Coursework Overview and Assessment Criteria

Module Title:	Cloud Native Development
Module Code:	COM682 (50722) UU-FT , COM682 (50077) UU-PT, SUST, COM682 (51469) QAHE
Module Coordinator:	Zeeshan Tariq
Teaching Staff Responsible:	Zeeshan Tariq-50%, Hanif Ullah-50%
Semester (s) Taught:	One

Course / Year Group: BEng Hons Software Engineering
BSc Hons Computing Science
BSc Hons Computing Technologies
BSc Hons Interactive Computing
CSPT, CSPT(HLA)

Coursework / Exam Weighting: 100/0

Coursework Assessment Overview

This module is assessed by two pieces of coursework.

Coursework 1 consists of a single in-class test which will have a time limit of 60 minutes. Coursework 1 contributes to 25% of the overall mark for this module.

Coursework 2 is a practical skills assessment wherein students need to develop a solution and produce a related presentation. Coursework 2 contributes to 75% of the overall mark for this module.

The university has a number of rules and regulations surrounding assessment, late submissions, and illness. These are in the student guide [1] - ensure you read this and understand the impact of these rules and regulations.

These coursework assignments are detailed below.

Coursework 1 – In class examination [25%]

Released: During the lab session in Week 7
Feedback Date: Marks after 5 working days and feedback within 20 working days

Related Learning Outcomes:
1. Assess the concepts behind a range of cloud native development techniques and critically evaluate when to apply these paradigms to realisation of solutions.
2. Demonstrate a comprehensive understanding of modern cloud development, techniques, and practice and how it may be leveraged to address related challenges.

3. Comprehend administrative aspects related to cloud native development such as pricing concerns and access control.

During the delivery course of the module, students will be expected to complete a 60-minute, online test. This test will assess understanding of concepts that have been introduced and detailed until that point.

This exam will be set in the 7th week of teaching and will incorporate the following topics:
- Cloud Computing Concepts and Paradigms
- Total Cost Analysis
- Operational models: Virtualisation, Containerisation, Hosted services and serverless/event-driven operation
- Identity Management and Security Concerns
- Hosted Web Endpoints
- Serverless execution
- Hosted Document databases
- Hosted SQL databases
- Hosted storage models
- Cloud Design Patterns
- Responsibility models and legal issues

This is open book test, students can access notes, books and lectures. Use of internet at any time is not allowed during the test.

Coursework 1 will be based on multiple choice questions, delivered, submitted, and assessed through the Blackboard online learning environment.

Coursework 2 – A set exercise [75%]

Released: During the lab session in Week 7
Submission Deadline: 8th Dec 2023 (Week 11)
               For QAHE – 11th Dec 2023 (Week-12)
Feedback Date: Within 20 working days as per University guidelines

Related Learning Outcomes:
1. Assess the concepts behind a range of cloud native development techniques and critically evaluate when to apply these paradigms to realisation of solutions.
2. Demonstrate a comprehensive understanding of modern cloud development, techniques and practice and how it may be leveraged to address related challenges.
3. Comprehend administrative aspects related to cloud native development such as pricing concerns and access control.
4. Autonomously and independently identify deficiencies when interacting with a range of architectures and deployment paradigms, leveraging knowledge of these deficiencies to improve future practice.

Students will be set an exercise where they will be expected to design, develop, and deploy a cloud native solution in the form of a web app/website. Test must be taken in the University Lab.

Specifically for this exercise, students will be expected to perform the following 3 tasks.

Task 1 - Design:

Design a scalable, cloud native, web-application which acts as a **media sharing platform** facilitating sharing of video, audio or photographic content. The exact media type(s) which can share are at the discretion of the student. The ability to share multiple content types is encouraged.

The developed solution should leverage a range of cloud native technologies and concepts as taught within the module and module materials.
These may include the following:

- Design a simple webpage where the user can login using their credentials and upload some media files.
- Design a Database schema and create a hosted database to store the user entries.
- Deploy the REST API to support the creation, retrieval, updating, and deletion of various asset records using the Logic Apps
- Establish the blob storage to hold the media files
- Create a Cosmos DB to hold the information about the uploaded media files.
- Create an endpoint that will store images and metadata to Cosmos DB and Azure blob storage.
- Design CI/CD using GiT
- Add advanced services, such as Q&A maker, Translator, Conversion and some other that are available free on Azure

Ideally, this solution would integrate the following, but not limited to:
- Static HTML hosting of the content of a web page that interacts with a web backed through REST calls.
- Hosting of a REST endpoint (URIs) which provides service logic and connections to all necessary elements such as storage.
- Use any type of DB for hosting SQL databases and NoSQL storage.

