Department of Computer Science and Engineering
Faculty of Engineering, University of Moratuwa

CS5440 Wireless Access Networks
Semester 2, MSc in CS 2018 (May-June)

Class Moodle	https://online.mrt.ac.lk/course/view.php?id=9113
Schedule/Hours	Sunday 8:00am - 12:00pm at UoM (8 sessions) About 2 hours/week of self-study and Moodle engagements are expected
Instructor(s)	Dr. Dilum Bandara, dilumb@cse.mrt.ac.lk, 011-265-0152
Prerequisite(s)	Students are required to have a background in fundamentals of data communication, computer networks, and programming. It is desirable to have a background on relevant topics such as LAN, WAN, TCP/IP, and network services.
Text	Wireless Networking Complete by P. Zheng et al., 2009, Morgan Kaufmann, ISBN: 9780123750778 Other readings: • Wireless Communications and Networking by Vijay K. Garg, The Morgan Kaufmann Series in Networking • Wireless Networking by Anurag Kumar, D. Manjunath, and Joy Kuri, The Morgan Kaufmann Series in Networking • Relevant research papers

Assessment	Distribution of marks is as follows:	
	• Project	28%
	• In-Class Activities (4)	12%
	• Quiz (2)	10%
	• Final Exam (2 hours, open book)	50%

In a group of 2 or 4, students will do an approved project relevant to the material covered in the class. The details will be provided.

Course objectives	To provide a broader understanding of wireless networking technologies and services as well as their designs and applications. At the end of the module, students will be able to understand wireless technologies, standards, and services, as well as select, justify, and apply them to solve some of the real-world problems. Moreover, they should be able to design, deploy, and manage a simple wireless network under a given set of constraints. Required readings, project, and discussions are expected to enhance both the analytical and soft skills.
	This module is compulsory for students who target the Mobile Computing specialization. It is also useful for students planning to specialize in Computer Networks and Cloud Computing. Other students may also take the class depending on their interest.

Syllabus	The goal for the class is to be broad rather than deep with an emphasis on wireless access networks, applications, and services (we will focus more on the application side of wireless networks). Following is a tentative list of topics that might be covered in the class. We will select material adaptively based on the background, interests, and progress of the students.
	 1. Introduction to Wireless Communications [1 session]
	     • Radio waves and wireless signal encoding techniques
	     • Wireless networking issues and constraints

- Wireless internetworking devices
2. Wireless Personal Area Networks (WPANs) [2 sessions]
   - Bluetooth, BLE, ZigBee, 6LoWPAN, Z-Wave, and UWB
   - Near-field communication, RFID
3. Wireless Sensor Networks (WSNs) [1.5 sessions]
   - Internet of Things (IoT)
   - IEEE 802.15.4 standard
   - Sensor network design, WSN applications
   - Routing, data fusion, clustering, and energy saving
   - Vehicular Networks
   - WSN security
4. Wireless Local Area Networks (WLANs) [1.5 sessions]
   - IEEE 802.11 standard
   - Planning, configuration, and troubleshooting
   - Capacity planning, management, and security
5. Wireless Metropolitan Area Networks (WMANs) [1.5 session]
   - Last mile connections to the Internet
   - Fixed and mobile WiMAX, 3G, 4G (LTE and LTE advanced)
   - NB-IoT & LTE-M
   - WMAN security
6. Wireless Services [0.5 session]
   - Streaming
   - Mobile IP
   - Mobile social networking
   - Localization and location-based services

Class policies

- Topics to be discussed in each class will be posted on Moodle, along with relevant readings for each topic. You are expected to keep up with the readings as we go, as they will help provide the foundation for the homework, quizzes, and exam. Impromptu quizzes will be based on these assigned readings.
- All students are expected to actively participate in class and Moodle activities. Poor participation and/or poor performance in assigned course work can be grounds for failure in the course.
- Discussing and exchanging ideas through study groups are encouraged, as this usually leads to a better depth of understanding. As part of the discussions, you may share ideas and thoughts, discuss the meaning of homework questions, or possible ways of approaching a solution. However, you must write homework solutions strictly. If one of your solutions is based on a key idea of someone else, you must acknowledge this in your homework, to avoid the perception of cheating. This form of collaboration is not an opportunity to copy answers from others.
- Group assignments are given to encourage team work and discussion/toleration of alternative ideas/views; hence, they need to be done as a group. A penalty will be enforced for doing group assignments individually.
- Plagiarism, copying another person's work, letting another person copy your work, giving or receiving aid during any test or examination is all strictly not allowed. Any student caught in any of these will receive a failing grade regardless of marks earned on other assessed work.
- Proper netiquette should be observed in using the Moodle and other learning tools.
- The dictionary meaning of deadline is "the latest time or date by which something should be completed". Thus, as you may already experience during your client interactions that deadlines are supposed to be met.
- Each assigned work will have either a deadline for submission or a specific date for

performance. For each day delayed beyond a deadline, 10% of marks will be deducted. Not performing (e.g., not doing a presentation) on an assigned date will result in 0 marks unless there is a valid reason and another student/group is arranged as a replacement. Details of submission will be given with each assignment. All assignments must be submitted via the Moodle.

- All quizzes are closed book. Final exam will be open book. The final exam will be comprehensive, covering material from the entire course including in classes, project, homework, and online/offline discussions.

- You may not use cell phones, mp3 players, etc., during the class. All laptops, smart phones, and tablets must be closed, unless you use it to take notes or search for additional contents relevant to the ongoing class discussion. The reason is to prevent distractions to other students, and to prevent the temptation to check email, Facebook, etc.