

## COMP4336/9336 Mobile Data Networking Course Outline for 2022 Term 2

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

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**Important Note:** This course will be delivered in **Hybrid Mode**, i.e, in both face-to-face and on-line. All assessments can be completed on-line. All lectures and labs can also be attended on-line. Students attending face-to-face lectures and labs on-campus must follow UNSW COVID [advice](#). Zoom links for on-line lectures and labs are available from Moodle.

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**UOC:** 6

**Assumed knowledge:** COMP9331/3331 or any other introductory course on networking.

**Parallel Teaching:** COMP4336 and COMP9336 will be taught together.

### **Description:**

First course in wireless and mobile networking examining the fundamental theories as well as the latest advances in wireless data and mobile communication networks. Topics include fundamental concepts in wireless coding, modulation, and signal propagation, WiFi and wireless local area networks, cellular networks, Bluetooth, and Internet of Things networks. The course will also overview some of the emerging wireless networking concepts, such as wireless sensing, and drone-assisted mobile networks. Hands-on experiments with mobile devices will be part of the learning exercise, which involves wireless packet capture, analysis, and programming.

*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 times are allocated per week for 9 weeks (NO lectures in Week 6). However, the lectures have been **flipped** and hence students need to watch the pre-recorded videos carefully before attending the corresponding lectures. The 3-hour lecture time is used for various interactions and activities, including answering student questions on the video lecture, completing quizzes, and discussing correct answers to the quizzes afterwards. Students must have access to Moodle while attending the lecture, so they can complete the online quizzes, which are part of the assessment and carry marks.

**Labs:** 2-hour hands-on experimental sessions per lecture week (NO tutorial/lab in Week 6).

Experiments are to be carried out using personal laptops and smartphones with WiFi and Bluetooth interfaces. Students must submit lab reports after completing the labs, which are part of the assessment and hence carry marks.

The first lab starts from Week 1. While there is no report submission for the first lab, it is very important for the students to sort out any problems with Wireshark wireless packet capture during this lab. Depending on the equipment and operating systems, students may have to buy a low-cost (~\$20-30) **dongle** to enable full access to the wireless interfaces. Lab-1 specification, available from Moodle, contains useful information about Wireshark installation and dongles.

Some labs will be conducted on-campus, while others will be on-line. Students planning to come to the campus should enroll in one of the on-campus labs and the remote students can enroll in the on-line lab slots. You need to bring your laptop and mobilephone to the lab for the hands-on-experiments.

### 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 **hands-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.

<i>Item</i>	<i>Weighting</i>	<i>Due</i>
Mid-lecture Quizzes	15%	9 weekly quizzes [best 6 will be counted]
Hands-on Experiments (Labs)	20%	8 experiments [best 5 will be counted]
Term Project	25%	Due: end of week 9
Final Exam	40%	End of Term Exam Period

**Quizzes have strict on-line schedules (to be taken during the lecture hours) and cannot be extended for late attempts (no special considerations applicable for quizzes). Late submissions of hands-on experiments and the term project are allowed with 5% late penalty applied per day late for maximum of 5 days. No submissions are allowed after 5 days. Due date extension, of a maximum of 7 days, is only possible under extra-ordinary situations with a valid special consideration application. When such extensions are allowed, the submission will not be accepted beyond the extended due date, but the penalties can be waived for the extended days.**

### Overall and Final Assessment

To pass this course, students need to score at least 50% after combining all assessments grades. The combined mark may be **scaled** to adjust the distribution of letter grades within the cohort.

## Continual Course Improvement

Student feedback via MyExperience 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. In its last delivery in 2021 T2, the major comment was about providing more guidance on the required hardware for the labs so students with different platforms can access the relevant wireless information. To address this, we have tested different platforms and provided guidance on required hardware (dongles) that can solve some of the problems faced by the earlier cohort. Another issue raised is the reuse of some quiz questions from the past years. We have decided to use completely new quizzes this year. We hope that these adjustments will help improve the laboratory and overall learning experience for our students in 2022.

**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 sources to help you understand what plagiarism is and how it is dealt with at UNSW:

- [Plagiarism and Academic Integrity](#)
- [Student Code Policy](#)
- [Student Misconduct Procedure](#)
- [Plagiarism Policy](#)
- [UNSW Plagiarism Procedure](#)
- [Essential Advice for CSE students](#)

Make sure that you read and understand the above. Ignorance is not accepted as an excuse for plagiarism. In particular, you are responsible for securely storing your assignment files such that they are not accessible by anyone but you by setting proper permissions on your CSE home directory and/or on online code repositories. 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.