Task 2 – Implement:

Implement, deploy, and test the solution designed in task 1. This should be implemented and deployed using the Microsoft Azure cloud platform taught and used within the practical exercises associated with this module.

Task 3 – Submission:

Student will submit two items:
1) Provide a slide deck which details the developed solution (details below);

2) An embedded video in PowerPoint slides where the student provides 5-minute max presentation of the developed, tested and deployed solution. You can attach this video as a separate item.

Once the solution is produced, students are required to produce a presentation that incorporates a 5-minute video capture demonstrating the solution. Do not run through slides in the video, the video is to include you talking about the project's backend, front end, and code.

Time Penalties: These deductions are from rubric section 'Video demonstartion and developed solution (25%)'
Within 5 mins – No penalty
> 30sec and < 1min – 10% deduction
>1min and above – 20% deduction

Should must follow the below ***content outline*** for slides:

- Title Slide: Project name, one line description. Student name, Student number.
- Discussion of the problem and identification of the issues related to   scalability for the resources used in your project.
- Solution architecture of the project (Azure resources)
- An overview of advanced features within the developed solution.
- An assessment of the limitations of the solution and an evaluation of its ability to scale
- Functionality of the recorded demonstration [5-minute video]. This needs to showcase the functionality of the solution and show its deployment to Azure.
- Concluding comments
- References

Slides should be produced in the ***PowerPoint format*** and will need to be uploaded to the relevant assessment area on Blackboard. Your presentation should not exceed more than 15 slides. Slide notes will not be assessed.

The assessment criteria for coursework 2 and rubric is presented as an appendix to this document.

N.B. Students should be aware of the plagiarism policy of the University and submit their coursework in accordance with this.

References

[1]   "Ulster University Student Guide." [Online]. Available: https://www.ulster.ac.uk/connect/guide.
[2]   IEEE, "Manuscript Templates for Conference Proceedings." [Online]. Available: https://www.ieee.org/conferences_events/conferences/publishing/templates.html.
[3]   IEEE, "IEEE Citation Reference." [Online]. Available: https://www.ieee.org/documents/ieeecitationref.pdf.
[4]   Mendeley Ltd, "Mendeley Citation Manager." [Online]. Available: https://www.mendeley.com/.

Appendix I – assessment criteria coursework II

	0%-39% (Fail) Poor, Insufficient, Incorrect	40%-49% (3rd) Basic, Weak, Flawed	50%-59% (2.2) Limited, Inconsistent, Unmanaged	60%-69% (2.1) Good, Consistent, Controlled	70%-79% (1st) Excellent, Comprehensive, Reflective	80%-100% (High 1st) Outstanding, Insightful, Professional	Overall credit allocation
Problem Definition and Discussion	Little description of the overall problem was provided, poor justification of why a cloud model needs to be adopted. Limited critical appraisal of the use of cloud technologies.	There was insufficient explanation of the issue as a whole, as well as inadequate justification for why a cloud-based model should be implemented. A constrained and selective analysis of the use of cloud computing technologies.	Moderate description of the overall problem was provided, adequate justification presented of why a cloud solution needs to be developed. Adequate critical appraisal of the use of cloud technologies and related patterns.	A sufficient amount of justification was provided as to why a cloud-based solution needs to be developed, and a good description of the problem as a whole was provided. Appropriate and critical evaluation of how cloud technologies and related patterns are being used in the solution.	Good description of the overall problem with a good justification of why a cloud solution needs to be developed. Strong critical appraisal of the use of cloud technologies, related patterns, and architectural components.	Excellent description of the issue as a whole, along with a full and comprehensive justification of why a solution based on the cloud ought to be developed. An in-depth analysis and evaluation of how cloud computing, associated patterns, and architectural components are being used.	15%
Overview of the technical solution developed	No justification for the choice of technology applied. No design presented No meaningful solution architecture was presented.	Justification for the choice of technology applied to the problem was minimal. Design was poorly informed and did not incorporate many cloud native elements. A moderate solution architecture was presented.	The technology used to produce the solution was appropriate given the development problem. Moderate effort was made to incorporate cloud native components. The design was satisfactorily informed by cloud native design patterns. An architectural diagram of the developed solution was presented.	Given the development issue, the technology used to produce the solution was appropriate, and sufficient details were provided. Cloud native components were incorporated with an appropriate amount of effort. Cloud native design patterns successfully informed the design. An architectural diagram of the developed solution was presented with detailed cloud components.	The technology used to produce the solution was carefully examined and logically chosen – given the development problem. Alternative technologies were examined and excluded accordingly. A wide range of cloud native components were incorporated into the solution. The solution architecture was documented well incorporating control flows and software architecture diagrams. The design of the solution was considered and justified through cloud native design patterns.	The technology that was used to produce the answer was thoroughly investigated, analysed, and selected in a logical manner, along with the reasoning behind the selection. Alternative technologies were investigated, detailed with pro and cons. The solution included a wide range of cloud native components with artitechuture diagram. insights for selection of the solution and its advantages over other cloud based solutions available in the literature.	20%
Advance Features	No advanced features were incorporated into the final solution.	Minimal efforts taken to present a possible advanced features to be included into the final solution.	One advanced feature was applied to the solution in a meaningful manner.	Two advanced features were implemented in the solution in a meaningful way, which resulted in an experience that was more	More than 2 advanced features were applied to the solution in a meaningful manner, providing a more compelling experience for the end users.	Insights for the selection of advance features were detailed in the solution. Impact of using these features on the solution is discussed in the video.	15%

