COLLEGE OF CREATIVE INNOVATION

Programme

Diploma in Cloud Computing and Cyber Security
(120 Credits)

Course

CCC601: Public Cloud Administration
(Level 6, 30 Credits, Version 1.1)

Assessment Title

AWS Theoretical and Practical Concepts Evaluation

CCC601 | Assessment-1

Weighting within the course

50%

Objective:

Course Learning Outcomes (LOs) covered:

LO1: Evaluate organizational needs for cost-effective, scalable, and secure business application management in the public cloud.

LO2: Implement server-based virtualization infrastructure using cloud services to meet the industry requirements.

Qualification Graduate Profile Outcomes (GPOs) covered:

GPO9: Implement a server-based virtualization infrastructure to support cost-effective solutions and meet organisational requirements.

Assessment Tasks to Learning Outcome and GPOs Mapping:

LO	GPO	Task	Task Component	Weighting
LO1. Evaluate organizational needs for cost-effective, scalable, and secure business application management in the public cloud. **LO2:** Implement server-based virtualization infrastructure using cloud services to meet the industry requirements.	**GPO9.** Implement a server-based virtualization infrastructure to support cost-effective solutions and meet organisational requirements.	**Task1:** (**LO1)** Theoretical Evaluation: Cloud-Based Virtualization Solution.	Task 1: Theoretical Evaluation	25%
		Task 2: (LO2) Theoretical and Practical Evaluation: Designing a Virtualization Architecture.	Task 2: Theoretical and Practical Evaluation	25%
		Task 3: (LO2) Practical Implementation: Virtual Machines and Storage Services.	Task 3: Practical Implementation	25%
		Task 4: (LO1) and (LO2) Theoretical and Practical Evaluation: Optimization and Security.	Task 4: Theoretical and Practical Evaluation	25%
			Total	100%

Recommended Tasks Completion Timeline:

Full Time Week	Part Time Week	Progress	Submission
Week 1	Week 1,2	Start working on Assessment	
Week 2	Week 3,4	Complete Task 1	
Week 3	Week 5,6	Complete Task 2, Task 3	
Week 4	Week 7,8	Complete Task 4 and submit	Assessment due by Week-4 (Full Time) Assessment due by Week-8 (Part Time)

This assessment evaluates your theoretical knowledge and practical skills in designing, implementing, and optimizing cloud-based virtualization solutions. It reflects the needs of **Yoobee College of Creative Innovation**, aligning with the learning outcomes (**LO1 and LO2**) and Graduate Profile Outcome (**GPO9**) by demonstrating the ability to deploy **secure, cost-efficient, and scalable AWS-based virtualization infrastructures** to support an educational institution's operational needs.

Grading:

The final grade will be determined by the score achieved in this assessment based on the following table. Should a second or third attempt be required, the maximum contribution toward the overall mark for the tasks that required a second or third assessment attempt is 50%. **A late submission is considered a second attempt, so the contribution will be capped at 50%.**

To pass this assessment, you must meet the requirements of each of the learning outcomes (irrespective of the numerical grade awarded).

Grade	Range
A	Meet all course requirements, range (80—100%)
B	Meet all course requirements, range (65—79%)
C	Meet all course requirements, range (50—64%)
D	Did not meet all course requirements, range (40—49%)
E	Did not meet all course requirements, mark range (0—39%)

Candidate's Assessment Instructions:

- This assessment is an **open-book activity**, you can use your course and review notes, and offline or online resources, such as textbooks or online journals.
- You can always ask your online tutor if you need further explanation if the instructions are unclear.
- Your work should not be plagiarised. Plagiarism includes copying material without acknowledging it, copying from another student, getting another person to help you with your assessment, using material from commercial essays or assignment services, or using AI to create the answers.
- The purpose of this assessment is to assess your knowledge. In the event Yoobee suspects collusion, this will be addressed. For more information on plagiarism, please refer to the Student Handbook.
- Submit your completed assessment online in the correct space provided.
- Marks and feedback will be returned within 15 days of the submission date.
- By completing and submitting an assessment you are authenticating that the work is original and does not violate plagiarism or copyright law. Authenticity is checked where any breaches of academic integrity are suspected. Please refer to the Student Handbook for further information.

