**Coursework Overview and Assessment Criteria**

**Module Title:** Cloud Native Development

**Module Code:** COM682 (QAHE-64481)

**Module Coordinator:** Dr Zeeshan Tariq

**Teaching Staff Responsible:** Dr Anupam Mazumdar (QAHE)

**Semester (s) Taught:** Two

**Course / Year Group**: QAHE

**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 design and develop a solution. Coursework 2 contributes to 75% of the overall mark for this module. CW2 will be received in two parts, part-1 is worth 35% and part-2 is worth 40%

The university has 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 – Class Test [25%]**

Released: During the lab session in Week 5 (In class)

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 5th 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
* Serverless execution
* Hosted Document databases
* Hosted SQL databases
* Hosted storage models
* Cloud Design Patterns

This is open book test, students can access notes, books and lectures. Use of internet at any time is not allowed during the test. Test must be attended at the campus’s lab.

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%]**

CW2 will be submitted in two parts. Part 1 is worth 35% and Part 2 is worth 40% of the overall coursework mark.

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.

**Coursework 2 – Part 1[ 35%]**

# Released: Week-1

Submission Deadline: Week-8 (21 March 2025)

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.

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

**Solution Designing:**

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 designed 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 on Cloud where the user can upload some media files. You may choose to create wireframes.
* Design an architecture of your solution consisting of VMs, DBs, Web servers, etc.
* Design a Database schema and create a hosted database to store the user entries.
* Design the REST API to support the creation, retrieval, updating, and deletion of various asset records using the Logic Apps

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.

**Submission:**

Students will submit a slide deck which details the designed solution (details below);

Students 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 (Only use Azure resources)
* An overview of advanced features that you intend to develop in the final solution.
* An assessment of the limitations of the solution and an evaluation of its ability to scale
* 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.

**Coursework 2 – Part 2[ 40%]**

# Released: Week-1

Submission Deadline: Week-12 (17 April 2025)

Feedback Date: Within 20 working days as per university guidelines

**Implementation of design:**

Implement, deploy, and test the solution designed in CW2 Part 1. This should be implemented and deployed using the Microsoft Azure cloud platform taught and used within the practical exercises associated with this module.

* Implement the solution based on the design produced in Part-1
* Create a Blob storage for storing multimedia, store metadata in Cosmos DB.
* Create endpoint URIs that will store images and metadata.
* Develop the REST API to support the creation, retrieval, updating, and deletion of various asset records using the Logic Apps
* Integrate CI/CD using GiT.
* Add advanced services, such as Azure App Monitor, App Insights, etc that are covered in labs.

**Submission:**

Each student will individually submit 5 mins video of the built solution:

* A video where the student provides 5-minute max walk-through of the developed, tested and deployed solution.
  + This video should demonstrate the functionality of the solution and showcase its deployment at Azure.
  + Student should present all of the used Azure resources.
* If there is no certain excuse, the video should include you (turn camera on, if possible). Ideally, the video should show a **live view of the** presenter.
* Please use **Panopto Capture**to record your video screencast - accessed by clicking the **'Panopto'** link from the menu on the left of the Blackboard site. While **Panopto Capture** is preferred, several free tools are available to support the dual recording feature – computer screen and presenter - (e.g., <https://screencast-o-matic.com/>).
* Please refer to the University's Panopto support pages for information on [Using Panopto Capture](https://ulster.atlassian.net/wiki/spaces/BLS/pages/379256833/Using+Panopto+Capture) and [Submitting to a Panopto Student Video Assignment](https://ulster.atlassian.net/wiki/spaces/BLS/pages/229548/Submitting+to+a+Panopto+Student+Video+Assignment).

**Time Penalties**: These deductions are from rubric section ‘Video Quality and Presentation’  
*Within 5 mins – No penalty*

*> 30sec and < 1min – 10% deduction*

*>1min and above – 20% deduction*

***Plagiarism***

*N.B. Students should be aware of the plagiarism policy of the University and submit their coursework in accordance with this. Plagiarism is the unattributed copying of the work of another person, either from a published work or the work of another student. It is a form of literary theft and is not permitted under any circumstances. Plagiarism is regarded by the University as a very serious offence and subject to formal disciplinary proceedings. See* [3] *for more details.*

*I declare that this is all my own work. Any material I have referred to has been accurately referenced and any contribution of Artificial Intelligence technology has been fully acknowledged. I have read the University’s policy on academic misconduct and understand the different forms of academic misconduct. If it is shown that material has been falsified, plagiarised, or I have otherwise attempted to obtain an unfair advantage for myself or others, I understand that I may face sanctions in accordance with the policies and procedures of the University. A mark of zero may be awarded and the reason for that mark will be recorded on my file.*

