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FIT5187 Wireless networks - Semester 1, 2013

This unit will review the basic concepts of networking technologies and analyse technological aspects of the wireless network. Main topics will include: antenna and propagation for wireless systems, fundamentals of physical layers used in wireless networks, wireless local area networks (WLAN/WiFi), WiMax systems, mobile network technologies (3G and LTE), mesh networks. Unit will also cover advanced topics in wireless networking.

Contact Hours

2 hrs lectures/wk, 2 hrs laboratories and tutorials/wk

Workload requirements

Students will be expected to spend a total of 12 hours per week during semester on this unit as follows:

- Lectures: 2 hours per week
- Tutorials/Lab Sessions: 2 hours per week per tutorial
- and up to an additional 8 hours in some weeks for completing lab and project work, private study and revision.

Unit Relationships

Prerequisites

Fundamental knowledge of computer and communication systems

Chief Examiner

Associate Professor Andrew Paplinski

Campus Lecturer
Academic Overview

Learning Outcomes

At the completion of this unit students will be able to:

- describe the basic characteristics of layered protocol networking model and wireless mobile systems;
- understand architecture and signal characteristics of cellular communication systems;
- understand physical and media access control layers used in wireless technologies for signal encoding, spread spectrum and error control;
- understand architectures of: WiFi, WiMax, and advanced mobile networking systems like LTE as described in relevant standards;
- understand concepts behind mesh networks analyse advance topics in wireless networking.
Unit Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Activities</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No formal assessment or activities are undertaken in week 0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Overview of Wireless Networks</td>
<td>Practical work assignment</td>
</tr>
<tr>
<td>2</td>
<td>Ethernet and TCP/IP protocols, Internet</td>
<td>Practical work assignment</td>
</tr>
<tr>
<td>3</td>
<td>Electromagnetic waves and antennas</td>
<td>Practical work assignment</td>
</tr>
<tr>
<td>4</td>
<td>Wireless LAN Technology Fundamentals</td>
<td>Practical work assignment</td>
</tr>
<tr>
<td>5</td>
<td>Advanced Aspects of WLAN/WiFi Technology</td>
<td>Practical work assignment</td>
</tr>
<tr>
<td>6</td>
<td>Physical Layer Fundamentals</td>
<td>Practical work assignment</td>
</tr>
<tr>
<td>7</td>
<td>Cellular Wireless Networks. 3G technologies</td>
<td>Practical work assignment</td>
</tr>
<tr>
<td>8</td>
<td>4G/LTE Networks</td>
<td>Assignment - Research paper</td>
</tr>
<tr>
<td>9</td>
<td>WiMax Networks</td>
<td>Practical work assignment</td>
</tr>
<tr>
<td>10</td>
<td>Mesh and ad hoc Networks</td>
<td>Practical work assignment</td>
</tr>
<tr>
<td>11</td>
<td>Wireless Personal Area Networks</td>
<td>Practical work assignment</td>
</tr>
<tr>
<td>12</td>
<td>Wireless Sensor Networks</td>
<td>No formal assessment is undertaken in SWOT VAC</td>
</tr>
<tr>
<td></td>
<td>SWOT VAC</td>
<td>LINK to Assessment Policy:</td>
</tr>
</tbody>
</table>

*Unit Schedule details will be maintained and communicated to you via your learning system.

Assessment Summary

Examination (3 hours): 60%; In-semester assessment: 40%

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Value</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment - Research paper</td>
<td>20%</td>
<td>Week 8</td>
</tr>
<tr>
<td>Practical work assignments</td>
<td>20% total (4% each)</td>
<td>Weeks 2, 4, 6, 9, 11</td>
</tr>
<tr>
<td>Examination 1</td>
<td>60%</td>
<td>To be advised</td>
</tr>
</tbody>
</table>

Teaching Approach

Lecture and tutorials or problem classes

This teaching and learning approach provides facilitated learning, practical exploration and peer learning.
Assessment Requirements

Assessment Policy

Faculty Policy - Unit Assessment Hurdles

Academic Integrity - Please see the Demystifying Citing and Referencing tutorial at http://lib.monash.edu/tutorials/citing/

Assessment Tasks

Participation

• Assessment task 1

  Title: Assignment - Research paper

  Description:
  Investigate a paper selected from the journals listed below.
  Write a set of PowerPoint presentations that explains details of the findings/results of the paper.
  Present the paper and answer questions asked by the tutor and students.

  The list of journals available electronically through Monash Library:
  Wireless Networks, Springer
  IEEE Wireless Communications
  IEEE Communications Magazine
  IEEE Transactions on Wireless Communications
  IEEE Transactions on Mobile Computing
  Journal of Wireless Communications & Mobile Computing (WCMC)
  International Journal of Wireless Information Networks
  Mobile Computing and Communications Review

  Weighting:
  20%

  Criteria for assessment:
  ♦ Correctness and understanding - there may be more than one "right" answer in many cases.
  ♦ Completeness - that you have answered all parts of each question.
  ♦ Presentation - that you have presented your answers using the appropriate method.
  ♦ Use of evidence and argument - you are able to explain your position by using logical argument.

  Due date:
  Week 8
Assessment Requirements

• Assessment task 2

Title: Practical work assignments
Description: Solve the problems set up in the tutorial and lab manuals.
5 practical assignments worth 4 marks each.
Weighting: 20% total (4% each)
Criteria for assessment:
♦ Correctness and understanding - there may be more than one "right" answer in many cases.
♦ Completeness - that you have answered all parts of each question.
♦ Presentation - that you have presented your answers using the appropriate method.
♦ Use of evidence and argument - you are able to explain your position by using logical argument.

