SBIT TECHMENTORS CURRICULUM BUSINESS ANALYTICS WITH AI AND GENERATIVE AI

TABLE OF CONTENTS

BUSINESS ANALYTICS WITH AI AND GENERATIVE AI

This program provides a comprehensive exploration of how artificial intelligence (AI), machine learning (ML), and generative AI can be leveraged in business analytics to drive data-driven decision-making and strategic growth. Beginning with fundamental concepts in business analytics, the program delves into the practical aspects of data acquisition, manipulation, and visualization using industry-standard tools such as Excel, SQL, Python, and Tableau. Students will learn to implement advanced machine learning models, apply generative AI techniques for innovative business solutions, and address the ethical considerations of AI in business. The program culminates in a capstone project where students develop a complete business analytics solution, integrating the skills and knowledge acquired throughout the course.

SCHEME

Course Name: Business Analytics with AI and Generative AI						
Duration: 9 Months (39 weeks)						
S. No.	**Paper Title**	**Lecture / Tutorial (per week)**	**Practical Classes (per week)**	**Total Hours (Lecture / Tutorial)**	**Total Hours (Practical Classes)**	**Total Credit**
1	Introduction to Business Analytics and AI	3	10	20	50	3
2	Data Acquisition and Manipulation with SQL and ETL	3	10	20	50	3
3	Data Analytics Using Python	4	11	26	68	4
4	Data Visualization with Tableau	3	10	20	50	3
5	Advanced Analytics and Machine Learning	3	10	20	50	3
6	Generative AI for Business Analytics	3	10	26	38	3
7	Capstone Project	1	5	18	144	6
Total				**150**	**450**	**25**

PROGRAM OUTCOMES

- Master the fundamentals of business analytics and its significance in modern business strategies.
- Acquire and manipulate data using SQL and ETL processes, ensuring data quality and ethical compliance.
- Utilize Python for comprehensive data analysis and predictive modeling.
- Create and present insightful data visualizations using Tableau.
- Implement advanced machine learning techniques to solve complex business problems. (Implementing Advanced AI Models to solve and to create innovative solutions tailored to business challenges)
- Apply generative AI to innovate and personalize business solutions.
- Develop a complete business analytics solution in a real-world context through a capstone project.
- Earn a career certificate from GGS IPU
- Solving Business Specific Problems
- Real time Assessment by Academia and Industry Experts

LEARNING PATH VISUALIZATION

1) Introduction to Business Analytics and AI
2) Data Acquisition and Manipulation with SQL and ETL
3) Data Analytics Using Python
4) Data Visualization with Tableau
5) Advanced Analytics and Machine Learning
6) Generative AI for Business Analytics
7) Capstone Project

MODULE 1: INTRODUCTION TO BUSINESS ANALYTICS AND AI

LEARNING OUTCOMES:

- Understand the core concepts and importance of business analytics.
- Recognize the role of AI and ML in transforming business analytics.
- Differentiate between traditional AI/ML and generative AI.
- Analyze real-world case studies to identify successful applications of AI/ML in business.

TOPICS COVERED:

- Overview of Business Analytics
  - Definition, importance, and key concepts
  - The role of data in decision-making
- Introduction to AI and ML in Business
  - Basic concepts of AI and ML
  - Overview of AI/ML applications in business analytics
- Understanding Generative AI
  - Key differences between traditional AI/ML and generative AI
  - Applications of generative AI in business contexts

- Why business analysts should care about GenAI
- The ethics of using GenAI in business analysis
- Limits to GenAI technology in business analysis

- Case Studies: Real-World Applications
  - Success stories of AI/ML in business analytics

MODULE 2: DATA ACQUISITION AND MANIPULATION WITH SQL AND ETL

LEARNING OUTCOMES:

- Acquire and manipulate data from multiple sources using Excel and SQL.
- Design and implement ETL pipelines for data cleaning and transformation.
- Optimize SQL queries for performance in large datasets.
- Understand and apply ethical principles in data acquisition and manipulation.

