COMP4336/9336 Mobile Data Networking
Course Outline for 2020 Term 2

Course Contact and Lecturer-in-Charge: Prof. Mahbub Hassan
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This course will be available via Moodle

Important Note: All assessments, including the hands-on experiments and the term project, can be completed on-line. All lectures can also be attended on-line.

UOC: 6

Pre-requisites: COMP9331/3331 or any other introductory course on networking.
Parallel Teaching: COMP4336 and COMP9336 will be taught together.

Description:

First course in mobile networking examining the fundamental theories as well as the latest advances in wireless data and mobile communication networks. It will teach the basic concepts of wireless communication, mobile networking principles and protocols for both local and wide area, protocols for connecting smart objects to the Internet, and mobility management in the TCP/IP protocol stack. Topics include recent trends in wireless and mobile networking, wireless coding and modulation, wireless signal propagation, IEEE 802.11a/b/g/n/ac/ad/ax wireless local area networks, white space networking, Bluetooth, Bluetooth Smart and Low Energy, Mobile IP, and cellular networks. The course will also overview some of the emerging wireless networking concepts, such as programmable wireless environment, simultaneous wireless information and power transfer, and drone-assisted mobile networks. Hands-on experiments with mobile devices will be part of the learning exercise, which involves wireless packet capture and analysis.

Note that the course description available in the university handbook may be slightly dated.

Learning Objectives:

1. To master the fundamental theories and the basic science and mathematics behind popular wireless networking technologies (Quizzes and Exams);
2. To analyse the algorithms and protocols used by popular wireless and mobile networking technologies (Quizzes and Exams);
3. To gain insight to some of the emerging wireless and mobile networking concepts and technologies (Quizzes and Exams);
4. To experiment with mobile devices (Hands-on Experiments and Term Project).

Teaching Strategies:

Lectures: 3-hour lecture per week for 9 weeks (NO lecture in Week 6). All lectures can be attended on-line. Learning in the lecture will be further supplemented by 24/7 on-line discussion forums monitored by the lecturer.

Tutorials/Labs: 2-hour problem-solving tutorial or hands-on experimental sessions per lecture week (NO tutorial/lab in Week 6). Experiments can be completed using personal laptops and smartphones with WiFi and Bluetooth interfaces (NO on-campus visit required).

Assessment

There are 4 assessment components each addressing different learning objectives:

1. A set of weekly **quizzes** to assess learning objectives 1-3.
2. A **term project** to assess learning objective 4.
3. A set of **hand-on experiments** for learning objective 4.
4. A **final exam** assessing learning objectives 1-3.

All assessments can be completed on-line without requiring any on-campus visit. The weighting and due date of each assessment component are shown in the following Table.

Item	***Weighting***	Due
Quizzes	15%	9 weekly quizzes [best 6 will be counted]
Hands-on Experiments	20%	6 or 7 experiments [best 5 will be counted]
Term Project	25%	Due in 3 stages throughout the term; final stage due in Week 10
Final Exam	40%	End of Term Exam Period

Quizzes will have strict on-line schedules and cannot be extended for late attempts. Late submissions of hands-on experiments and term project reports are possible with a late submission penalty accumulating at a rate of 10% per day (no submissions will be accepted after one week of the original due date).

Overall and Final Assessment

To pass this course, students need to score at least 50% after combining all assessments grades. Under special circumstances, the Lecturer-in-Charge reserves the right to scale the overall marks.

Continual Course Improvement

Student feedback on the course and the lecturer will be gathered towards the end of the session. These feedbacks are taken seriously, and continual improvements are made to the course based in part on this feedback. The course questionnaire results go to the Head of the School of Computer Science and Engineering, who reads the results and follows up in cases where action is clearly needed.

In its last delivery in 2019, students requested more help for the hands-on experimental tasks as well as better alignment of these practical tasks with the theories learned in the lectures. To respond to this feedback, we have redesigned the experimental works. In particular, the experimental works have been designed with a more gradual increase in difficulty to help students learn the data capture tools and processes more smoothly. Also, the timings of the experimental works are now better aligned with the lecture delivery, so students learn the relevant topics well in advance in the lecture before applying them in practice. We hope that these adjustments will help improve the learning experience for our students in 2020.

