

SEVERN BUSINESS COLLEGE

SBC Level 6 Graduate Diploma in Big Data and Analytics

Course Handbook

Qualification
SBC Level 6 Graduate Diploma in Big Data and Analytics

Level
6

Guided Learning Hours
480

Total Qualification Time Hours
1200

Credit Value
120

Qualification Objective
The Graduate Diploma in Big Data and Analytics is designed for students who want to develop specialized knowledge and skills in data management, big data analysis, and predictive analytics. This program covers advanced topics in data science, statistical modeling, data visualization, machine learning, and cloud-based technologies, preparing students for leadership roles in data-driven industries. The program uses practical case studies, projects, and hands-on activities to ensure that students gain both theoretical and real-world experience in working with big data tools and techniques.

Assessment
Assessment is through practical assignments, with no exams - to more accurately reflect the real working environment.

Unit Structure of the Qualification
Level 6 Graduate Diploma in Big Data and Analytics (120 credits):

Units	Unit level	Unit credit
Introduction to Big Data and Analytics	6	20
Data Science and Statistical Methods for Big Data	6	20
Machine Learning for Big Data	6	20
Big Data Infrastructure and Cloud Computing	6	20
Data Visualization and Business Intelligence	6	20
Advanced Topics in Big Data Analytics	6	20

Assessment Grades

Marks Ranges	Marking Criteria
Pass	All learning outcomes are achieved. All assessment criteria are met.
Fail	All learning outcomes are not achieved. All assessment criteria are not met.
No Marks	Plagiarism

UNIT SPECIFICATIONS

Unit Title
Introduction to Big Data and Analytics

Level
6

Guided Learning Hours
80

Learning Time Hours
200

Credit Value
20

Learning Outcomes and Assessment Criteria
The learning outcomes describe the abilities that learners will possess after they have completed the unit. The assessment criteria provide a list of achievements sufficient to demonstrate that a learner has met the learning outcomes.

Learning Outcome	Assessment Criteria

To achieve this unit a learner must:	*Assessment of this outcome will require a learner to demonstrate that they can:*
1. Understand the key concepts of Big Data and Analytics.	1.1 Define Big Data and its importance in contemporary business. 1.2 Identify and describe the sources of Big Data. 1.3 Explain the significance of analytics in data-driven decision making. 1.4 Discuss the key challenges in handling Big Data.
2. Evaluate the impact of Big Data on various industries.	2.1 Analyze the role of Big Data in marketing and customer analytics. 2.2 Discuss the use of Big Data in healthcare and life sciences. 2.3 Evaluate how Big Data transforms operations in logistics and supply chain. 2.4 Examine Big Data's influence on finance and risk management.
3. Develop an understanding of the architecture of Big Data systems	3.1 Identify the components of a Big Data ecosystem. 3.2 Discuss the role of distributed computing in Big Data. 3.3 Explain the importance of data storage and retrieval in Big Data systems. 3.4 Assess the scalability challenges in Big Data systems.
4. Understand the ethical and legal considerations in Big Data and Analytics	4.1 Explain the principles of data privacy and security. 4.2 Discuss legal regulations surrounding data usage. 4.3 Identify ethical issues related to data analytics. 4.4 Evaluate the importance of responsible data usage in analytics.

UNIT SPECIFICATIONS

Unit Title
Data Science and Statistical Methods for Big Data

Level
6

Guided Learning Hours
80

Learning Time Hours
200

Credit Value
20

Learning Outcomes and Assessment Criteria
The learning outcomes describe the abilities that learners will possess after they have completed the unit. The assessment criteria provide a list of achievements sufficient to demonstrate that a learner has met the learning outcomes.