TOPICS COVERED:

- Introduction to Data Acquisition
  - Data sources: internal, external, structured, and unstructured
  - Importance of data quality and reliability
- Business Analytics with Excel- Mastering business analytics essentials with foundational statistics and techniques is an initial step in our Business Analytics program.
- SQL for Business Analytics
  - SQL basics: SELECT, JOIN, GROUP BY, etc.
  - Advanced SQL: subqueries, window functions, and common table expressions (CTEs)
  - Query optimization and performance tuning
- ETL (Extract, Transform, Load) Processes
  - Designing and implementing ETL pipelines
  - Data extract, cleaning, transformation, and loading into data warehouses
  - ETL tools and platforms: Apache NiFi, Talend, etc.
  - Pentaho Data Integration (PDI) (Kettle)
- Data Ethics and Governance
  - Ensuring data integrity and privacy
  - Legal and ethical considerations in data collection and usage

MODULE 3: DATA ANALYTICS USING PYTHON

LEARNING OUTCOMES:

- Perform data cleaning, transformation, and exploratory analysis using Python.
- Apply statistical analysis techniques to identify trends and patterns in data.
- Build and evaluate predictive models using machine learning in Python.
- Use Python tools to conduct comprehensive business data analysis.

TOPICS COVERED:

- Python for Data Analytics
    - Introduction to Python programming for analytics
    - Essential libraries: NumPy, pandas, and SciPy
- Data Manipulation and Analysis
    - Data cleaning, transformation, and preprocessing with Python
    - Exploratory data analysis (EDA): identifying trends, patterns, and outliers
- Statistical Analysis with Python
    - Hypothesis testing, correlation, and regression analysis
    - Time series analysis and forecasting using Python
    - Conduct ANOVA & Chi-square tests
- Building Predictive Models
    - Introduction to machine learning with scikit-learn
    - Building and evaluating predictive models (regression, classification)

MODULE 4: DATA VISUALIZATION WITH TABLEAU

LEARNING OUTCOMES:

- Create and customize data visualizations using Tableau.
- Build interactive dashboards to present business insights.
- Apply advanced visualization techniques to complex datasets.
- Develop narratives that effectively communicate data-driven insights to stakeholders.

TOPICS COVERED:

- Introduction to Data Visualization
    - Principles of effective data visualization
    - Overview of popular tools: Tableau, Power BI, etc.
- Getting Started with Tableau
    - Connecting to data sources and basic visualizations
    - Creating dashboards and interactive reports
- Advanced Visualization Techniques
    - Using calculated fields, parameters, and filters
    - Visualizing complex data: heatmaps, scatter plots, and more
- Creating Dashboards and Storytelling with ~~Data~~ Tableau
    - Build a dashboard and crafting compelling narratives through visualization
    - Best practices for presenting data-driven insights to stakeholders

MODULE 5: ADVANCED ANALYTICS AND MACHINE LEARNING

LEARNING OUTCOMES:

- Implement advanced supervised and unsupervised learning techniques.
- Evaluate and select appropriate models for business problems.
- Integrate ML models into business workflows for automated decision-making.
- Address ethical issues in the deployment and use of AI and ML models.

TOPICS COVERED:

- Supervised Learning Techniques
  - Linear and logistic regression, decision trees, and random forests
  - Model evaluation and selection: cross-validation, accuracy, precision, recall
- Unsupervised Learning Techniques
  - Clustering algorithms (K-Means, hierarchical) and principal component analysis (PCA)
  - Anomaly detection and market basket analysis
- Integrating ML Models with Business Processes
  - Deployment of machine learning models in business environments
  - Monitoring model performance and adjusting
- Ethical AI in Business Analytics
  - Addressing bias in AI models
  - Ensuring fairness and transparency in AI-driven decisions
- Building an end-to-end machine learning model to solve a real-world business problem

MODULE 6: GENERATIVE AI FOR BUSINESS ANALYTICS

LEARNING OUTCOMES:

- Understand the principles and techniques behind generative AI models.
- Apply generative AI for synthetic data generation and content creation.
- Use generative AI for personalization in marketing and customer engagement.
- Analyze successful case studies of generative AI in business.
- Enhancing Your Business Analysis Skills with GenAI

