



ELEC889

Wireless Sensor Network Applications

S1 Day 2018

Dept of Engineering

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General Information

Unit convenor and teaching staff

Lecturer

Subhas Mukhopadhyay

subhas.mukhopadhyay@mq.edu.au

Contact via Subhas.Mukhopadhyay@mq.edu.au

E6B 111

Monday 1pm to 3pm

Tutor

Eshrat E Alahi

ealahi@yahoo.com

Contact via Email

E6A 220

Credit points

4

Prerequisites

Admission to MEng

Corequisites

Co-badged status

Unit description

This unit will explore the underlying technologies and applications for wireless sensor networks. Beginning with foundation knowledge in sensors, embedded processing and wireless concepts for ad hoc radios and network solutions, concepts will built towards notions of latency, performance, and Quality of Service in the support and consideration of a wide range of applications, from wireless body area networks (WBAN) to fixed monitoring to emergency services.

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:

Demonstrate ability to implement wireless sensor network system using sensors,

embedded processors, interfacing electronics and wireless communicating devices
Able to select proper hardware to design and implement wireless sensor network systems for remote monitoring

A good understanding on wireless protocols, security and implementation

Design and implement software for wireless sensor networks

Demonstrate a good knowledge of Data storage, security and cloud computing in the context of wireless sensor networks

General Assessment Information

To obtain a passing grade (P/CR/D/HD) a total mark of 50/more is required.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Project and Implementation</u>	30%	No	Week 13
<u>Test #1</u>	20%	No	Week #4
<u>Test #2</u>	20%	No	Week #8
<u>Test #3</u>	30%	No	Week #13

Project and Implementation

Due: **Week 13**

Weighting: **30%**

The student will select a project and implement it over the semester. The laboratory time need to be used for this purpose. A prototype is expected to be demonstrated at the end of the semester.

The attendance at every week is expected.

More information will be provided at the laboratory class.

On successful completion you will be able to:

- Demonstrate ability to implement wireless sensor network system using sensors, embedded processors, interfacing electronics and wireless communicating devices
- Able to select proper hardware to design and implement wireless sensor network systems for remote monitoring
- A good understanding on wireless protocols, security and implementation
- Design and implement software for wireless sensor networks
- Demonstrate a good knowledge of Data storage, security and cloud computing in the

context of wireless sensor networks

Test #1

Due: **Week #4**

Weighting: **20%**

The Class Test #1 will be held on Week #4.

The class test will be based on the content taught from Week #1 to Week #3.

On successful completion you will be able to:

- Demonstrate ability to implement wireless sensor network system using sensors, embedded processors, interfacing electronics and wireless communicating devices
- Able to select proper hardware to design and implement wireless sensor network systems for remote monitoring
- Demonstrate a good knowledge of Data storage, security and cloud computing in the context of wireless sensor networks

Test #2

Due: **Week #8**

Weighting: **20%**

The Class Test #2 will be held on Week #8.

The class test will be based on the content taught from Week #1 to Week #7.

On successful completion you will be able to:

- Able to select proper hardware to design and implement wireless sensor network systems for remote monitoring
- A good understanding on wireless protocols, security and implementation
- Design and implement software for wireless sensor networks
- Demonstrate a good knowledge of Data storage, security and cloud computing in the context of wireless sensor networks

Test #3

Due: **Week #13**

Weighting: **30%**

The Class Test #3 will be held on Week #13.

The class test will be based on the content taught from Week #1 to Week #12.

On successful completion you will be able to:

- Demonstrate a good knowledge of Data storage, security and cloud computing in the context of wireless sensor networks

Delivery and Resources

Teaching materials will be uploaded in iLearn.

Unit Schedule

The tentative plan of the unit is as follows:

Week #1: Unit description; Big picture, WSN challenges and opportunities; a few projects

Week #2: Sensors: Resistive, Capacitive and Inductive;

Week#3: Sensors: Resistive, Capacitive and Inductive (contd.) Week#4: Sensors Interfacing; Test #1 Week#5: Sensors Interfacing (contd.)

Week#6: Embedded Systems

Week#7: Embedded Systems (contd.)

Week#8: Wireless Protocols; Test #2

Week#9: Wireless Protocols

Week#10: Security in Wireless Protocols;

Week#11: Software Design for WSN;

Week#12: Application Examples (Smart Home, Solar panel, Power management, green house etc.)

Week#13: Review and Discussion; Test #3

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). 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](#)
- [Grade Appeal Policy](#)

- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

Undergraduate students seeking more policy resources can visit the [Student Policy Gateway](https://students.mq.edu.au/support/study/student-policy-gateway) (<https://students.mq.edu.au/support/study/student-policy-gateway>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central](http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/study/getting-started/student-conduct>

Results

Results shown in *iLearn*, 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 ask.mq.edu.au.

Student Support

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

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

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.

Graduate Capabilities

PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

Learning outcome

- Demonstrate a good knowledge of Data storage, security and cloud computing in the context of wireless sensor networks

Assessment tasks

- Project and Implementation
- Test #3

PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

Learning outcomes

- Demonstrate ability to implement wireless sensor network system using sensors, embedded processors, interfacing electronics and wireless communicating devices
- Able to select proper hardware to design and implement wireless sensor network systems for remote monitoring
- A good understanding on wireless protocols, security and implementation
- Design and implement software for wireless sensor networks
- Demonstrate a good knowledge of Data storage, security and cloud computing in the context of wireless sensor networks

Assessment tasks

- Project and Implementation
- Test #1

- Test #2
- Test #3

PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

Learning outcomes

- Demonstrate ability to implement wireless sensor network system using sensors, embedded processors, interfacing electronics and wireless communicating devices
- Able to select proper hardware to design and implement wireless sensor network systems for remote monitoring
- A good understanding on wireless protocols, security and implementation
- Design and implement software for wireless sensor networks
- Demonstrate a good knowledge of Data storage, security and cloud computing in the context of wireless sensor networks

Assessment tasks

- Project and Implementation
- Test #1
- Test #2
- Test #3

PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

Learning outcomes

- Demonstrate ability to implement wireless sensor network system using sensors, embedded processors, interfacing electronics and wireless communicating devices
- Able to select proper hardware to design and implement wireless sensor network systems for remote monitoring

- A good understanding on wireless protocols, security and implementation
- Design and implement software for wireless sensor networks
- Demonstrate a good knowledge of Data storage, security and cloud computing in the context of wireless sensor networks

Assessment tasks

- Project and Implementation
- Test #1
- Test #2
- Test #3

PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual formats.

This graduate capability is supported by:

Learning outcomes

- Able to select proper hardware to design and implement wireless sensor network systems for remote monitoring
- A good understanding on wireless protocols, security and implementation
- Design and implement software for wireless sensor networks
- Demonstrate a good knowledge of Data storage, security and cloud computing in the context of wireless sensor networks

Assessment tasks

- Project and Implementation
- Test #3

PG - Engaged and Responsible, Active and Ethical Citizens

Our postgraduates will be ethically aware and capable of confident transformative action in relation to their professional responsibilities and the wider community. They will have a sense of connectedness with others and country and have a sense of mutual obligation. They will be able to appreciate the impact of their professional roles for social justice and inclusion related to national and global issues

This graduate capability is supported by:

Learning outcomes

- A good understanding on wireless protocols, security and implementation
- Design and implement software for wireless sensor networks
- Demonstrate a good knowledge of Data storage, security and cloud computing in the context of wireless sensor networks

Assessment tasks

- Project and Implementation
- Test #2
- Test #3