Learning Outcome *To achieve this unit a learner must:*	**Assessment Criteria** *Assessment of this outcome will require a learner to demonstrate that they can:*
1. Apply statistical methods in analyzing large datasets.	1.1 Define and apply basic statistical concepts to Big Data. 1.2 Explain hypothesis testing and its application in Big Data. 1.3 Conduct regression analysis to make predictions. 1.4 Interpret the results of statistical models and test their validity.
2. Analyze and interpret patterns and trends in data.	2.1 Apply descriptive statistics to summarize data characteristics. 2.2 Identify correlations and trends within large datasets. 2.3 Use time-series analysis for trend forecasting. 2.4 Interpret outliers and anomalies in datasets.
3. Use predictive modeling techniques for Big Data analytics.	3.1 Develop a predictive model using supervised learning techniques. 3.2 Apply unsupervised learning techniques for clustering. 3.3 Evaluate the effectiveness of predictive models. 3.4 Discuss model validation and performance evaluation metrics.
4. Implement data cleaning and preparation methods.	4.1 Discuss the importance of data cleaning in Big Data analytics. 4.2 Apply techniques to handle missing data. 4.3 Identify and handle outliers in datasets. 4.4 Use data transformation techniques to prepare data for analysis.

UNIT SPECIFICATIONS

Unit Title
Machine Learning for Big Data

Level
6

Guided Learning Hours
80

Learning Time Hours
200

Credit Value
20

Learning Outcomes and Assessment Criteria
The learning outcomes describe the abilities that learners will possess after they have completed the unit. The assessment criteria provide a list of achievements sufficient to demonstrate that a learner has met the learning outcomes.

Learning Outcome *To achieve this unit a learner must:*	**Assessment Criteria** *Assessment of this outcome will require a learner to demonstrate that they can:*
1. Understand the principles of machine learning and its applications in Big Data	1.1 Define machine learning and its relevance to Big Data. 1.2 Identify types of machine learning (supervised, unsupervised, reinforcement). 1.3 Describe the process of training and testing machine learning models. 1.4 Analyze the performance of machine learning models.
2. Implement machine learning algorithms for data analysis.	2.1 Develop a machine learning model using decision trees. 2.2 Apply clustering techniques such as K-means. 2.3 Implement neural networks for complex datasets. 2.4 Evaluate the performance of machine learning algorithms.
3. Evaluate and fine-tune machine learning models.	3.1 Assess the importance of hyperparameter tuning in model optimization. 3.2 Use cross-validation to assess model robustness. 3.3 Compare the performance of multiple machine learning models. 3.4 Use confusion matrices and other metrics to evaluate classification models.
4. Address challenges in applying machine learning to Big Data.	4.1 Discuss scalability challenges in machine learning with large datasets. 4.2 Implement distributed machine learning frameworks. 4.3 Identify challenges in data imbalance and how to address them. 4.4 Discuss model interpretability in the context of Big Data.

UNIT SPECIFICATIONS

Unit Title
Big Data Infrastructure and Cloud Computing

Level
6

Guided Learning Hours
80

Learning Time Hours
200

Credit Value
20

Learning Outcomes and Assessment Criteria
The learning outcomes describe the abilities that learners will possess after they have completed the unit. The assessment criteria provide a list of achievements sufficient to demonstrate that a learner has met the learning outcomes.

Learning Outcome *To achieve this unit a learner must:*	**Assessment Criteria** *Assessment of this outcome will require a learner to demonstrate that they can:*
1. Understand the infrastructure requirements for Big Data analytics.	1.1 Discuss the hardware and software requirements for Big Data systems. 1.2 Evaluate the role of cloud platforms in Big Data. 1.3 Identify the components of a data warehouse. 1.4 Discuss storage solutions for Big Data (e.g., HDFS).

2. Work with Big Data tools and technologies.	2.1 Introduce Hadoop and its ecosystem for Big Data management. 2.2 Explore the capabilities of Apache Spark in data processing. 2.3 Use SQL and NoSQL databases for managing Big Data. 2.4 Apply distributed computing frameworks for large-scale data analytics.
3. Understand cloud-based services for Big Data storage and processing.	3.1 Evaluate cloud platforms such as AWS, Azure, and Google Cloud for Big Data. 3.2 Discuss the integration of cloud-based databases in Big Data analytics. 3.3 Set up and configure cloud-based environments for data analysis. 3.4 Analyze cost-effectiveness and scalability of cloud-based Big Data services.
4. Implement security measures for Big Data systems.	4.1 Define the security risks associated with Big Data environments. 4.2 Implement data encryption and access control policies. 4.3 Discuss the role of data privacy laws and compliance standards. 4.4 Assess the effectiveness of Big Data security frameworks.

