University of Central Lancashire
UCLan

Academic Year: 2024-2025

Assessment Introduction:

Course:
MSc Electrical and Electronic Engineering
MSc Applied Data Science
MEng Robotics Electronic Engineering
PGCert Engineering

Module Code: EL4012
Module Title: Internet of Things

Title of the Brief:
IoT Application

Type of assessment: Coursework (This assessment is worth 50% of the overall module mark)

This Assessment Pack consists of a detailed assignment brief, guidance on what you need to prepare, and information on how class sessions support your ability to complete successfully. You'll also find information on this page to guide you on how, where, and when to submit. If you need additional support, please make a note of the services detailed in this document.

How, when, and where to submit:

Assessment Release date: **6th November 2024**

Mutually agreed Proposal Deadline date: **3rd December 2024**. Email Agreed Proposal document to zxie2@uclan.ac.uk

Assessment Deadline Date and time: **20th January 2025, 23:59**. Report submission is via the Turnitin link on Blackboard. The submission also includes a short video (max 5 mins, sent as a link by email to zxie2@uclan.ac.uk) illustrating the capabilities of your system. Any code created should be included as an appendix to the report. The Turnitin link will be visible to you on 6th January 2025.

Please note that the submission deadline of 20/01/2025 23:59 is the final time you can submit – not the time to submit!

Your feedback and mark for this assessment will be provided within the University's 15 working day policy for feedback, by 10th February 2025.

You should aim to submit your assessment in advance of the deadline.

Note: If you have any valid mitigating circumstances that mean you cannot meet an assessment submission deadline and you wish to request an extension, you will need to apply online, via MyUCLan with your evidence **prior to the deadline**. Further information on Mitigating Circumstances via this link.

We wish you all success in completing your assessment. Read this guidance carefully, and any questions, please discuss with your Module Leader.

Additional Support available:

All links are available through the online Student Hub

1. Academic support for this assessment will be provided by contacting Zheng Xie, zxie2@uclan.ac.uk

2. Our **Library resources** link can be found in the library area of the Student Hub or via your subject librarian at SubjectLibrarians@uclan.ac.uk.

3. Support with your academic skills development (academic writing, critical thinking and referencing) is available through **WISER** on the Study Skills section of the Student Hub.

4. For help with Turnitin, see Blackboard and Turnitin Support on the Student Hub

5. If you have a disability, specific learning difficulty, long-term health or mental health condition, and not yet advised us, or would like to review your support, **Inclusive Support** can assist with reasonable adjustments and support. To find out more, you can visit the Inclusive Support page of the Student Hub.

6. For mental health and wellbeing support, please complete our online referral form, or email wellbeing@uclan.ac.uk. You can also call 01772 893020, attend a drop-in, or visit our UCLan **Wellbeing Service** Student Hub pages for more information.

7. For any other support query, please contact **Student Support** via studentsupport@uclan.ac.uk.

8. For consideration of Academic Integrity, please refer to detailed guidelines in our policy document . All assessed work should be genuinely your own work, and all resources fully cited.

9. For this assignment, you are not permitted to use any category of AI tools.

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Preparing for your assignment.

The lectures and associated practical work provide background information to this coursework. Ensure that you fully understand the requirements of the assessment. Any questions about the requirements could be mentioned to the lecturer during the teaching sessions or via emails. Make sure you read the guide to writing a technical document https://www.theiet.org/media/5182/technical-report-writing.pdf

This coursework consists of a complete system. Do not leave work until the last minute.

The following module learning outcome will be assessed in this assignment.

- Develop an IoT application for a selected problem.

Assessment Brief

The availability of cheap, powerful microcontrollers and associated communications hardware has enabled the proliferation of a whole range of 'IoT' systems, from sensing/monitoring applications to remote control and assistive technologies. Cheap cloud processing and storage means that these devices are beginning to revolutionise our approach to monitoring and control, from home automation systems, through environmental monitoring/control, to 'Industrial IoT' applications.

You are to design, develop, test and evaluate a prototype system which can be applied to one of the application areas outlined above. Consideration should be given to the following criteria (where appropriate):

Size
Cost
Power Requirements – lifetime, recharging
Technology
Speed
Reliability
Communications – choice of protocols, media, etc.
Operational lifetime
System Maintenance/Updating
Security (of system and data) – potential threats and their effect
Infrastructure requirements
Use of cloud-based data storage/processing/visualisation

The system must be implemented using an ESP32, programmed in MicroPython, in the Linux-Ubuntu operating system – screen shots in the report should confirm this.

The report should detail the design, development, testing and evaluation of the system. The Laboratory demonstration video should highlight the important features of the system and may be augmented by a short session where you will be asked to explain/defend your system.

As each system will be different, each student will need to submit a one-page Proposal (plus initial system diagram) to the lecturer for agreement at the outset. This proposal may be modified by mutual consent as the system is developed. The aim of this is to ensure that the assignment does not 'drift'. I will email students as confirmation of an acceptable initial specification, and on any agreed updates/modifications to that specification. Make sure you obtain this email confirmation

Marking Scheme

This assignment contributes up to 50% of the mark for the module. As it is a student-devised system, the marking scheme is somewhat generic.

Marks will be awarded as follows:

Item	**Possible Mark %**	**Comment**
Documentation of the initial specification of an IoT system	10	Final version of the agreed specification, due by end of February 2024.
Justified choices of technology with reference to the specification and alternative technologies	10	Set out alternatives and justify selection. Describe steps taken to conserve power and other resources (like communications bandwidth).
Description of the development and testing of the system (this section may include packet-based captures of data)	20	Coverage of issues that emerged during development, and problem-solving strategies that were used.
Use of third-party cloud-based systems	10	Marks for innovative/appropriate use of available systems.
Security – implementation and evidence in the form of captured packet data	10	Description of security/encryption measures taken.
Innovation	10	Use of new, innovative, appropriate technologies not covered in class.
Evaluation of the system	10	Technical evaluation of your system, highlighting strengths and weaknesses, and possible improvements.
Laboratory demonstration (video) of your system	*20*	*You are required to demonstrate and explain your system. You may subsequently be asked questions in order to clarify your work.*

(Items in italics will be assessed by demonstration)

Submission of assignment work

Proposal: Brief proposal of work to be submitted and agreed with Module Leader by 3rd December 2024. Submitted by email to zxie2@uclan.ac.uk, and agreed by return of email.

Report due by 20th January 2025, plus a short (max 5 mins) demonstration video. Report should be submitted to Blackboard via Turnitin, video by link in email to zxie2@uclan.ac.uk.

Example Assessment

Examples of completed projects will be discussed during classes.

Feedback Guidance:

Reflecting on Feedback: how to improve.

From the feedback you receive, you should understand:

- The grade you achieved.
- The best features of your work.
- Areas you may not have fully understood.
- Areas you are doing well but could develop your understanding.
- What you can do to improve in the future - feedforward.

Use the WISER: Academic Skills Development service. WISER can review feedback and help you understand your feedback. You can also use the WISER Feedback Glossary

Next Steps:

- List the steps have you taken to respond to previous feedback.
- Summarise your achievements
- Evaluate where you need to improve here (keep handy for future work):