

SEVERN BUSINESS COLLEGE

SBC Level 7 Postgraduate Diploma in Computer Science

Course Handbook

Qualification
SBC Level 7 Postgraduate Diploma in Computer Science

Level
7

Total Qualification Time
1200

Credit Value
120

Aim of the Course
The Postgraduate Diploma in Computer Science is designed for students seeking advanced knowledge and skills in computing, software development, data analysis, and emerging technologies. This program emphasizes critical thinking, research skills, and practical application in real-world computing environments. Graduates will be prepared for leadership roles in IT, software development, data analytics, and technology management.

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

Course Structure

SBC Level 7 Postgraduate Diploma in Computer Science			
Unit number	**Units**	**Unit level**	**Unit credit**
1	Advanced Software Engineering	7	20
2	Data Science and Analytics	7	20
3	Cybersecurity and Risk Management	7	20
4	Artificial Intelligence and Machine Learning	7	20
5	Cloud Computing and Distributed Systems	7	20
6	Research Methods and Project	7	20

Assessment Grades

Grade	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
Advanced Software Engineering

Level
7

Learning Time Hours
200

Credit Value
20

Learning outcomes and assessment criteria
In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning Outcome	Assessment Criteria
1. Demonstrate advanced software design and architectural principles.	1. Critically evaluate different software architectural styles. 2. Apply design patterns to solve complex problems. 3. Develop high-quality software using modular design principles. 4. Conduct peer reviews of software design artifacts.
2. Apply advanced software testing and	1. Design and implement unit, integration, and system tests.

quality assurance techniques.	2. Use automated testing frameworks effectively. 3. Analyze and report software quality metrics. 4. Recommend improvements based on testing outcomes.
3. Manage software development projects using advanced methodologies.	1. Apply agile and DevOps practices to project workflows. 2. Develop project timelines using advanced project management tools. 3. Evaluate risks and implement mitigation strategies. 4. Communicate project progress to stakeholders effectively.
4. Integrate emerging technologies into software solutions.	1. Research and evaluate emerging computing technologies. 2. Assess feasibility of new technologies in project contexts. 3. Prototype solutions using innovative tools. 4. Reflect on the impact of technology adoption on business goals.

UNIT SPECIFICATIONS

Unit Title
Data Science and Analytics

Level
7

Learning Time Hours
200

Credit Value
20

Learning outcomes and assessment criteria
In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning Outcome	Assessment Criteria
1. Apply advanced statistical methods to large datasets.	1. Use statistical software to analyze complex datasets. 2. Interpret and visualize data trends. 3. Perform hypothesis testing for decision-making. 4. Critically evaluate statistical results.
2. Develop predictive models using machine learning algorithms.	1. Implement supervised and unsupervised learning models. 2. Optimize model performance using parameter tuning. 3. Validate models using cross-validation techniques. 4. Explain model results to non-technical stakeholders.
3. Manage and manipulate big data using modern tools.	1. Utilize databases and data warehouses efficiently. 2. Apply data preprocessing and cleaning techniques. 3. Employ distributed computing for large datasets. 4. Evaluate performance of big data processing solutions.
4. Communicate insights and recommendations effectively.	1. Develop clear visualizations of data findings. 2. Prepare reports that translate technical findings into actionable insights. 3. Present data-driven recommendations to decision-makers. 4. Critically evaluate the impact of analytics on business processes.

UNIT SPECIFICATIONS

Unit Title
Cybersecurity and Risk Management

Level
7

Learning Time Hours
200

Credit Value
20

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning Outcome	Assessment Criteria
1. Assess security risks in complex computing environments.	1. Conduct vulnerability assessments. 2. Evaluate threats and attack vectors. 3. Recommend risk mitigation strategies. 4. Maintain documentation of risk management procedures.
2. Apply advanced cybersecurity techniques to protect systems.	1. Implement cryptographic solutions for data protection. 2. Deploy intrusion detection and prevention systems. 3. Perform penetration testing on applications. 4. Develop security policies based on industry standards.
3. Analyze legal, ethical, and regulatory aspects of cybersecurity.	1. Examine relevant data protection laws and regulations. 2. Evaluate ethical dilemmas in cybersecurity. 3. Recommend compliance strategies for organizations. 4. Assess implications of cybersecurity breaches.
4.Develop and implement organizational security policies.	1. Create security guidelines for staff and stakeholders. 2. Monitor compliance with security policies. 3. Conduct security awareness training. 4. Evaluate effectiveness of policy implementation.

