Northeastern University London

Assessment Brief: Coursework 2023-24

Assessment Details

Course Title:	Advanced Programming with Data
Course Code:	LDSCI5206
Course Leader:	Amil Mohanan
Level:	5
First or Second Sitting:	First
Assessment Title	Microservice
Assessment Number:	AE2
Assessment Type:	Written Assignment – Group
Restrictions on Time/Length:	2,500 words
Individual/Group:	Group
Assessment Weighting:	30%
Issue Date:	15 January 2025
Hand in Deadline:	28 March 2025, 13:00
Planned Feedback Deadline:	28 calendar days after hand in deadline
File format accepted:	PDF
Mode of Submission:	Canvas
Anonymous Marking:	NO

Assessment Task

Create a web application as a group that allows users to interact with a classification model that is trained on the Diabetes dataset available inside scikit-learn. The application should consist of a Python microservice that serves the model via an API and an appropriate front-end that allows users to access the model and generate visualisations for viewing the data.

As well as a working microservice implementation, the task will be assessed using a written report that documents the application and how it was developed. The documentation should demonstrate technical writing proficiency by effectively communicating complex concepts to both technical and non-technical audiences,

supported by appropriate diagrams and examples. As this is a group project, you must show evidence of how you made technical decisions, roles were delegated and how you used version control software to collaborate on the project.

Requirements

Create a web application using the Iris dataset that consists of two main components. The backend should be a microservice that loads the Diabetes dataset, trains a classification model and provides API endpoints for making predictions on new data points, retrieving cluster centres, and accessing the complete clustered dataset for visualisation.

The frontend should be a simple, interactive web interface where users can input the following information and receive predictions:

- age in years
- sex
- body mass index
- average blood pressure
- total serum cholesterol
- low-density lipoproteins
- high-density lipoproteins
- total cholesterol / HDL
- possibly log of serum triglycerides level
- blood sugar level

The interface must include a scatter plot visualisation of the dataset showing the different clusters and their centres.

Backend

Create an API that is capable of serving a machine learning model via a REST interface

It should provide endpoints for:

- Getting cluster predictions for new data points
- Retrieving cluster centres
- Getting the entire clustered dataset for visualisation
- Implement error handling and validation
- Contain extensive unit tests and typing

Frontend

Create a simple web interface that:

- Allows users to input measurements
- Displays prediction results
- Shows a scatter plot of the dataset with cluster assignments

Assessment Criteria

This assignment is marked as a group written report that documents your reflections on the development process and professional practice. This report should demonstrate your ability to communicate technical decisions and work effectively in a team environment. The report will be assessed using the qualitative assessment rubric, against which each respective learning outcome specified below will be marked.

You report should cover the following topics:

Project Design

Provide a clear description of your application architecture **(K1b, K2b)**

- Include architecture diagrams and defend your design decisions
- This should justify the adoption of a microservice architecture

Contain instructions for setting up application **(T3b)**

Provide clear documentation for the API with examples **(T3b)**

Working as a Team (T4b)

Document role assignments and how responsibilities were distributed

Explain how technical decisions were made as a team

Document your team's Git workflow and branching strategy

- Include screenshots to give examples of how you collaborated using version control tools

Reflections (T2b)

Reflect on any challenges faced and how they were overcome

Propose any specific improvements to the existing implementation

Submitting Assessments

You will have an opportunity to present your architecture design as a group and receive formative feedback during the course. Work should be submitted as a PDF which includes a link to the repositories for the microservice and front-end detailed in the assessment criteria on the VLE.

You have three submission attempts, but only the last submission will be graded. If your last submission attempt is late, you will receive the late penalty even if you have a previous submission that was on time. Please make sure to avoid multiple submissions for assessments with multiple components, as only the last attempt will be graded. Upload several files in one submission attempt instead.

If your assessment requires anonymous submission (see the assessment details table at the top of your assessment brief), please be sure you have left your name off of your submission and out of the submission file name, as failing to do so may result in a 0% mark on the assessment.

Refer to the assessment details table in your assignment brief for acceptable file formats. Avoid submitting zip files (unless explicitly required by the assessment brief); use the 'add files' function to submit multiple files instead. If you are submitting a physical artefact, you must also provide clear and thorough documentation (such as in the form of photographs or a video) of your submission by the deadline; see the bottom of this section for guidance on submitting video files.

Please ensure that you tick the agreement box at the very bottom of your Canvas submission page (scroll down if you don't see it). This will enable you to select 'Submit Assessment.' Please review the submitted file to ensure that everything is in order.

If you encounter any issues with submission, e-mail a copy of your assignment before the deadline to student.assessments@nulondon.ac.uk along with screenshots of the problem on Canvas, showing a timestamp.

To turn on notifications for submission confirmation emails in your Canvas settings: Account > Notifications > Turn on the bell for 'All submissions.' In the app this is via Settings > Email Notifications > All submissions.

To submit a video recording: Select the 'Panopto video' icon in the text entry box in your submission portal. You can upload a video file of any format from your media library by selecting 'upload,' choosing 'my folder' in the drop down menu, and clicking 'insert.' You should be able to play the video back once it processes. See further explanation, including guidance on recording videos using Panopto, in this support article: 'How to Submit a Video Assignment in Canvas.'

Marking

The University uses two categorical assessment marking schemes – one for undergraduate and one for postgraduate – to mark all taught programmes leading to an award of the University.

More detailed information on the categorical assessment marking scheme and the criteria can be found in the Course Syllabus, available on the University's VLE.