Student Conduct

The **Student Code of Conduct** (Information, Policy) sets out what the University expects from students as members of the UNSW community. As well as the learning, teaching and research environment, the University aims to provide an environment that enables students to achieve their full potential and to provide an experience consistent with the University's values and guiding principles. A condition of enrolment is that students *inform themselves* of the University's rules and policies affecting them, and conduct themselves accordingly.

In particular, students have the responsibility to observe standards of equity and respect in dealing with every member of the University community. This applies to all activities on UNSW premises and all external activities related to study and research. This includes behaviour in person as well as behaviour on social media, for example Facebook groups set up for the purpose of discussing UNSW courses or course work. Behaviour that is considered in breach of the Student Code Policy as discriminatory, sexually inappropriate, bullying, harassing, invading another's privacy or causing any person to fear for their personal safety is serious misconduct and can lead to severe penalties, including suspension or exclusion from UNSW.

If you have any concerns, you may raise them with your lecturer, or approach the School Ethics Officer, Grievance Officer, or one of the student representatives.

Plagiarism is defined as using the words or ideas of others and presenting them as your own. UNSW and CSE treat plagiarism as academic misconduct, which means that it carries penalties as severe as being excluded from further study at UNSW. There are several on-line sources to help you understand what plagiarism is and how it is dealt with at UNSW:

- Plagiarism and Academic Integrity
- UNSW Plagiarism Procedure

Make sure that you read and understand these. Ignorance is not accepted as an excuse for plagiarism. In particular, you are also responsible that your assignment files are not accessible by anyone but you by setting the correct permissions in your CSE directory and code repository, if using. Note also that plagiarism includes paying or asking another person to do a piece of work for you and then submitting it as your own work.

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW staff and students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.

If you haven't done so yet, please take the time to read the full text of

- UNSW's policy regarding academic honesty and plagiarism

The pages below describe the policies and procedures in more detail:

- Student Code Policy
- Student Misconduct Procedure
- Plagiarism Policy Statement
- Plagiarism Procedure

You should also read the following page which describes your rights and responsibilities in the CSE context:

- Essential Advice for CSE Students

The following URL contains all the text and links for student conduct:
http://webapps.cse.unsw.edu.au/cse/student-conduct.html

Special Consideration and Supplementary Exam

Students who missed the final exam during the end-of-term exam period due to extra-ordinary reason may be granted supplementary exam upon submission (via myUNSW) of special consideration application with valid evidences attached. Make sure you read carefully the updated special consideration rules regarding on-line exams available from the official UNSW site:
https://student.unsw.edu.au/special-consideration

Also be aware of the **Fit-to-Sit policy** of UNSW, which would invalidate your application for a supplementary final exam if you have already taken the original exam in the first place.

Textbook

There is no prescribed text for this course, but comprehensive lecture notes and links to other freely available resources will be provided.

References (NOT compulsory)

Wireless communications, 2nd Ed, Prentice Hall, 2002, Theodore S. Rappaport.

This is a classic book on wireless communications, but for this course, it is relevant mainly for the first two lectures examining the fundamental concepts behind wireless communications.

Course Syllabus: The following topics will be covered (there may be minor variations):

Topic	Week
Course Overview + Trends in Wireless and Mobile Networking + Wireless Fundamentals I (modulation and coding)	1
Wireless Fundamentals II (signal propagation)	2
WiFi I (802.11a/b/g/n/ac)	3
WiFi II (802.11ad, ax)	4
Whitespace Networking (802.11af)	5
NO LECTURE	6
Bluetooth (classic, smart, low energy)	7
Cellular Networking Fundamentals	8
Mobility Management in TCP/IP Protocol Stack (Mobile IP)	9
Emerging Concepts (e.g., Terahertz Networking, Programmable Wireless Environment, Simultaneous Wireless Information and Power Transfer, WiFi Sensing, Drone-assisted Mobile Networks, etc.) + Course Recap	10

Lecturer in Charge (LIC)

Prof. Mahbub Hassan, Office Room 607 (Building K17, CSE) Tel: 9385 6198
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Due to COVID-19 restrictions, physical office visits may not be available in 2020. However, the lecturer will constantly monitor the on-line discussion forums and assist with any student queries seeking further clarity or help with lecture materials.

Online Lectures: Wednesdays 9am-12noon (AEST), Weeks 1-5 & 7-10. **NO lecture in Week 6.**

End of Course Outline