UNIT SPECIFICATIONS

Unit Title

Artificial Intelligence and Machine Learning

Level

7

Learning Time Hours

200

Credit Value

20

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning Outcome	Assessment Criteria
1. Design intelligent systems using AI techniques.	1. Implement AI algorithms for problem-solving. 2. Evaluate different AI approaches for specific tasks. 3. Integrate AI components into software systems. 4. Analyze performance metrics of AI systems.
2. Apply deep learning techniques to complex problems.	1. Design and train neural network models. 2. Optimize deep learning architectures. 3. Use GPUs and high-performance computing for training. 4. Evaluate model robustness and generalization.
3. Solve real-world problems using AI applications.	1. Develop AI-driven solutions for industry-specific challenges. 2. Test AI solutions under realistic conditions. 3. Interpret AI outputs for decision-making. 4. Document AI project development processes.
4. Critically evaluate ethical and societal implications of AI.	1. Analyze bias and fairness in AI systems. 2. Assess privacy implications of AI applications. 3. Recommend responsible AI practices. 4. Discuss long-term societal impacts of AI deployment.

UNIT SPECIFICATIONS

Unit Title
Cloud Computing and Distributed Systems

Level
7

Learning Time Hours
200

Credit Value
20

Learning outcomes and assessment criteria
In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning Outcome	Assessment Criteria
1. Design scalable cloud-based solutions.	1. Evaluate cloud architecture models. 2. Implement cloud infrastructure solutions. 3. Optimize cloud resource utilization. 4. Assess performance and scalability of deployed systems.
2. Manage and secure distributed systems.	1. Implement distributed computing solutions. 2. Monitor and troubleshoot distributed applications. 3. Apply security best practices in distributed environments. 4. Analyze system reliability and fault tolerance.
3. Utilize cloud services for application development.	1. Integrate SaaS, PaaS, and IaaS offerings. 2. Develop microservices using cloud platforms. 3. Deploy serverless applications. 4. Evaluate cost-effectiveness of cloud solutions.
4.Optimize performance and resource allocation in cloud environments.	1. Monitor system performance metrics. 2. Apply load balancing techniques. 3. Implement auto-scaling strategies. 4. Recommend improvements for cloud resource management.

UNIT SPECIFICATIONS

Unit Title
Research Methods and Project

Level
7

Learning Time Hours
200

Credit Value
20

Learning outcomes and assessment criteria
In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning Outcome	Assessment Criteria
1. Analyse and evaluate core data structures.	1.1 Compare efficiency of arrays, linked lists, stacks, and queues. 1.2 Implement advanced data structures (trees, graphs, hash tables). 1.3 Evaluate trade-offs in choosing data structures. 1.4 Optimise storage and retrieval in data-intensive applications.
2. Be Apply algorithmic design and analysis techniques.	2.1 Demonstrate use of sorting and searching algorithms. 2.2 Analyse algorithm efficiency using Big-O notation. 2.3 Implement recursive and iterative algorithm solutions. 2.4 Compare deterministic and non-deterministic algorithms.
3. Demonstrate understanding of	3.1 Explain concepts of automata and formal languages.

computational theory.	3.2 Apply Turing machine concepts to problem-solving. 3.3 Distinguish between tractable and intractable problems. 3.4 Evaluate complexity classes (P, NP, NP-complete).
4. Solve practical computing problems using algorithms.	4.1 Identify appropriate algorithms for real-world problems. 4.2 Implement algorithms in a programming environment. 4.3 Test and optimise algorithmic solutions. 4.4 Evaluate solution performance under varying conditions.

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