Submission Instructions:

Submit **one PDF format report** document to the LMS by the specified due date.

Your report should:

- Include your name and ID number
- Include the AWS account login details, a cover page, and a report index for verification purposes in your report.
- Use a standard citation format if, external sources are referenced
- Clearly label tasks and subtasks and Diagrams must be clear and labeled properly.
- Include screenshots of each practical step in sequence, naming and numbering the screenshots. Screenshots must display the relevant settings or outputs for each step.
- Include your answers to the assessment questions for each task, describing choices, configurations, and learned insights with an appropriate practical and theoretical understanding.
- **Submission must be in PDF format only because other formats may cause issues with accessing screenshots.**

Assessment Tasks: AWS Theoretical and Practical Concepts Evaluation

Scenario:

Yoobee College of Creative Innovation is undergoing a digital transformation to enhance its academic services and operational efficiency. The institution aims to move its IT infrastructure to the AWS cloud to improve scalability, reduce costs, and ensure high availability for students and staff. Currently, Yoobee College hosts learning management systems, student databases, and faculty applications on on-premises servers, which face performance bottlenecks and security challenges.

The college plans to implement a server-based virtualization infrastructure using AWS services to address these issues. The new cloud infrastructure should meet the following key requirements:

- **Cost-effectiveness:** Optimize cloud expenses while ensuring resource availability.
- **Scalability:** Support increasing student enrolment and faculty requirements.
- **Security:** Ensure compliance with best security practices to protect academic and student data.
- **High Availability:** Implement redundancy and load balancing to maintain uninterrupted services.

As a Cloud Solutions Engineer, you evaluate, design, implement, and optimize Yoobee College's cloud-based server virtualization infrastructure. Your role involves both theoretical assessments and hands-on AWS implementation to ensure the cloud environment meets industry standards and institutional goals.

Note: You can use an example of **5 on-premises** computer systems at Yoobee College of Creative Innovation to illustrate the adoption of an AWS-based cloud infrastructure.

(Learning management systems = 2 servers | Staff (Facutly) Application = 2 servers |Students Database = 1 system)

Task 1: Theoretical Evaluation: Cloud-Based Virtualization Solution.

1. Identify Yoobee College's key cloud infrastructure requirements for cost, scalability, security, and high availability.
2. Compare at least two AWS pricing models (e.g., On-Demand, Reserved, and Spot Instances) and recommend the most cost-effective option.
3. Analyze how AWS services like Auto Scaling and Load Balancing can help improve application availability and performance.
4. Provide a brief report of 800-1000 words (+/- 10% allowed) summarizing your findings and justifying your recommendations.

Deliverables:

A structured report (PDF format only) with:

- Key infrastructure requirements
- Comparison of AWS pricing models
- Explanation of Auto Scaling and Load Balancing benefits
- Justification for the recommended approach

Task 2: Theoretical and Practical Evaluation: Designing a Virtualization Architecture

1. Design and deploy a cloud-based server virtualization infrastructure for Yoobee using AWS services (e.g., EC2, VPC, IAM, and RDS).
2. Include a diagram illustrating the architecture, depicting security groups, subnets, and network access control.
3. Define user roles and permissions using AWS Identity and Access Management (IAM) to ensure security and compliance.
4. Provide a document explaining the architecture, security policies, and service choices.

Deliverables:

- A cloud architecture diagram (PNG, JPEG, or PDF format) created using Lucid chart, AWS Architecture Designer, or similar tools.
- A structured report (PDF format only) detailing:
    - Infrastructure design and chosen AWS services
    - Security considerations and IAM policies
    - Justification for selected configurations

Task 3: Practical Implementation: Virtual Machines and Storage Services

1. Launch two AWS EC2 instances (one Linux and one Windows) with appropriate configurations for academic applications.
2. Configure an S3 bucket for storage, applying security policies to restrict unauthorized access.
3. Demonstrate the implementation of an Elastic Load Balancer (ELB) to distribute traffic between EC2 instances.
4. Document step-by-step implementation with screenshots.