## 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.

## Reference textbooks

The lecture slides are based on the following book, which will be published on 1<sup>st</sup> of August 2022:

*Wireless and Mobile Networking*, CRC Press, 2022, M. Hassan.

Pre-prints of some key chapters from the book may be released in Moodle.

*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. This book has more rigorous mathematical treatment of the concepts.

### Course Syllabus and Tentative Schedule (subject to minor changes):

Week-Date	Q&A/Quiz Topic	Lab	Assessment Task
1 (03 Jun)	Wireless Fundamentals I	1	<ul style="list-style-type: none"> <li>Quiz-1 at 11:30am</li> <li>No submission for Lab-1</li> </ul>
2 (10 Jun)	Wireless Fundamentals II	2	<ul style="list-style-type: none"> <li>Quiz-2 at 11:30am</li> <li>Submit Lab-2 by 10am, 13 Jun</li> <li>Preliminary version of project specs released (expected) for discussion and feedback</li> </ul>
3 (17 Jun)	WiFi I: IEEE 802.11 basics + Mainstream WiFi (802.11a/b/g/n/ac/ax/be)	3	<ul style="list-style-type: none"> <li>Quiz-3 at 11:30am</li> <li>Submit Lab-3 by 10am, 20 Jun</li> </ul>
4 (24 Jun)	WiFi II: Niche WiFi (802.11af/ah/ad/ay)	4	<ul style="list-style-type: none"> <li>Quiz-4 at 11:30am</li> <li>Submit Lab-4 by 10am, 27 Jun</li> <li>Project specs finalized</li> </ul>
5 (01 Jul)	Bluetooth	5	<ul style="list-style-type: none"> <li>Quiz-5 at 11:30am</li> <li>Submit Lab-5 by 10am, 04 Jul</li> </ul>
6 (08 Jul)	No Lecture, No Quiz, No Lab		
7 (15 Jul)	Cellular Networks	6	<ul style="list-style-type: none"> <li>Quiz-6 at 11:30am</li> <li>Submit Lab-6 by 10am, 18 Jul</li> </ul>
8 (22 Jul)	Internet of Things (LoRa Networks)	7	<ul style="list-style-type: none"> <li>Quiz-7 at 11:30am</li> <li>Submit Lab-7 by 10am, 25 Jul</li> </ul>
9 (29 Jul)	Wireless Sensing	8	<ul style="list-style-type: none"> <li>Quiz-8 at 11:30am</li> <li>Project Due: 5pm, 29 July</li> <li>Submit Lab-8 by 10am, 01 Aug</li> </ul>
10 (05 Aug)	Aerial Networks	9	<ul style="list-style-type: none"> <li>Quiz-9 at 11:30am</li> <li>Submission Lab-9 by 10am, 08 Aug</li> </ul>

Detailed contents for each lecture topic are available in Moodle.

### Lecturer in Charge (LIC)

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Due to COVID-19 restrictions, physical office visits may not be available in 2022. However, the lecturer will constantly monitor the on-line discussion forums in Moodle and assist with any student queries seeking further clarity or help with lecture materials.

**Lectures:** Fridays 10am-1pm (AEST), Ainsworth G03, Weeks 1-5 & 7-10. **NO lecture in Week 6.**

The lectures will run in **Hybrid Mode**, which means that students coming to the campus can attend the lecture and interact with the lecturer face-to-face, while remote students can participate via Zoom. Lecture recordings will be released in Moodle for later use.

**This course contributes to the development of the following graduate capabilities:**

<b>Graduate Capability</b>	<b>Acquired in</b>
Scholarship: of their discipline in its interdisciplinary context	Lectures, labs, project
Scholarship: Capable of independent and collaborative	Labs, project
Scholarship: rigorous in their analysis, critique, and reflection	Lectures, labs, exams, quizzes
Scholarship: able to apply their knowledge and skills to solving problems	Labs, project, exams,
Scholarship: capable of effective communication	Labs, project, lectures
Scholarship: digitally literate	All aspects of the course
Scholarship: information literate	All aspects of the course
Leadership: collaborative team workers	Lecture discussions
Professionalism: capable of independent, self-directed practice	All aspects of the course
Professionalism: capable of lifelong learning	All aspects of the course
Professionalism: capable of operating within an agreed Code of Practice	Labs, project
Global citizens: culturally aware and capable of respecting diversity and acting in socially /responsible ways	Discussion forums

**End of Course Outline**

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