Criteria							Weight
		Potentially, a partial incorporation of a feature has occurred but not fully implemented.	The application of this feature was justified given the context of the problem and will provide a more compelling experience for end users.	The application of implemented features was justifiable given the problem's context and will provide end users with a more engaging experience.	Incorporation of these features were well justified and integrated with finesse.	Details about how the inclusion of these features support in overall scalability of the solution and improved user experience.	
Assessment of Limitations and Scalability	The limitations of the solution were not enumerated nor discussed adequately. The solution integrates no elements to offer scalable operation.	The limitations of the solution were discussed without any reflection The solution minimally integrated elements to offer scalable operation.	Some limitations of the solution were discussed with some awareness of how to remedy these presented. Scalability was partially catered for in the solution.	"-3 limitations of the solution were discussed with some awareness of how to remedy these presented. Scalability was catered for most of the resources in the solution.	A broad appraisal of the limitations of the solution were presented. Strategies to address these were presented. Scalability was well catered for with multiple cloud native elements applied to achieve this.	A comprehensive analysis of the constraints imposed by the solution was provided here. Presented here are some potential solutions to these problems. Scalability was effectively addressed by employing a number of cloud-native components throughout the development process.	15%
Concluding comments	No reflection was applied to the solution, its functionality, limitations and potential applicability.	The proposed solution, its functionality, limitations, and its potential applicability were all given some reflections	Meaningful reflection was applied to the solution, its functionality, limitations, and potential applicability.	Veriety of meaningful reflection was applied to the solution, its functionality, limitations, and potential applicability.	Insightful reflection was applied to the solution, its functionality, limitations and potential applicability. Weaknesses were identified and improvements were suggested.	The solution, its functionality, its limitations, and its potential applicability were all given careful consideration in this in-depth analysis. It was determined what the problems were, and some potential solutions were proposed.	5%
Video Demonstration & developed solution.	The solution poorly or didn't operate at all. There was noevidence provided of the use of cloud native technologies in a scalable fashion.	The solution does operate but not explained in the video at all. There was limited evidence provided of the use of cloud native technologies in a scalable fashion.	The solution functioned moderately well. Implementation issues may have been present but were deemed acceptable. Some evidence of the use of scalable cloud native technologies was presented.	The solution performed well and had minimal implementation issues. Advanced techniques or functionality has been partially demonstrated. It was evident that the solution leveraged a range of scalable cloud native technologies.	The solution performed well and had no implementation issues. Advanced techniques or functionality has been well demonstrated. It was evident that the solution leveraged a range of scalable cloud native technologies.	The solution meets all requirements given in the CW and had no implementation issues. A thorough implementation of advanced features has been demonstrated. It was clear that the solution made use of a variety of scalable cloud native technologies.	25%
Referencing	No referencing.	Inadequate or incorrect referencing.	Only few references provides which doesn't relate to the solution	Relateable references provided	Correct and appropriate referencing.	Correct and appropriate referencing and within document citation.	5%