Deliverables:

A step-by-step implementation document (PDF format only) with:

- Details of EC2 instance configurations
- S3 bucket security policies
- Elastic Load Balancer setup
- AWS console screenshots demonstrating each step

Task 4: Theoretical and Practical Evaluation: Optimization and Security

1. Apply AWS security best practices (e.g., Security Groups, IAM roles, MFA, and encryption) to secure the cloud environment.
2. Configure AWS CloudWatch for monitoring EC2 instances and setting up alerts for resource utilization.
3. Optimize cost using AWS Trusted Advisor recommendations and provide a cost-reduction strategy.
4. Present your security and cost-optimization recommendations in a structured report.

Note: Due to the limitations of the AWS Free Tier subscription, the AWS Trusted Advisor service will be explored through theoretical analysis and research-based discussion, supported by relevant academic and industry references.

Deliverables:

- A security configuration document (only PDF format) with:
    - List of AWS security best practices implemented
    - IAM roles, Security Groups, and MFA setup details
- Screenshots (PNG or JPEG format) of:
    - AWS CloudWatch monitoring setup
    - Cost optimization analysis using AWS Trusted Advisor
- A final structured report summarizing security enhancements and cost reduction strategies.
- Evaluate the report’s clarity, depth, and thoroughness.

Marking Rubric

To pass this assessment, you must meet the requirements of each of the learning outcomes (irrespective of the numerical grade awarded).

Criterion		Evidence				
Task and Weightage		**A (80-100%)**	**B (65-79%)**	**C (50-64%)**	**D (40-49%)**	**E (0-39%**
Task 1: **Theoretical Evaluation: Cloud-Based Virtualization Solution. (LO1)**	**(25%)**	Comprehensive evaluation of organizational needs with clear justification for a cost-effective, scalable, and secure cloud solution; accurate comparison of AWS pricing models and exceptional use of Auto Scaling and Load Balancing.	Solid evaluation of organizational needs and pricing models, good use of Auto Scaling and Load Balancing, but lacks detailed justification for the approach.	Basic evaluation of needs and pricing models, but with incomplete or somewhat inaccurate explanation of Auto Scaling and Load Balancing.	Superficial evaluation with minimal analysis of pricing models and Auto Scaling/Load Balancing; lacks depth.	Insufficient evaluation of organizational needs or pricing models; does not address Auto Scaling or Load Balancing.
Task 2: **Theoretical and Practical Evaluation: Designing a Virtualization Architecture. (LO2)**	**(25%)**	Well-designed architecture with clear, detailed diagrams, justifying AWS service choices, and strong security compliance with IAM roles and permissions.	Good design with diagrams and security configurations, but some aspects of the architecture or IAM roles may be less fully explained.	Design is functional, but security and service choices are only partially explained or incorrect. Diagrams may lack clarity.	Poorly designed architecture with incomplete diagrams and minimal security configuration or explanation of AWS services.	No coherent design; lacking key components like security configuration, IAM roles, or necessary AWS services.
Task 3:(25%) **Practical Implementation: Virtual Machines and Storage Services. (LO2)**	**(25%)**	Successfully launched EC2 instances with proper configurations, correctly set up S3 bucket with strict security policies, and implemented Elastic Load Balancer (ELB); clear documentation with screenshots.	EC2 instances are set up correctly with some minor issues, S3 bucket configuration is correct but lacks full security measures, and ELB implementation works but is incomplete or poorly documented.	EC2 instances are configured but with some errors in setup; S3 bucket or ELB setup is partially incorrect or incomplete; documentation is lacking in clarity or detail.	EC2 instances launched but with major errors or missing configurations; S3 bucket setup does not meet best practices; ELB not fully implemented.	No or very incomplete EC2 instances or S3 bucket configuration; Elastic Load Balancer missing; no documentation or incorrect screenshots.
Task 4: **Theoretical and Practical Evaluation: Optimization and Security. (LO1 and LO2)**	**(25%)**	Excellent application of AWS security best practices with proper IAM roles, MFA, CloudWatch configuration, and clear cost optimization through AWS Trusted Advisor.	Good application of security practices and cost optimization, but lacks detailed explanation of some aspects (e.g., CloudWatch configuration or MFA).	Basic security measures are applied, but with errors or missing configurations. Some attempts at cost optimization, but lacking detail.	Security practices are poorly implemented; CloudWatch configuration is incomplete or not working; limited cost optimization.	No or incorrect application of security best practices; CloudWatch and Trusted Advisor are not configured or are ineffective.