SCHULICH School of Engineering

COURSE OUTLINE
Fall 2014

1. Calendar Information

ENEL 529 Wireless Communications Systems

Overview of terrestrial wireless systems including system architecture and industry standards; propagation characteristics of wireless channels; modems for wireless communications; cells and cellular traffic; cellular system planning and engineering; fading mitigation techniques in wireless systems; multiple access techniques for wireless systems.

Course Hours:*H(3-1T-2)*

Calendar Reference: http://www.ucalgary.ca/pubs/calendar/current/electrical-engineering.html#7631

2. Learning Outcomes

At the end of this course, you will be able to:

1. Define the basic features and characteristics of wireless communications systems and distinguish among the different types of wireless systems
2. Define the propagation mechanisms that characterize wireless channels, determine the effects of the propagation mechanisms and develop mathematical and simulation models for predicting the effects of the propagation mechanisms
3. Analyze the bit error rate performance of digital modulation and demodulation formats when used over the Rayleigh fading channel
4. Define the diversity techniques for mitigating the effects of wireless propagation channel and quantify the improvement in bit error rate performance provided by the diversity techniques
5. Perform coverage and capacity design of a wireless communication system
6. Distinguish among the different multiple access techniques for wireless communication systems and analyze their capacity performance
7. Work collaboratively with your classmates to successfully complete ENEL529 Laboratories.

3. Timetable

Section	Days of the Week	Start Time	Duration (Minutes)	Location
L01	MWF	08:00	50 Min.	CHE 110
B01	M	15:00	110 Min.	ICT 320
T01	M	14:00	50 Min.	ST 059

4. Course Instructor

Section	Name	Phone	Office	Email

L01, B01, T01	A. Fapojuwo	403-220-8524	ICT 310	fapojuwo@ucalgary.ca

Teaching Assistants

Section	Name	Phone	Office	Email
B01	Jonathan Kwan	403-210-9810	ENA 119	jkwan@ucalgary.ca

5. Examinations

The following examinations will be held in this course:

1. Midterm: 50 minutes duration, Scheduled for Friday, October 24, 2014 in CHE 110 (closed book, closed notes).
2. Final: 3 hours duration, Registrar Scheduled (closed book, closed notes)

Note: The timetable for Registrar Scheduled exams can be found at the University's Enrolment Services website, http://www.ucalgary.ca/registrar/.

6. Use of Calculators in Examinations

- Only non-programmable calculators may be used during examinations

7. Final Grade Determination

The final grade in this course will be based on the following components:

Component	Learning Outcome(s) Evaluated	Weight
Assignments (3 Assignments)	2, 3, 4	10 %
Labs (4 Labs are planned)	2, 3, 7	10 %
Quizzes (2 Quizzes)	2, 5	10 %
Midterm Examination	1, 2, 3	20 %
Final Examination	1 to 6	50 %
	Total:	100 %

Notes:

a) It is not necessary to earn a passing grade on the final exam in order to pass the course as a whole.

b) Conversion from a score out of 100 to a letter grade will be done using a scale determined after the final examination has been marked. This allows the creation of

a scale appropriate to the relative difficulty or easiness of the term work and the final exam.

8. Textbook

The following textbook is required for this course:

Title	Introduction to Wireless Systems
Author(s)	P.M. Shankar
Edition, Year	1st, 2002
Publisher	John Wiley

9. Course Policies

Advising Syllabus

All Schulich School of Engineering students and instructors have a responsibility to familiarize themselves with the policies described in the Schulich School of Engineering Advising Syllabus available at:

http://schulich.ucalgary.ca/undergraduate/advising

Emergency Evacuation/Assembly Points

In the event of an alarm sounding, all classrooms and labs must be evacuated immediately. Please respond to alarms promptly by leaving the building by the closest available exit. Faculty and students must remain outside the building until the 'all clear' has been given by a Fire Marshall. In case of emergency, call 220-5333.

Assembly Points have been identified across campus. These areas have been selected as they are large enough to hold a significant number of people and will provide an evacuated population access to washroom facilities and protection from the elements. More information on assembly points can be found at http://www.ucalgary.ca/emergencyplan/assemblypoints.

10. Additional Course Information

Major Topics:	Topic:	Hours
	1. Overview of Terrestrial Wireless Communications Systems	4.5
	2. Propagation Characteristics of Wireless Channels	9
	3. Modulation and Demodulation Techniques for Wireless Communications	7.5
	4. Fading Mitigation Techniques in Wireless Systems	4.5
	5. Cellular System Design and Performance	6
	6. Multiple Access Techniques for Wireless Communications	6

Laboratory Experience:	Laboratory:	Hours
	1. Lab 1: Familiarity with relevant signal processing tools and MATLAB functions	2
	2. Lab 2: Characteristics and Simulation of Rayleigh fading Channel – Part I	2
	3. Lab 3: Characteristics and Simulation of Rayleigh fading Channel – Part II	2
	4. Lab 4: Digital Modulation and Demodulation Schemes for Wireless Systems	2

Course Material

Softcopy of Lecture Notes, Assignments, Tutorials and Labs are downloadable from the ENEL 529 D2L site.

Watch out for email announcements on the availability of course material, as the term progresses.

Template revised on 30 July 2013 (RWB)