TOPICS COVERED:

- Introduction to Generative AI Techniques
  - Overview of GANs, VAEs, and other generative models
  - Applications in data generation, personalization, and content creation
- Synthetic Data Generation
  - Use of generative AI to create synthetic datasets for training and analysis
  - Balancing synthetic data benefits with ethical considerations
- Generative AI in Marketing and Personalization
  - AI-driven content generation for marketing strategies
  - Personalizing customer experiences using generative AI
- Case Studies: Generative AI in Business
  - Analysis of successful implementations of generative AI in various industries

MODULE 7: CAPSTONE PROJECT

LEARNING OUTCOMES:

- Design and implement a business analytics solution using AI, ML, and generative AI.
- Demonstrate the ability to solve complex business problems through a comprehensive project.

- Present and defend project outcomes in a professional setting.
- Understand and prepare for emerging trends in business analytics and AI.

TOPICS COVERED:

- Customer Segmentation and Personalization for E-Commerce
    - Use AI/ML techniques to segment customers based on purchasing behavior and demographic data.
    - Data acquisition from an e-commerce platform, feature engineering, clustering analysis, personalized marketing content generation using generative AI, and building a dashboard in Tableau for visualizing customer segments.
- Predictive Maintenance for Manufacturing
    - Implement a predictive maintenance system using machine learning models to predict equipment failures and optimize maintenance schedules.
    - Data collection from sensors (IoT devices), time series analysis, regression modeling, deployment of predictive models, and visualization of maintenance schedules and predictions using Tableau.
- Fraud Detection in Financial Transactions
    - Develop an AI-driven system to detect fraudulent transactions in real-time using machine learning and anomaly detection techniques.
    - Data preprocessing and feature extraction from financial transactions, integration of generative AI for synthetic fraud data generation, and implementation of a monitoring dashboard for visualizing fraud detection insights.
- Sales Forecasting and Inventory Optimization
    - Build a sales forecasting model to predict future sales and optimize inventory levels, reducing overstock and stockouts.
    - Time series forecasting using Python, integration of external data sources (e.g., market trends, holidays), and visualization of forecasted sales and inventory levels using Tableau.
- AI-Powered Sentiment Analysis for Brand Monitoring
    - Analyze customer sentiment towards a brand by using natural language processing (NLP) techniques on social media and customer feedback data.
    - Data acquisition from social media platforms, sentiment analysis using NLP, generative AI for summarizing customer feedback, and creating a real-time sentiment dashboard in Tableau for brand monitoring.
- Automated Customer Support Chatbot with Generative AI
    - Develop an AI-driven chatbot capable of handling customer queries, providing personalized responses, and learning from interactions.
    - Designing the chatbot framework, training using NLP and deep learning models, integrating generative AI for personalized response generation, and deploying the chatbot within a business context.
- Market Basket Analysis and Product Recommendation System
    - Implement a product recommendation system using market basket analysis and machine learning to improve cross-selling and upselling strategies.

- Data preprocessing and transaction analysis, association rule mining, building and deploying a recommendation engine, and visualizing association rules and recommendation performance with Tableau.

ATTENDANCE AND EVALUATION

Attendance: 75% of all mandatory classes/mini projects

Evaluation: Score from assignments, mini-projects, online quiz (20 min tests every week), and a final exam.

Evaluation Scheme

Assessment Type	Total Count	Best of	Points / Assessment	Total Points
Quizzes	24	22	5	110
Lab Assignments	24	20	3	60
Mini Projects	24	23	10	230
Final Exams	6	6	100	600
Capstone	1	1	400	400
			Total	1400

Grading Scheme

Letter Grade	Percentage Range
A+	90% - 100%
A	70% - 89%
B+	50% - 69%
B	40% - 49%
C	0% - 40%

Certificate of Completion Criteria:

- Secure more than **40% marks** overall
- Maintain at least **75% attendance** as per the policy

Certificate of Participation Criteria:

- Secure less than **40% marks** overall
- Maintain at least **50% attendance** as per the policy

C Grade: Only participation certificate

Capstone evaluation: Based on the final presentation during the campus visit/online session.