ELEC889

Wireless Sensor Network Applications

S1 Day 2017

Dept of Engineering

Contents

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General Information

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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:

1. Demonstrate understanding of fundamental components to implement wireless sensor network system such as sensors, embedded processors, interfacing electronics and wireless communicating devices

2. Able to design and implement wireless sensor network systems for remote monitoring

3. A good understanding on wireless protocols, security and implementation

4. Understanding of Data storage, security and cloud computing in the context of wireless sensor networks

5. Understanding on the design and implementation of software for wireless sensor networks

General Assessment Information

Self-Study Project and Presentation:

Week #2: Topic and a short description; Justification and suitability

Week#4: Design and Implementation Details

Week#8: Strength and Weaknesses in Design and Implementation

Week#11: Design Improvements and Future Extensions

Assessment Tasks

Name	Weighting	Hurdle	Due
Self-study on a project	10%	No	2
Project Progress Presentation:	15%	No	4, 8 and 11
Mid Term Test: 20% (Week 7)	20%	No	7
Project Report writing	15%	No	13
Final examination	40%	No	14

Self-study on a project

Due: **2**
Weighting: **10%**

Self-study on a project: Initial topic selection and a short presentation: 10% (Week 2)

On successful completion you will be able to:
- 1. Demonstrate understanding of fundamental components to implement wireless sensor network system such as sensors, embedded processors, interfacing electronics and wireless communicating devices
- 2. Able to design and implement wireless sensor network systems for remote monitoring
- 3. A good understanding on wireless protocols, security and implementation

Project Progress Presentation:

Due: **4, 8 and 11**
Weighting: **15%**

Project Progress Presentation: 3 * 5% = 15% (Week 4, 8, 11)

On successful completion you will be able to:

- 2. Able to design and implement wireless sensor network systems for remote monitoring

Mid Term Test: 20% (Week 7)

Due: **7**
Weighting: **20%**

Mid Term Test: 20% (Week 7)

On successful completion you will be able to:

- 1. Demonstrate understanding of fundamental components to implement wireless sensor network system such as sensors, embedded processors, interfacing electronics and wireless communicating devices
- 2. Able to design and implement wireless sensor network systems for remote monitoring
- 3. A good understanding on wireless protocols, security and implementation

Project Report writing

Due: **13**
Weighting: **15%**

Project Report writing: 15% (Week 13)

On successful completion you will be able to:

- 4. Understanding of Data storage, security and cloud computing in the context of wireless sensor networks
- 5. Understanding on the design and implementation of software for wireless sensor networks

Final examination

Due: **14**
Weighting: **40%**

Final examination: 40% (Week 14)

On successful completion you will be able to:

- 1. Demonstrate understanding of fundamental components to implement wireless sensor network system such as sensors, embedded processors, interfacing electronics and wireless communicating devices
- 2. Able to design and implement wireless sensor network systems for remote monitoring
- 3. A good understanding on wireless protocols, security and implementation
- 4. Understanding of Data storage, security and cloud computing in the context of wireless sensor networks
- 5. Understanding on the design and implementation of software for wireless sensor networks

Delivery and Resources

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.

Unit Schedule

Weekly content:

Week#1: Unit description; Assessment; Big picture, WSN challenges and opportunities; Project description

Week#2: Sensors: Resistive, Capacitive and Inductive; **Project presentation**

Week#3: Sensors: Resistive, Capacitive and Inductive (contd.)

Week#4: Sensors Interfacing; **Project presentation**

Week#5: Sensors Interfacing (contd.)

Week#6: Embedded Systems

Week#7: Embedded Systems (contd.) + **Mid Term Test**

Week#8: Wireless Protocols; **Project presentation**

Week#9: Wireless Protocols;

Week#10: Security in Wireless Protocols;

Week#11: Software Design for WSN; **Project presentation**

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

Week#13: Review and Discussion

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy_2016.html

Grade Appeal Policy http://mq.edu.au/policy/docs/gradeappeal/policy.html

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration

In addition, a number of other policies can be found in the Learning and Teaching Category of 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/support/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 outcomes

- 2. Able to design and implement wireless sensor network systems for remote monitoring
- 3. A good understanding on wireless protocols, security and implementation

- 4. Understanding of Data storage, security and cloud computing in the context of wireless sensor networks
- 5. Understanding on the design and implementation of software for wireless sensor networks

Assessment tasks

- Project Report writing
- Final examination

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

- 1. Demonstrate understanding of fundamental components to implement wireless sensor network system such as sensors, embedded processors, interfacing electronics and wireless communicating devices
- 2. Able to design and implement wireless sensor network systems for remote monitoring
- 3. A good understanding on wireless protocols, security and implementation
- 4. Understanding of Data storage, security and cloud computing in the context of wireless sensor networks
- 5. Understanding on the design and implementation of software for wireless sensor networks

Assessment tasks

- Self-study on a project
- Project Progress Presentation:
- Mid Term Test: 20% (Week 7)
- Project Report writing
- Final examination

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

- 1. Demonstrate understanding of fundamental components to implement wireless sensor network system such as sensors, embedded processors, interfacing electronics and wireless communicating devices
- 2. Able to design and implement wireless sensor network systems for remote monitoring
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- 4. Understanding of Data storage, security and cloud computing in the context of wireless sensor networks
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Assessment tasks

- Self-study on a project
- Project Progress Presentation:
- Mid Term Test: 20% (Week 7)
- Project Report writing
- Final examination

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

- 1. Demonstrate understanding of fundamental components to implement wireless sensor network system such as sensors, embedded processors, interfacing electronics and wireless communicating devices
- 2. Able to design and implement wireless sensor network systems for remote monitoring
- 4. Understanding of Data storage, security and cloud computing in the context of wireless sensor networks
- 5. Understanding on the design and implementation of software for wireless sensor networks

Assessment tasks

- Self-study on a project

- Project Progress Presentation:

- Mid Term Test: 20% (Week 7)

- Project Report writing

- Final examination

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

- 2. Able to design and implement wireless sensor network systems for remote monitoring

- 5. Understanding on the design and implementation of software for wireless sensor networks

Assessment tasks

- Self-study on a project

- Project Progress Presentation:

- Mid Term Test: 20% (Week 7)

- Project Report writing

- Final examination

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

- 1. Demonstrate understanding of fundamental components to implement wireless sensor network system such as sensors, embedded processors, interfacing electronics and wireless communicating devices

- 2. Able to design and implement wireless sensor network systems for remote monitoring

- 3. A good understanding on wireless protocols, security and implementation

- 4. Understanding of Data storage, security and cloud computing in the context of

wireless sensor networks

- 5. Understanding on the design and implementation of software for wireless sensor networks

Assessment tasks

- Project Progress Presentation:

- Mid Term Test: 20% (Week 7)

- Final examination