meaningful visualizations to support business intelligence.
- **Recurrent Neural Networks (RNNs) for Time Series Forecasting and Trend Analysis**: Learn about RNNs and how they are used for time series forecasting and analyzing trends over time.
- **Training Deep Neural Networks: Overview, Architecture, and Backpropagation**: Gain an understanding of how deep neural networks are trained, including their architecture and the process of backpropagation.
- **Implementing Neural Networks for Pattern Recognition and Prediction**: Explore how neural networks can be implemented for tasks like pattern recognition and predictive analytics.
- **Case Study: Using Deep Learning for Customer Segmentation in Retail**: Analyze a case study on using deep learning for customer segmentation in the retail sector, improving targeting and personalization.

5.2 Generative AI for BI

- **Overview of Generative AI: What is Generative AI? Introduction to the Concept and Types (e.g., GANs, VAEs)**: Understand the concept of Generative AI, exploring its types such as GANs and VAEs, and their capabilities in generating new data.
- **Applications in Business Intelligence: Data Augmentation, Scenario Planning, and Content Generation**: Discover how Generative AI is used in BI for data augmentation, scenario planning, and generating relevant content to improve insights.
- **Generative Models in BI: How They Can Generate Predictive Insights, Automate Reporting, and Simulate Business Strategies**: Learn how generative models can be applied in BI to create predictive insights, automate reporting processes, and simulate various business strategies.
- **Use Cases: Product Development, Personalized Marketing, and Financial Modeling**: Explore real-world use cases of Generative AI in BI, such as product development, personalized marketing, and financial modeling for optimized outcomes.
- **Impact on BI: Enhanced Decision-Making, Improved Analytics, and Automation of Complex Tasks**: Examine the transformative impact of Generative AI on BI, enhancing decision-making, analytics, and automating complex tasks to drive business growth.

5.3 Advanced AI Techniques

- **CNNs for Image Data Analysis**: Learn how Convolutional Neural Networks (CNNs) are applied for image data analysis, enabling businesses to extract meaningful insights from visual content.
- **RNNs for Time Series Forecasting**: Understand how Recurrent Neural Networks (RNNs) are used in time series forecasting, helping businesses predict future trends and patterns from sequential data.
- **Transformer Models (BERT, GPT): NLP in BI**: Explore how Transformer models like BERT and GPT are revolutionizing Natural Language Processing (NLP) in BI, enabling businesses to analyze and interpret text data for deeper insights.

5.4 Hands-On Activity

- **Create a Deep Learning Model for Predictive Analytics and Integrate It with BI**: Learn how to build a deep learning model for predictive analytics and seamlessly integrate it with Business Intelligence systems to provide actionable insights and enhance decision-making.

Module 6

Statistical Analysis with AI Tools

6.1 Statistical Analysis for BI

- **Descriptive & Inferential Statistics**: Understand the difference between descriptive and inferential statistics, and how each is used to summarize data and make predictions about populations.
- **Visualizing Trends with AI Tools**: Learn how AI tools can be used to visualize trends in data, enhancing the understanding of patterns and insights for better decision-making.

6.2 Time Series Analysis

- **Forecasting Trends and Demands Using AI**: Learn how AI can be utilized to forecast trends and demands, enabling businesses to plan more accurately and optimize operations.
- **Sales and Operational Planning with AI-Enhanced Models**: Discover how AI-enhanced models improve sales and operational planning by providing more accurate predictions and better resource allocation.
- **Use-Case: Time-Series Analysis for Predicting Demand Spikes in Retail**: Explore a use case of time-series analysis to predict demand spikes in retail, helping businesses manage inventory and optimize sales strategies.

6.3 Hands-On Activity

- **Perform Time Series Analysis with AI Tools, Forecasting Future Trends**: Learn how to use AI tools to perform time series analysis, enabling the forecasting of future trends and helping businesses make data-driven decisions.