Due date: Weeks 2, 4, 6, 9, 11

Examinations

• Examination 1

Weighting: 60%
Length: 3 hours
Type (open/closed book): Closed book
Electronic devices allowed in the exam: None

Learning resources

Monash Library Unit Reading List
http://readinglists.lib.monash.edu/index.html

Feedback to you

Types of feedback you can expect to receive in this unit are:

• Informal feedback on progress in labs/tutes
• Graded assignments with comments
• Solutions to tutes, labs and assignments
Assessment Requirements

Extensions and penalties

Submission must be made by the due date otherwise penalties will be enforced.


Returning assignments

Students can expect assignments to be returned within two weeks of the submission date or after receipt, whichever is later.

Assignment submission

It is a University requirement (http://www.policy.monash.edu/policy-bank/academic/education/conduct/plagiarism-procedures.html) for students to submit an assignment coversheet for each assessment item. Faculty Assignment coversheets can be found at http://www.infotech.monash.edu.au/resources/student/forms/. Please check with your Lecturer on the submission method for your assignment coversheet (e.g. attach a file to the online assignment submission, hand-in a hard copy, or use an online quiz).

Online submission

Use Moodle for all your online submissions.

Required Resources

Please check with your lecturer before purchasing any Required Resources. Limited copies of prescribed texts are available for you to borrow in the library, and prescribed software is available in student labs.

- MATLAB (Octave, freely available from http://www.gnu.org/software/octave/ can also be used in most cases)
- Wireshark, Packet Analysis Software freely available from http://www.wireshark.org/
- inSSIDder, WiFi Analysis Software freely available from http://www.metageek.net/products/inssider/
Other Information

Policies

Monash has educational policies, procedures and guidelines, which are designed to ensure that staff and students are aware of the University’s academic standards, and to provide advice on how they might uphold them. You can find Monash’s Education Policies at: www.policy.monash.edu.au/policy-bank/academic/education/index.html

Key educational policies include:

- Plagiarism;  
  http://www.policy.monash.edu/policy-bank/academic/education/conduct/plagiarism-policy.html
- Assessment in Coursework Programs;  
- Special Consideration;  
  http://www.policy.monash.edu/policy-bank/academic/education/assessment/special-consideration-policy.html
- Grading Scale;  
  http://www.policy.monash.edu/policy-bank/academic/education/assessment/grading-scale-policy.html
- Discipline: Student Policy;  
  http://www.policy.monash.edu/policy-bank/academic/education/conduct/student-discipline-policy.html
- Academic Calendar and Semesters; http://www.monash.edu.au/students/dates/
- Orientation and Transition; http://intranet.monash.edu.au/infotech/resources/students/orientation/
- Academic and Administrative Complaints and Grievances Policy;  
  http://www.policy.monash.edu/policy-bank/academic/education/management/complaints-grievance-policy.html
- Code of Practice for Teaching and Learning;  
- Graduate Attributes Policy  
  http://www.policy.monash.edu/policy-bank/academic/education/management/monash-graduate-attributes-policy.html

Graduate Attributes Policy

http://www.policy.monash.edu/policy-bank/academic/education/management/monash-graduate-attributes-policy.html

Student services

The University provides many different kinds of support services for you. Contact your tutor if you need advice and see the range of services available at http://www.monash.edu.au/students. For Sunway see http://www.monash.edu.my/Student-services, and for South Africa see http://www.monash.ac.za/current/.

Monash University Library

The Monash University Library provides a range of services, resources and programs that enable you to save time and be more effective in your learning and research. Go to www.lib.monash.edu.au or the library tab in my.monash portal for more information. At Sunway, visit the Library and Learning Commons at http://www.lib.monash.edu.my/. At South Africa visit http://www.lib.monash.ac.za/.
Disability Liaison Unit

Students who have a disability or medical condition are welcome to contact the Disability Liaison Unit to discuss academic support services. Disability Liaison Officers (DLOs) visit all Victorian campuses on a regular basis.

Website: http://www.monash.edu/equity-diversity/disability/index.html
Telephone: 03 9905 5704 to book an appointment with a DLO; or contact the Student Advisor, Student Community Services at 03 55146018 at Sunway
Email: dlu@monash.edu
Drop In: Equity and Diversity Centre, Level 1, Building 55, Clayton Campus, or Student Community Services Department, Level 2, Building 2, Monash University, Sunway Campus

Your feedback to Us

Monash is committed to excellence in education and regularly seeks feedback from students, employers and staff. One of the key formal ways students have to provide feedback is through the Student Evaluation of Teaching and Units (SETU) survey. The University’s student evaluation policy requires that every unit is evaluated each year. Students are strongly encouraged to complete the surveys. The feedback is anonymous and provides the Faculty with evidence of aspects that students are satisfied and areas for improvement.

For more information on Monash’s educational strategy, see:
www.monash.edu.au/about/monash-directions and on student evaluations, see:
www.policy.monash.edu/policy-bank/academic/education/quality/student-evaluation-policy.html

Previous Student Evaluations of this Unit

Based on previous student feedback this unit is well structured and no changes have been made this semester.

If you wish to view how previous students rated this unit, please go to