ECE 4540 – Wireless Networks

IMPORTANT NOTICE – Mandatory Requirement to Report
This course will be conducted using remote instruction. Students who are accessing the course from outside of Canada or the USA must notify the instructor and indicate in which country they are located. Access to software may be restricted from some countries and failure to comply with these restrictions may result in criminal prosecution.

Course Objectives
The objective of this course is to give an introduction to the fundamentals of the wireless communications systems, the wireless network architectures, protocols, and applications. Topics of study include an overview of wireless communications and mobile computing systems, signal propagation characteristics of wireless channels, wireless channel modelling, frequency reuse/cellular/microcellular concepts, modulation techniques for wireless systems, diversity techniques, and multiple access techniques.

Course Content
The following topics will be covered:
- Overview of Wireless Communications and Networks
- Wireless Channel Modelling
- Modulation, Coding, Diversity Techniques
- Cellular Concept
- Multiple Access Techniques

Textbook

Other Resources

Requirements and Regulations
- Attendance at lectures and laboratories is essential for successful completion of this course. Students must satisfy each evaluation component in the course to receive a final grade.
- It is the responsibility of each student to contact the instructor in a timely manner if he or she is uncertain about his or her standing in the course and about his or her potential for receiving a failing grade. Students should also familiarize themselves with the University’s General Academic Regulations, as well as Section 3 of the Faculty of Engineering Academic Regulations dealing with incomplete term work, deferred examinations, attendance and withdrawal.
- No programmable devices or systems (such as calculators, PDAs, iPods, iPads, cell phones, wireless communication or data storage devices) are allowed in examinations unless approved by the course instructor.
- Students should be aware that they have access to an extensive range of resources and support organizations. These include Academic Resources, Counselling, Advocacy and Accessibility Offices as well as documentation of key University policies e.g. Academic Integrity, Respectful Behaviour, Examinations and related matters.
Learning Outcomes

1. Understanding wireless channel modeling.
2. Understanding different digital modulation, channel coding, and diversity techniques for wireless communications.
3. Learning design and analysis of cellular wireless systems.
4. Learning and understanding multiple access techniques for wireless networks.
5. Understanding basic queuing theory for network performance analysis.

Expected Competency Levels

<table>
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<tr>
<th>Component</th>
<th>Value (%)</th>
<th>Method of Feedback</th>
<th>Learning Outcomes Evaluated</th>
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<td>Assignments</td>
<td>15</td>
<td>F, S</td>
<td>1, 2, 3, 4, 5</td>
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<td>Laboratories</td>
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<td>Term Test</td>
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<td>Final Examination</td>
<td>40</td>
<td>S</td>
<td>1, 2, 3, 4, 5</td>
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* Method of Feedback: F - Formative (written comments and/or oral discussion), S - summative (numerical grade)

Academic Integrity

Students are expected to conduct themselves in accordance with the highest ethical standards of the Profession of Engineering and evince academic integrity in all their pursuits and activities at the university. As such, in accordance with the General Academic Regulations on Academic Integrity, students are reminded that plagiarism or any other form of cheating in examinations, term tests, assignments, projects, or laboratory reports is subject to serious academic penalty (e.g. suspension or expulsion from the faculty or university). A student found guilty of contributing to cheating by another student is also subject to serious academic penalty.

Copyright Notice

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Retention of Student Work

Students are advised that copies of their work submitted in completing course requirements (i.e. assignments, laboratory reports, project reports, test papers, examination papers, etc.) may be retained by the instructor and/or the department for the purpose of student assessment and grading, and to support the ongoing accreditation of each Engineering program. This material shall be handled in accordance with the University’s Intellectual Property Policy and the protection of privacy provisions of The Freedom of Information and Protection of Privacy Act (Manitoba). Students who do not wish to have their work retained must inform the Head of Department, in writing, at their earliest opportunity.