Module 7

AI-Powered Business Intelligence Tools

7.1 AI in BI Platforms

- **Overview of AI Capabilities in Power BI, Tableau, and Looker**: Explore the AI capabilities integrated into Power BI, Tableau, and Looker, enhancing data analysis and visualization with machine learning-driven insights.
- **Automated Visualization and Insight Generation**: Learn how automated visualization tools can generate real-time insights, making it easier to interpret complex data and support business decisions.

7.2 Power BI Essentials

- **Data Import & Transformation**: Learn the techniques for importing and transforming data, preparing it for analysis and visualization using various AI tools and platforms.
- **Building Interactive Dashboards with AI Features**: Discover how to create interactive dashboards with AI-driven features, enhancing data visualization and user experience for better decision-making.

7.3 Tableau Essentials

- **Data Connection & Preparation**: Understand the process of connecting and preparing data from various sources to ensure it is ready for analysis and visualization.
- **Creating Advanced Visualizations with AI-Enhanced Features**: Learn how to create advanced visualizations with AI-enhanced features to provide deeper insights and more effective data storytelling.

7.4 Hands-On Activity

- **Build Interactive Dashboards and Create BI Reports with Power BI and Tableau Using Real-Time Data**: Learn how to design interactive dashboards and generate BI reports with Power BI and Tableau, utilizing real-time data for dynamic insights and decision-making.

Module 8

Prompt Engineering for AI-Driven BI

8.1 Introduction to Prompt Engineering

- **Overview of Prompt Engineering: Crafting Effective Prompts to Interact with AI Models**: Understand the principles of prompt engineering and learn how to craft effective prompts for interacting with AI models to achieve desired outcomes.
- **Overview of LLM Model and Role of LLMs (Large Language Models) in BI**: Explore Large Language Models (LLMs) and their role in business intelligence, enhancing data analysis and decision-making through advanced natural language processing.
- **Optimizing Prompts for Various BI Tasks: Data Analysis, Reporting, Decision-Making**: Learn how to optimize prompts for specific BI tasks such as data analysis, reporting, and decision-making to improve efficiency and accuracy.
- **Use-Case: Automating Report Generation in Power BI Using LLM Prompts**: Analyze a use case of automating report generation in Power BI using LLM prompts, streamlining the reporting process and improving productivity.

8.2 Crafting Effective Prompts

- **Generating Predictive Insights: Optimizing Prompts for Predictive Analytics**: Learn how to optimize prompts to generate predictive insights, enhancing forecasting and decision-making in business intelligence tasks.
- **Automating Visualization Workflows: Creating Visualizations Directly Through LLM-Generated Instructions**: Discover how to automate the creation of visualizations by using LLM-generated instructions, streamlining the visualization workflow and improving efficiency.

8.3 Hands-On Activity

- **Design and Test Prompts to Automate BI Tasks Such as Report Generation, Data Analysis, and Visualization**: Learn how to design and test effective prompts to automate key BI tasks, including report generation, data analysis, and visualization, improving efficiency and accuracy.

Module 9

Communication Skills

9.1 Data Storytelling & Communication

- **Crafting Narratives: Presenting AI Insights Effectively to Non-Technical Stakeholders**: Learn how to craft clear and compelling narratives to present AI-generated insights in a way that resonates with non-technical stakeholders.
- **Visual Communication: Best Practices for Visualizing Insights Using BI Tools**: Discover best practices for visualizing insights using BI tools, ensuring clarity and impact in presenting data to diverse audiences.

9.2 Solution Presentation

- **Delivering Findings and Strategic Recommendations to Stakeholders, Focusing on Actionable AI-Driven Insights**: Learn how to effectively deliver findings and strategic recommendations, emphasizing actionable AI-driven insights that drive informed decision-making and business outcomes.

Module 10

Capstone Project

- **Capstone Project 1**
- **Capstone Project 2**
- **Capstone Project 3**