UNIT SPECIFICATIONS

Unit Title
Data Visualization and Business Intelligence

Level
6

Guided Learning Hours
80

Learning Time Hours
200

Credit Value
20

Learning Outcomes and Assessment Criteria
The learning outcomes describe the abilities that learners will possess after they have completed the unit. The assessment criteria provide a list of achievements sufficient to demonstrate that a learner has met the learning outcomes.

Learning Outcome *To achieve this unit a learner must:*	**Assessment Criteria** *Assessment of this outcome will require a learner to demonstrate that they can:*
1. Understand the importance of data visualization in Big Data analytics.	1.1 Explain the role of data visualization in interpreting complex data. 1.2 Identify key elements of effective data visualization. 1.3 Discuss the challenges of visualizing Big Data. 1.4 Analyze different types of visualizations for Big Data.
2. Create data visualizations using industry-standard tools.	2.1 Use tools like Tableau, Power BI, and D3.js for data visualization. 2.2 Create interactive dashboards for decision-making. 2.3 Design and implement data charts to communicate insights. 2.4 Customize visualizations for different audiences (e.g., technical, executive).
3. Leverage business intelligence (BI) tools for actionable insights.	3.1 Implement BI tools to analyze data trends and patterns. 3.2 Integrate Big Data analytics with BI software. 3.3 Interpret and present BI reports for business decision makers. 3.4 Develop strategies for improving business performance using BI.
4. Develop insights and communicate findings effectively.	4.1 Present data-driven findings in a clear and concise manner. 4.2 Discuss the implications of data insights on business strategy. 4.3 Write analytical reports for non-technical stakeholders. 4.4 Communicate complex data findings through visual and written means.

UNIT SPECIFICATIONS

Unit Title
Advanced Topics in Big Data Analytics

Level
6

Guided Learning Hours
80

Learning Time Hours
200

Credit Value
20

Learning Outcomes and Assessment Criteria
The learning outcomes describe the abilities that learners will possess after they have completed the unit. The assessment criteria provide a list of achievements sufficient to demonstrate that a learner has met the learning outcomes.

Learning Outcome *To achieve this unit a learner must:*	**Assessment Criteria** *Assessment of this outcome will require a learner to demonstrate that they can:*
1. Examine the future trends in Big Data and Analytics.	1.1 Discuss the evolution of Big Data technologies. 1.2 Explore the role of artificial intelligence in Big Data analytics. 1.3 Identify the impact of IoT (Internet of Things) on Big Data. 1.4 Examine the potential of quantum computing in data analysis.
2. Develop advanced predictive models for Big Data.	2.1 Build advanced predictive models using deep learning techniques. 2.2 Discuss the use of reinforcement learning in data-driven decision making. 2.3 Evaluate the accuracy of advanced predictive models. 2.4 Implement real-time data analysis in predictive modeling.
3. Integrate Big Data analytics with emerging technologies.	3.1 Discuss the integration of Big Data with blockchain technology. 3.2 Explore the use of AI and machine learning in real-time Big Data analysis. 3.3 Identify the role of edge computing in data processing. 3.4 Analyze the benefits of integrating Big Data with 5G technology.
4. Evaluate Big Data solutions in real-world applications.	4.1Case study analysis of Big Data solutions in industries such as healthcare, finance, and retail. 4.2 Assess the scalability and effectiveness of Big Data systems in real-world settings. 4.3 Discuss the challenges of implementing Big Data solutions in organizations. 4.4 Identify the key success factors for Big Data adoption.

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