Learning Outcomes

This assessment will enable students to demonstrate in full or in part the learning outcomes identified in the Course Descriptor.

On successful completion of this assessment, students should be able to:

Knowledge and Understanding

K1b	Demonstrate knowledge and critical understanding of software design paradigms.
K2b	Create, refine and express a software design in graphical notation such as UML class diagrams.

Subject-Specific Skills

S1b	Choose, include, and implement design patterns appropriately to design solutions to problems and understand the impact of the design decisions on the technical, social and management dimensions of software.
S2b	Develop well-documented, understandable, reusable and extensible code in an object-oriented programming language, accompanied with appropriate unit testing, to solve small to moderately-sized computing problems.

Transferable Skills

T2b	Review and defend the design choices made in existing software libraries and frameworks to a group of peers, identify limitations and propose ways for improvement.
T3b	Demonstrate a sound technical proficiency in written English and skill in selecting vocabulary so as to communicate effectively to specialist and non-specialist audiences.
T4b	Work in a proactive and effective manner as part of a team in a data-driven application project, assuming significant responsibility in the design and implementation of software for that project.

Accessing Feedback

Students can expect to receive feedback on all summative coursework within 28 calendar days of the submission deadline. The 28 calendar day deadline does not apply to work submitted late. Feedback can be accessed through the Turnitin assessment link on the course page. Further instructions on submitting an assessment and accessing feedback can be found on the University's VLE.

Late Submissions

Please ensure that you submit your assignment well before the deadline to avoid any late penalties, as a submission made exactly on the deadline will be considered late. Please keep in mind that there may be differences between your computer's clock and the server time, which can cause discrepancies, and that Canvas may take some time to process your submission.

Your Canvas submission portal displays two due dates: one is the deadline for your assignment, and the second is the latest possible date by which your assignment can be submitted late. Please make sure you submit by the assessment deadline in order to avoid late penalties.

If assessments are submitted late without approved Extenuating Circumstances, there are penalties:

- For assessment elements submitted up to one day late, any passing mark will receive 10 marks deducted or a threshold pass (40% for undergraduate students, 50% for postgraduate students), whichever is higher. Any mark below 40% for undergraduate students and below 50% for postgraduate students will stand.
- Students who do not submit their assessment within one day of the deadline, and have no approved Extenuating Circumstances, are deemed not to have submitted and to have failed that assessment element. The mark recorded will be 0%.
- For assessment subelements, late submission will result in non-submission penalties deducted according to the marking criteria above.

For further information, please refer to AQF7 Part C in the Academic Handbook.

Extenuating Circumstances

The University's Extenuating Circumstances (ECs) procedure is in place if there are genuine circumstances that may prevent a student from submitting an assessment. If the EC application is successful, there will be no academic penalty for missing the published submission deadline.

Students are normally expected to apply for ECs in advance of the assessment deadline. Students may apply for consideration of ECs retrospectively if they can

provide evidence that they could not have done so in advance of the deadline. All applications for ECs must be supported by independent evidence.

Successful EC applications for live oral assessments, including vivas, will result in a deferral of the oral to be organized by faculty, students, and Timetabling for a date as close as possible to the original presentation date. The deadline for supplementary materials, if assigned, will be carried forward by the length of the oral assessment extension.

Missing an oral assessment, including a compulsory viva, without an approved EC will result in a non-submission for the entire assessment and, accordingly, a recorded mark of 0%.

Students are reminded that the ECs procedure covers only short-term issues (within 21 days leading to the submission deadline) and that if they experience longer-term matters that impact on learning then they must contact Student Support and Development for advice.

Under the Extenuating Circumstances Policy, students may defer an assessed element on only one occasion and may request an extension on a maximum of two occasions.

For further information, please refer to the Extenuating Circumstances Policy in the Academic Handbook.

Academic Misconduct

Any submission must be a student's own work and, where facts or ideas have been used from other sources, these sources must be appropriately referenced. The University reserves the right to hold a viva if there are concerns about the authenticity of a student's or learner's work. The Academic Misconduct Policy includes the definitions of all practices that will be deemed to constitute academic misconduct. This includes the use of artificial intelligence (AI) where not expressly permitted within the assessment brief, or in a manner other than specified. Students should check this policy before submitting their work. Students suspected of committing Academic Misconduct will face action under the Policy. Where students are found to have committed an offence they will be subject to sanction, which may include failing an assessment, failing a course or being dismissed from the University depending upon the severity of the offence committed. For further information, please refer to the Academic Misconduct Policy in the Academic Handbook.

Version History

Title: Assessment Brief Template **Approved by: The Quality Team**					
Version number	**Date approved**	**Date published**	**Owner**	**Location**	**Proposed next review date**
4.0	March 2023	March 2023	Registrar	VLE/ Faculty Resources Page	March 2024
3.0	August 2022	August 2022	Registrar	VLE, Faculty Resources Page	July 2023
2.3	December 2021	December 2021	Registrar	VLE	August 2022
2.2	August 2021	August 2021	Registrar	VLE	August 2022
2.1	September 2020	September 2020	Registrar	VLE	August 2021
2.0	September 2020	September 2020	Registrar	VLE	August 2021
1.0	August 2019	August 2019	Registrar	VLE	August 2020
Referenced documents	AQF7 Academic Regulations for Taught Awards; Extenuating Circumstances Policy; Academic Misconduct Policy; Course Syllabus				
External Reference Point(s)	UK Quality Code Theme: Assessment				