University of Victoria Engineering

Faculty of Engineering

COURSE OUTLINE

ELEC 456 – Wireless Communications

Term – SUMMER 2015 (201505)

Instructor

Dr. Hong-Chuan Yang
Phone: (250) 721-8672
E-mail: hy@uvic.ca

Office Hours

Days: Wednesday
Time: 1:30 – 2:30pm or by appointment
Location: EOW 421

Lectures:

A- Section(s): A01 / CRN 30345, A02 / CRN 30346
Days: Tuesday, Wednesday, Friday
Time: 9:30am-10:20am
Location: Clearihue A211

Labs: **Location: ELW**

B01 Tue 14:30-17:20 TA (email)

Required Text

Title: Wireless Communications
Author: A. Goldsmith
Publisher: Cambridge
Year: 2005

Optional Text

Title:
Author:
Publisher:
Year:

References:

T. Rappaport, Wireless Communications, 2nd Ed, Prentice Hall, 2001
R. Yates and D. Goodman, Probability and Stochastic processes, Wiley, 1999.
J. Proakis, Digital Communications, 4th Ed, McGraw-Hill, 2000.

Assessment:

Assignments:	25 %	
Mid-terms:	75 %	Dates: June 2, July 7, and July 31.

Prerequisites:

ELEC 350 required, ELEC 450 (basics of digital communications and probability theory) recommended.

Course Homepage:

http://coursespaces.uvic.ca/: Log in with your University of Victoria Netlink ID and Password.

Course Objectives

To introduce various fundamental topics of current and future wireless communication systems, including propagation channel modelling, digital communication over fading channel, fading mitigation techniques, multiple access techniques, spread spectrum techniques and system capacity analysis.

Learning Outcomes

- Develop log-distance path loss model based on measurement data;
- Carry out cell coverage analysis using combined path loss and shadowing models;
- Evaluate the effect of co-channel interference on the capacity of cellular systems;
- Categorize fading channels using the characteristics of transmitted signal and operation environment;
- Evaluate the performance of digital transmission over fading channels;
- Assess the performance benefits of fading mitigation techniques quantatively;
- Illustrate the tradeoff of performance versus complexity among different diversity combining schemes
- Carry out cost-benefit analysis on transmission scheme with channel state information at the transmitter
- Analyze the data rate of multicarrier transmission systems in selective fading environment.

Syllabus

- Introduction to wireless communications.
- Wireless channel models: path loss, shadowing, and multi-path fading.
- Digital modulation techniques and their performance over fading channels.
- Fading mitigation techniques: diversity techniques and multicarrier modulation.
- Spread spectrum and multiple access techniques.
- Cellular concept and selected advanced topics.

Assignments:

Eight to nine problem sets will be assigned. The assignments are due in the drop box in EOW on the due dates. Selected problems from each problem set will be marked. Solution will be posted after the due dates. Late assignment will not be accepted.

Plagiarism detection software may be used to aid the instructor and/or TA's in the review and grading of some or all of the work you submit.

Exams:

There will be three midterm exams. The midterm is tentatively scheduled in class on June 2, July 7, and July 31. The midterms will be close-book exams. One single-side formulae sheet and calculator is allowed. Tutorial sessions will be scheduled before the midterms.

The final grade obtained from the above marking scheme for the purpose of GPA calculation will be based on the percentage-to-grade point conversion table as listed in the current Undergraduate Calendar.

There will be no supplemental examination for this course.

Note to Students:

Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the Chair of the Department by email or the Chair's Secretary to set up an appointment.

Accommodation of Religious Observance
http://web.uvic.ca/calendar/GI/GUPo.html

Policy on Inclusivity and Diversity
http://web.uvic.ca/calendar/GI/GUPo.html

Standards of Professional Behaviour

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour in current Undergraduate Calendar, which contains important information regarding conduct in courses, labs, and in the general use of facilities.

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult entry in current Undergraduate Calendar for the UVic policy on academic integrity.

http://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf

Course Lecture Notes

Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructor and are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar.