ELEC889

Wireless Sensor Network Applications

S1 Day 2019

School of Engineering

Contents

General Information

Unit convenor and teaching staff
Professor
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E6B
THURSDAY 1pm to 3pm

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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 understanding of fundamental components to implement wireless sensor network system such as 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 understanding on wireless protocols, security and implementation
Ability to handle Data, implement security and design software 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 along with a minimum of 50% is required for Test#3. If any student is not able to secure 50% in the Test#3, he will be allowed to re-take the Test provided he/she gets more than or equal to 40%.

Assessment Tasks

Name	Weighting	Hurdle	Due
Participation	5%	No	1-13
Report on a WSN article	5%	No	2
Project and Practical	30%	No	13
Test#1	10%	No	4
Test#2	20%	No	8
Test#3	30%	Yes	14

Participation

Due: **1-13**
Weighting: **5%**

Participation both in lectures and practical classes will be noted and will be encouraged to do group activities. Marks will be allocated proportionally.

On successful completion you will be able to:

- Able to select proper hardware to design and implement wireless sensor network systems for remote monitoring
- Demonstrate understanding on wireless protocols, security and implementation
- Ability to handle Data, implement security and design software in the context of wireless

sensor networks

Report on a WSN article

Due: **2**
Weighting: **5%**

The students will read a journal paper and write a 2-page report on it to emphasis the overall picture of wireless sensor networks. The students will submit the report by the end of 2nd week.

Late submission will be penalized and will be deducted 10% of the obtained marks for each day of delay.

On successful completion you will be able to:

- Demonstrate understanding of fundamental components to implement wireless sensor network system such as 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 understanding on wireless protocols, security and implementation
- Ability to handle Data, implement security and design software in the context of wireless sensor networks

Project and Practical

Due: **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.

Late submission will be penalized and will be deducted 10% of the obtained marks for each day of delay.

On successful completion you will be able to:

- Demonstrate understanding of fundamental components to implement wireless sensor network system such as 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 understanding on wireless protocols, security and implementation

- Ability to handle Data, implement security and design software in the context of wireless sensor networks

Test#1

Due: **4**
Weighting: **10%**

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 understanding of fundamental components to implement wireless sensor network system such as 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 understanding on wireless protocols, security and implementation
- Ability to handle Data, implement security and design software in the context of wireless sensor networks

Test#2

Due: **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:

- Demonstrate understanding of fundamental components to implement wireless sensor network system such as 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 understanding on wireless protocols, security and implementation
- Ability to handle Data, implement security and design software in the context of wireless sensor networks

Test#3

Due: **14**

Weighting: **30%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

The Class Test #3 will be held on Week #14.

The class test will be based on the content taught from Week #1 to Week #13, similar to the Final examination.

Students need to get a minimum of 50% in the Test. If any student is not able to secure 50% in the Test#3, he will be allowed to re-take the Test provided he/she gets more than or equal to 40%.

On successful completion you will be able to:

- Demonstrate understanding of fundamental components to implement wireless sensor network system such as sensors, embedded processors, interfacing electronics and wireless communicating devices
- Demonstrate understanding on wireless protocols, security and implementation
- Ability to handle Data, implement security and design software in the context of wireless sensor networks

Delivery and Resources

Teaching materials will be uploaded in iLearn as well as will be discussed during the lecture and laboratory times.

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

Unit Schedule

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). 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 (htt

ps://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 (https://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 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 ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@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

If you are a Global MBA student contact globalmba.support@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 outcomes

- Able to select proper hardware to design and implement wireless sensor network systems for remote monitoring
- Demonstrate understanding on wireless protocols, security and implementation
- Ability to handle Data, implement security and design software in the context of wireless sensor networks

Assessment task

- 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 understanding of fundamental components to implement wireless sensor network system such as 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 understanding on wireless protocols, security and implementation
- Ability to handle Data, implement security and design software in the context of wireless sensor networks

Assessment tasks

- Participation
- Report on a WSN article

- Project and Practical
- 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 understanding of fundamental components to implement wireless sensor network system such as 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
- Ability to handle Data, implement security and design software in the context of wireless sensor networks

Assessment tasks

- Project and Practical
- 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 understanding of fundamental components to implement wireless sensor network system such as 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 understanding on wireless protocols, security and implementation
- Ability to handle Data, implement security and design software in the context of wireless sensor networks

Assessment tasks

- Report on a WSN article
- Project and Practical
- 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 outcome

- Ability to handle Data, implement security and design software in the context of wireless sensor networks

Assessment tasks

- Participation
- Report on a WSN article
- Test#1
- Test#2
- 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

- Demonstrate understanding of fundamental components to implement wireless sensor network system such as 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 understanding on wireless protocols, security and implementation
- Ability to handle Data, implement security and design software in the context of wireless sensor networks

Assessment tasks

- Participation
- Project and Practical
- Test#1
- Test#2
- Test#3

Changes from Previous Offering

Participation mark has been included to encourage attendance and group activities.

Report on journal article has been added as new activity.

Test#3 has been schedule for Week#14 to provide them time for preparation.

Changes since First Published

Date	Description
22/03/2019	The name of a tutor has been added.