ELEC885

Beyond 5G Mobile

S1 Day 2017

Dept of Engineering

Contents

General Information

Unit convenor and teaching staff
Senior Lecturer
Robert Abbas
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Contact via 1558
E6B , Room 126
Tuesdays & Thursdays 2-4 PM

Credit points
4

Prerequisites
Admission to MEng

Corequisites

Co-badged status

Unit description
This unit explores The most advanced technologies in the field of all IP Mobile Communications Networks, LTE, LTE advanced and what lies ahead in mobile communications. LTE Networks fundamentals, LTE Network Architecture, LTE Design and Planning, Coverage, Capacity, LTE advanced (4.5G-5G) with all IP E2E Networks -Voice over LTE and Video over LTE , - 4.5G Carrier aggregation, 5G Networks Architecture, IoT, 5G network Performance Management , Cloud computing , network Virtualization for 5G Network, 6G & 7G networks.

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 understand and describe the mobile communication network concept and architecture, RAN and Core Network.
Demonstrate competence in the LTE networks fundamentals, User Plane and DataPlan
Demonstrate competence in LTE Cell Planing Design, Planning, operation , optimisation and Managment

Demonstrate ability to anlyse the LTE Advanced Features, and Migration to 5G concept
Demonstrate competence to analyse and model 5G fundamentals, Cloud RAN, and 5G applications.

Assessment Tasks

Name	Weighting	Hurdle	Due
Class Test	45%	No	Week 3,6,11
Presentation	10%	No	W12
Research- Project	45%	No	W13

Class Test

Due: **Week 3,6,11**
Weighting: **45%**

Class test

On successful completion you will be able to:

- Demonstrate ability to understand and describe the mobile communication network concept and architecture, RAN and Core Network.
- Demonstrate competence in the LTE networks fundamentals, User Plane and DataPlan
- Demonstrate competence in LTE Cell Planing Design, Planning, operation , optimisation and Managment
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Presentation

Due: **W12**
Weighting: **10%**

Class Group Presentation 4G, 4,5 G, 5G fundamentals, architecture , cell planning design...

On successful completion you will be able to:

- Demonstrate ability to understand and describe the mobile communication network concept and architecture, RAN and Core Network.
- Demonstrate competence in the LTE networks fundamentals, User Plane and DataPlan

- Demonstrate competence in LTE Cell Planing Design, Planning, operation , optimisation and Managment
- Demonstrate ability to anlyse the LTE Advanced Features, and Migration to 5G concept
- Demonstrate competence to analyse and model 5G fundamentals, Cloud RAN, and 5G applications.

Research- Project

Due: **W13**
Weighting: **45%**

Research paper on an area of 5G mobile networks. The task is to read a set of selected papers, and provide a critical review of the research area covered by those papers, as well as integrating the relevant material from the lectures. The review must be written as a review article in the format that would be submitted for publication in an IEEE Journal publication, with abstract, introduction, conclusions and references, as well as the main body of the paper.

On successful completion you will be able to:

- Demonstrate ability to understand and describe the mobile communication network concept and architecture, RAN and Core Network.
- Demonstrate competence in the LTE networks fundamentals, User Plane and DataPlan
- Demonstrate competence in LTE Cell Planing Design, Planning, operation , optimisation and Managment
- Demonstrate ability to anlyse the LTE Advanced Features, and Migration to 5G concept
- Demonstrate competence to analyse and model 5G fundamentals, Cloud RAN, and 5G applications.

Delivery and Resources

The Unit delivery consists of interactive classes, Lectures, Research Project and research Presentation, quizzes class tests

There will be a sequence of lectures each week. These lectures will include new material as well as problem solving practice. Lecture notes,.

Lectures will have practical approach to the 4G & 5G implementation, operation , Optimisation and Performance Management.

Research paper on an area of 5G mobile networks. The task is to read a set of selected papers, and provide a critical review of the research area covered by those papers, as well as integrating the relevant material from the lectures. The review must be written as a review article in the format that would be submitted for publication in an IEEE Journal publication, with abstract, introduction, conclusions and references, as well as the main body of the paper. The report is

due in week 12.

Reference material will be made available on closed reserve in the library.

References are:

Jonathan Rodriguez, Fundamentals of 5G Mobile Networks, 2015 John Wiley & Sons, Ltd.

"Millimeter Wave Wireless Communications" by Theodore Rappaport, Robert Heath, Robert Daniels and James Murdock (Prentice Hall)

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

- Demonstrate competence in LTE Cell Planing Design, Planning, operation , optimisation and Managment
- Demonstrate ability to anlyse the LTE Advanced Features, and Migration to 5G concept
- Demonstrate competence to analyse and model 5G fundamentals, Cloud RAN, and 5G applications.

Assessment tasks

- Class Test
- Presentation
- Research- Project

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 understand and describe the mobile communication network concept and architecture, RAN and Core Network.
- Demonstrate competence in the LTE networks fundamentals, User Plane and DataPlan
- Demonstrate competence in LTE Cell Planing Design, Planning, operation , optimisation and Managment
- Demonstrate competence to analyse and model 5G fundamentals, Cloud RAN, and 5G applications.

Assessment tasks

- Class Test
- Presentation
- Research- Project

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 understand and describe the mobile communication network concept and architecture, RAN and Core Network.
- Demonstrate competence in the LTE networks fundamentals, User Plane and DataPlan
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Assessment tasks

- Class Test
- Presentation
- Research- Project

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 competence in LTE Cell Planing Design, Planning, operation , optimisation and Managment
- Demonstrate ability to anlyse the LTE Advanced Features, and Migration to 5G concept
- Demonstrate competence to analyse and model 5G fundamentals, Cloud RAN, and 5G applications.

Assessment tasks

- Class Test
- Research- Project

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

- Demonstrate ability to anlyse the LTE Advanced Features, and Migration to 5G concept
- Demonstrate competence to analyse and model 5G fundamentals, Cloud RAN, and 5G applications.

Assessment tasks

- Class Test
- Presentation
- Research- Project

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 ability to anlyse the LTE Advanced Features, and Migration to 5G concept
- Demonstrate competence to analyse and model 5G fundamentals, Cloud RAN, and 5G applications.

Assessment tasks

- Class Test
- Research- Project

Changes since First Published

Date	Description
23/02/2017	Change wording for assessment Items.