**School of Engineering, Computing and Mathematics**

**Oxford Brookes University**

**COMP7033 Big Data and The Cloud**

**(Semester 2, 2022-2023)**

Coursework 1 Specification

Analysis And Design of A Big Data and Cloud Application

# Assessed Learning Outcomes

This coursework counts **50%** of total assessment of this module.

It is designed to develop and assess your attainment of the following learning outcomes.

* *Learning Outcomes 1*: “Critically analyse the key concepts in Big Data Analytics including tools, techniques, and applications”
* *Learning Outcomes 2* (partly): *“*Design and critically evaluate a solution to a real-world Big Data problem”
* *Learning Outcomes 3*: “Critically appraise the challenges posed by Big Data Analytics”
* *Learning Outcomes 4*: “Work in context informed by relevant privacy issues”.

It is design to assess the following AHEP 4 learning outcomes.

* *M3*: Select and apply appropriate computational and analytical techniques to model complex problems, discussing the limitations of the techniques employed.
* *M4*: Select and critically evaluate technical literature and other sources of information to solve complex problems.
* *M5*: Design solutions for complex problems that evidence some originality and meet a combination of societal, user, business and customer needs as appropriate. This will involve consideration of applicable health & safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards.
* *M7*: Evaluate the environmental and societal impact of solutions to complex problems (to include the entire life-cycle of a product or process) and minimise adverse impacts.
* *M16*: Function effectively as an individual, and as a member or leader of a team. Evaluate effectiveness of own and team performance.

# The problem to be solved

The goal of this coursework is to identify the quality requirements of a given computer application of big data and cloud computing techniques, to analyse the professional, legal, ethical and social (PLES) issues associated to the application, and to make an architectural design of a solution that meets both the functional and non-functional requirements and addresses the PLES issues.

The application to be developed is a mobile cloud application of a multi-tenant virtual learning environment called *ClaClo*. The functional requirements of the application and the key features to be implemented are given in the coursework case study, which is available on the Moodle website.

In this coursework, you will use the theory and technology of big data, mobile computing and cloud computing taught in this module to develop one of the four subsystems of the application. You will be ***assessed individually***, but you are required to collaborate within a group of 4 students on the same module to integrate the subsystems into a complete solution.

Each student should select one of the following subsystems to work on throughout this coursework and coursework 2. Different members of the group must choose a different subsystem.

1. *ClaClo-Student*: a subsystem for students to receive information and learning materials as well as to do exercises and conduct and/or submit assessments works.
2. *ClaClo-Teacher*: a subsystem for teachers to assign exercises and coursework to the students, to receive and mark student works (include exercises and assessments) and provide feedback to the students.
3. *ClaClo-Admin*: a subsystem for university administrators to manage the curriculum and courses of the university.
4. *ClaClo-Ops*: a subsystem for the platform operators to manage the university accounts hosted on the platform and to provide cross university services.

# Tasks to do

The following is a brief description of the tasks and the distribution of their weights in the assessment. A detailed marking scheme is available on Moodle.

## **Task 1: Analysis and specification of quality requirements (10 Marks)**

You are required to analyse the quality requirements that are critical for the applications based on your understanding of the functional requirements. Typically, the quality requirements should cover aspects of *performance*, *scalability*, *reliability*, *security*, *privacy*, etc. Each student should identify and specify the quality requirements of your selected subsystem.

## **Task 2: Analysis and discussion of the PLES aspects associated to the system (10 Marks)**

Each student should identify the issues of professional, legal, ethical and social aspect related to the development and operation of your selected subsystem.

## **Task 3: Architectural Design (20 Marks)**

Each student should work independently make an architectural design of the subsystem. In order to enable the integration of the subsystems into one coherent system, the members of the group should collaborate to provide interfaces in the form of APIs so that the components of your subsystem can interact with other subsystems.

The architectural style of the system should be *microservices*.

You should also justify that your design meets the quality requirements.

## **Task 4: Documentation (10 Marks)**

In this task, you are required to assemble the results of your work on the above tasks into a well-structured and well-presented document on the system’s quality requirements, PLES issues, and the architectural design of a solution including a discussion about the design on how it meets the quality requirements.

You should also include a section to reflect on your collaboration with the coursework group, especially on how your subsystem will integrates with other subsystems as designed.

# Submission of Coursework

## When to submit

The submission deadline is at 23:00pm on Sunday, the 10th March 2024 (End of Week 6).

## What to be submitted

Each student must submit **one** file in pdf format.

***Note****:*

*(1) The workload on this coursework is 30 hours.*

*(2) If you have used the work of others in your coursework submission, you are required to cite the work and include a list of references using the university recommended referencing style.*

## Where to submit

You must upload the file the module’s Moodle website.

## Feedback on your coursework

* The formal summative feedbacks on your coursework will be provided within 2 weeks of time after your submission of the coursework.
* Informal verbal feedbacks can be obtained from the lecturer during the whole process of the module at any time, such as during practical classes. The students are encouraged to show their work to the lecturer and seeking for comments and advises.