

THE UNIVERSITY OF WESTERN ONTARIO  
FACULTY OF ENGINEERING  
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

**ECE 9308 – WIRELESS COMMUNICATIONS: DESIGN AND SIMULATIONS**  
***COURSE OUTLINE – 2013***

**OBJECTIVE:**

The objective of this course is to provide the students an in-depth understanding of the fundamental techniques, design principles and simulation skills for wireless communications. Upon completion of the course, students should be able to design and analyze advanced communication systems, and expand experience and knowledge for their future careers.

**CONTACT HOURS:** 3 lecture hours per week, half course (STVH3166, Friday,9:00am to 12:00pm)

**ANTIREQUISITE:** None

**PREREQUISITES:** Bachelor's degree in Electrical Engineering, or equivalent (subject to the approval of the instructor).

**COURSE CONTENT:**

- Introduction to wireless communications
- Channel models for wireless communications
- Rayleigh and Rician fading
- Digital transmission techniques
- ISI channel and equalization technique
- Cellular concept, frequency reuse and cognitive radio
- Spread spectrum communications
- Diversity techniques
- Multicarrier modulation techniques
- Co-channel and adjacent channel interference
- Spectrum allocation principles
- Simulations of wireless communication system using MATLAB
- Selected topics (wireless networks, MIMO, cooperative communications)

**SPECIFIC LEARNING OBJECTIVES:**

1. To learn the principles for wireless communication system design.
2. To understand the characteristics of wireless channel, including fading and various interferences.
3. To understand the techniques for efficient wireless system design.
4. To analyze and evaluate the performance of communication systems.
5. To develop the simulation skills for communication system design.

**REFERENCE BOOK:**

- [1] A. F. Molisch "Wireless Communications", Wiley, 2006.
- [2] J.G. Proakis and M. Salehi, "Digital Communications", 5th edition, 2008.
- [3] A set of class notes/slides.

**OTHER REFERENCES:**

Published papers and wireless communication standards.

**PROJECT AND ORAL PRESENTATION:**

The students in the course will be required to perform a design and simulation project on an assigned topic related to communication system. An oral presentation along with the project-report submission is also required.

**EVALUATION:**

For the purpose of evaluation, the course is divided into three components, namely

- a. assignments
- b. project - report and oral presentation
- c. final examination

The final course grade will be determined from students' performance in the project and the final examination. The examination shall be semi-open book; calculators and formula sheets will be allowed.

In order to pass the course, a student must obtain a passing grade in each component. A student who fails either component shall receive a final grade not greater than 48%. The weighting of each of these components will be as follows:

Component	Value	Maximum Penalties*	
		English	Presentation
Assignments	20%	10%	10%
Project: Report and Presentation	40%	10%	10%
Final Examination (3 hours)	40%	10%	10%

\*In accordance with the policy of the University, the grade assigned to all written and oral work presented in English shall take into account syntax, diction, grammar and spelling. In the professional life of an engineer, the manner in which oral and written communications are presented is extremely important. An engineering student must develop these skills as an integral part of the undergraduate program. To encourage the student to do so, the grades assigned to all written and oral work will take into account all aspects of presentation including conciseness, organization, neatness, use of headings, and the preparation and use of tables and figures.

All work will be marked first for content after which a penalty not to exceed the maximum shown above may be applied for lack of proficiency in English and/or presentation.

**ATTENDANCE:**

Any student, who in the opinion of the instructor is absent too frequently from class in this course, will be reported to the Dean (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Dean, the student will be debarred from taking the regular examination in the course.

**CHEATING:**

University policy states that cheating is a scholastic offence. The commission of a scholastic offence is attended by academic penalties that might include expulsion from the program. If you are caught cheating, there will be no second warning.

**PLAGIARISM:**

Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage of text from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar).

Please contact the course instructor if you require material in an alternate format or if any other arrangements can make this course more accessible to you, You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 X 82147 for any specific question regarding an accommodation.

**COURSE INSTRUCTOR:**

Professor Xianbin Wang  
TEB 355  
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