ENGG4201

Internet of Things Systems Design

Session 1, In person-scheduled-weekday, North Ryde 2025

School of Engineering

Contents

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General Information

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Credit points
10

Prerequisites
Completion of 200 credit points at 1000 level or above

Corequisites

Co-badged status

Unit description
This unit will broadly explore the underlying technologies, applications, and systems design principles underlying the Internet of Things. Students will explore the principles of IoT systems while engaging in their own group-based design and build of a practical IoT system. To support the design and build process, the principles covered will begin with foundation knowledge in IoT devices and systems, including network architectures and technologies, sensors, embedded processing and actuators. Concepts will then build towards notions of IoT communications and data protocols, security, data visualization, Machine Learning and Artificial Intelligence techniques for IoT data, all highlighted by IoT application case studies.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

ULO1: Apply knowledge of fundamental components to implement IoT system such as sensors, embedded processors, interfacing electronics and wireless communicating devices, in designing and building a simple IoT system.

ULO2: Select proper hardware to design and implement IoT systems for remote monitoring and control

ULO3: Explain critical IoT communications technologies and network protocols, security and implementation

ULO4: Demonstrate understanding of data management, visualization and analysis techniques for IoT Data

ULO5: Investigate, critically evaluate, and communicate the effectiveness and performance of different IoT systems and their constituent components.

General Assessment Information

The details of the assessment, report and demonstration will be discussed during the lectures as well as during the practical activities. The guidelines along with due dates will be provided in iLearn.

The lectures will start from Week#1: The lectures of the very first week only will be on line over zoom. The lectures and practical from the Week#2 will be F2F, The pracs activities will start from Week#2.

Requirements to Pass this Unit

Grading and passing requirement for unit: In order to pass this unit a student must obtain a total mark of 50 or more for the unit (i.e. obtain a passing grade P/ CR/ D/ HD). If any student fails to obtain a total minimum of 50% marks, the student needs to repeat the unit in the following year.

Hurdle Requirement: There is no hurdle requirement in this unit.

Late Assessment Submission

Late assessments for the submission of reports are not accepted in this unit unless a Special Consideration has been submitted and approved.

The finer details of individual versus group reports will be discussed during the practical activities and provided in iLearn.

Assessment Tasks

Name	Weighting	Hurdle	Due
Individual research report - Final report	15%	No	Week#13
Progress Report on practical implementation of IoT project	10%	No	Week 8
Initial project idea presentation	10%	No	Week 3
Final Examination	30%	No	Week 13
Mid-term Test	15%	No	Week 7
Demonstration of project work	20%	No	Week 13

Individual research report - Final report

Assessment Type [1]: Report
Indicative Time on Task [2]: 8 hours
Due: **Week#13**
Weighting: **15%**

Individual research report on IoT literature, application case studies and the actual implementation of the project activities

On successful completion you will be able to:
- Apply knowledge of fundamental components to implement IoT system such as sensors, embedded processors, interfacing electronics and wireless communicating devices, in designing and building a simple IoT system.
- Explain critical IoT communications technologies and network protocols, security and implementation
- Investigate, critically evaluate, and communicate the effectiveness and performance of different IoT systems and their constituent components.

Progress Report on practical implementation of IoT project

Assessment Type [1]: Project
Indicative Time on Task [2]: 6 hours
Due: **Week 8**
Weighting: **10%**

Working in groups, students will present the design problem and solution in the form of written report

On successful completion you will be able to:

- Apply knowledge of fundamental components to implement IoT system such as sensors, embedded processors, interfacing electronics and wireless communicating devices, in designing and building a simple IoT system.
- Select proper hardware to design and implement IoT systems for remote monitoring and control
- Explain critical IoT communications technologies and network protocols, security and implementation
- Demonstrate understanding of data management, visualization and analysis techniques for IoT Data

Initial project idea presentation

Assessment Type [1]: Presentation
Indicative Time on Task [2]: 6 hours
Due: **Week 3**
Weighting: **10%**

On Week#3, the students will present the project idea. The students will work in a team of 2 to 3 members.

On successful completion you will be able to:

- Apply knowledge of fundamental components to implement IoT system such as sensors, embedded processors, interfacing electronics and wireless communicating devices, in designing and building a simple IoT system.
- Select proper hardware to design and implement IoT systems for remote monitoring and control
- Explain critical IoT communications technologies and network protocols, security and implementation
- Demonstrate understanding of data management, visualization and analysis techniques for IoT Data

- Investigate, critically evaluate, and communicate the effectiveness and performance of different IoT systems and their constituent components.

Final Examination

Assessment Type [1]: Examination
Indicative Time on Task [2]: 10 hours
Due: **Week 13**
Weighting: **30%**

Final Examination

On successful completion you will be able to:

- Apply knowledge of fundamental components to implement IoT system such as sensors, embedded processors, interfacing electronics and wireless communicating devices, in designing and building a simple IoT system.
- Select proper hardware to design and implement IoT systems for remote monitoring and control
- Explain critical IoT communications technologies and network protocols, security and implementation
- Demonstrate understanding of data management, visualization and analysis techniques for IoT Data

Mid-term Test

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 6 hours
Due: **Week 7**
Weighting: **15%**

There will be a mid-term test on Week#7

On successful completion you will be able to:

- Apply knowledge of fundamental components to implement IoT system such as sensors, embedded processors, interfacing electronics and wireless communicating devices, in designing and building a simple IoT system.
- Select proper hardware to design and implement IoT systems for remote monitoring and

control

- Explain critical IoT communications technologies and network protocols, security and implementation

Demonstration of project work

Assessment Type [1]: Demonstration
Indicative Time on Task [2]: 8 hours
Due: **Week 13**
Weighting: **20%**

Group-based demonstration of project work

On successful completion you will be able to:

- Apply knowledge of fundamental components to implement IoT system such as sensors, embedded processors, interfacing electronics and wireless communicating devices, in designing and building a simple IoT system.
- Select proper hardware to design and implement IoT systems for remote monitoring and control
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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

The teaching materials for lectures and practical activities are available in iLearn.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policie

s.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit connect.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE
- Upload an assignment to Studiosity
- Complete the Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault
- Social support including information about finances, tenancy and legal issues
- Student Advocacy provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via the Service Connect Portal, or contact Service Connect.

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/ offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Changes from Previous Offering

There is no change from previous year.

Unit information based on version 2025.04 of the Handbook