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

**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 2 Part-1**

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|  | ***0%-39% (Fail)*** | ***40%-49% (3rd)*** | ***50%-59% (2.2)*** | ***60%-69% (2.1)*** | ***70%-79% (1st)*** | ***80%-100% (High 1st)*** | *Overall credit allocation* |
| Poor, Insufficient, Incorrect | Basic, Weak, Flawed | Limited, Inconsistent, Unmanaged | Good, Consistent, Controlled | Excellent, Comprehensive, Reflective | Outstanding, Insightful, Professional |
| ***Problem Definition and Discussion*** | Little description of the overall problem was provided, poor justification of why a cloud model needs to be adopted. | There was insufficient explanation of the issue as a whole, as well as inadequate justification for why a cloud-based model should be implemented. | Moderate description of the overall problem was provided, adequate justification presented of why a cloud solution needs to be developed. | 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. | Good description of the overall problem with a good justification of why a cloud solution needs to be developed. | 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. | *20%* |
| Limited critical appraisal of the use of cloud technologies. | A constrained and selective analysis of the use of cloud computing technologies. | Adequate critical appraisal of the use of cloud technologies and related patterns. | Appropriate and critical evaluation of how cloud technologies and related patterns are being used in the solution. | Strong critical appraisal of the use of cloud technologies, related patterns, and architectural components. | An in-depth analysis and evaluation of how cloud computing, associated patterns, and architectural components are being used. |
| ***Overview of the technical solution developed*** | No justification for the choice of technology applied. | Justification for the choice of technology applied to the problem was minimal. | The technology used to produce the solution was appropriate given the development problem. | Given the development issue, the technology used to produce the solution was appropriate, and sufficient details were provided. | The technology used to produce the solution was carefully examined and logically chosen – given the development problem. | 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. | *40%* |
| No design presented | Design was poorly informed and did not incorporate many clouds native elements. | Moderate effort was made to incorporate cloud native components. The design was satisfactorily informed by cloud native design patterns. | Cloud native components were incorporated with an appropriate amount of effort. Cloud native design patterns successfully informed the design. | Alternative technologies were examined and excluded accordingly. A wide range of cloud native components were incorporated into the solution. | Alternative technologies were investigated, detailed with pro and cons. The solution included a wide range of cloud native components with architecture diagram. |
| No meaningful solution architecture was presented. | A moderate solution architecture was presented. | An architectural diagram of the developed solution was presented. | An architectural diagram of the developed solution was presented with detailed cloud components. | 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. | Insights for selection of the solution and its advantages over other cloud-based solutions available in the literature. |
| ***Assessment of Limitations of the solution*** | The limitations of the solution were not enumerated nor discussed adequately. | The limitations of the solution were discussed without any reflection | Some limitations of the solution were discussed with some awareness of how to remedy these presented. | "-3 limitations of the solution were discussed with some awareness of how to remedy these presented. | A broad appraisal of the limitations of the solution were presented. Strategies to address these were presented. | A comprehensive analysis of the constraints imposed by the solution was provided here. Presented here are some potential solutions to these problems. | *15%* |
| ***Assessment of Scalability*** | The solution integrates no elements to offer scalable operation. | The solution minimally integrated elements to offer scalable operation. | Scalability was partially catered for in the solution. | Scalability was catered for most of the resources in the solution. | Scalability was well catered for with multiple cloud native elements applied to achieve this. | 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, its limitations, and its potential applicability were all given some reflections | Meaningful reflection was applied to the solution, its functionality, limitations, and potential applicability. | Variety 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%* |
| ***Referencing*** | No referencing. | Inadequate or incorrect referencing. | Only few references provide which doesn’t relate to the solution | Relatable references provided | Correct and appropriate referencing. | Correct and appropriate referencing and within document citation. | *5%* |

**Appendix II – assessment criteria coursework 2 Part-2**

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|  | ***0%-39% (Fail)*** | ***40%-49% (3rd)*** | ***50%-59% (2.2)*** | ***60%-69% (2.1)*** | ***70%-79% (1st)*** | ***80%-100% (High 1st)*** | *Overall credit allocation* |
| *Poor, Insufficient, Incorrect* | *Basic, Weak, Flawed* | *Limited, Inconsistent, Unmanaged* | *Good, Consistent, Controlled* | *Excellent, Comprehensive, Reflective* | *Outstanding, Insightful, Professional* |
| Implementation | Incomplete or incorrect implementation. Key components are missing, non-functional, or improperly deployed. | Basic implementation with significant issues or missing components. | Adequate implementation with most components functional, though minor errors may exist. | Comprehensive implementation with all major components functional and well-integrated. | Detailed and highly effective implementation with all components seamlessly integrated and functional. | Exceptional and innovative implementation with all components expertly integrated and functional. | *35%* |
| Use of Azure Resources | Poor or incorrect use of Azure resources. Key services are missing or non-functional. | Some Azure resources used, but implementation is flawed or incomplete. | Adequate use of Azure resources with most components correctly deployed and functional. | Effective use of Azure resources with all components correctly deployed and well-integrated. | Excellent use of Azure resources with all components flawlessly deployed and integrated. | Masterful use of Azure resources with flawless deployment and integration. | *35%* |
| Use of Advanced Features | Little to no attempt to integrate advanced features. Features are non-functional or incorrectly implemented. | Minimal integration of advanced features, with limited functionality. | Some integration of advanced features, with basic functionality. | Effective integration of advanced features with good functionality. | Advanced features are expertly integrated and fully functional, significantly enhancing the solution. | Advanced features integrated at an expert level, adding significant value. | *20%* |
| Video Quality and Presentation | Poorly structured video, unclear, lacks key elements. May not appear in video. | Somewhat clear video but may be poorly structured or lack essential content. | Clear video that presents the solution adequately but may lack depth. | Well-structured and clear video, presenting the solution effectively. | Highly professional video, clearly structured, within the time limit. | Exemplary video with clear, well-structured presentation, highly professional. | *10%* |