

CONCORDIA UNIVERSITY
Department of Electrical and Computer Engineering

ELEC 363/4: Fundamentals of Telecommunication Systems
(January 2011)

INSTRUCTOR:

Dr. A.K. Elhakeem

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Office Hours: Mondays and Wednesdays 3:00 to 5:00 PM plus by appointment

TEXT: B.P. Lathi, Z.Ding, Modern Digital and Analog Communication Systems,
Fourth Edition, Oxford University Press, 2009.

COURSE OUTLINE:

1. REVIEW OF SIGNALS AND SYSTEMS:

Classification of Signals, Generalized Functions, Fourier Series, Fourier Transforms, Signal Transmission through Linear Systems (Sections 2.8, 2.9, 3.1-3.4, 3 Lectures).

2. AMPLITUDE MODULATION:

Amplitude Modulation: DSB, DSB-SC, SSB, VSB, Generation and Reception of AM Signals, Carrier Acquisition, Super-heterodyne receiver (Sections 4.1-4.9, 5 Lectures).

3. ANGLE MODULATION:

Frequency and Phase Modulation, Narrow-band and Wide-band FM, Generation and Demodulation of FM Signals (Sections 5.1-5.7, 4 Lectures).

4. NOISE IN AM AND FM SYSTEMS:

Representation of Noise, Signal-to-Noise Ratio in AM Systems, Signal-to-Noise Ratio in FM Systems, Threshold Effect in FM, Pre-emphasis and De-emphasis, Performance Comparison of AM and FM (Sections 10.1-10.3, 2 Lectures).

5. SAMPLING AND QUANTIZATION:

Sampling, Nyquist Theorem, Analog-to-Digital Conversion, Digital-to-Analog Conversion, Line Codes, Pulse Code Modulation (PCM), T1 Carrier System (Sections 6.1,-6.3, 3 Lectures).

6. DIGITAL MODULATION:

Baseband versus Carrier Modulation, Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), Quadrature Amplitude Modulation (QAM) (Sections 7.1-7.9, 6 Lectures).

LAB EXPERIMENTS: 1. Signal representation in time and frequency domains. 2. Generation and reception of AM Signals. 3. Generation and reception of FM Signals. 4. Waveform Coding Techniques: PCM, DPCM, DM. 5. Baseband Data Transmission. Few experiments have been recently modified

GRADING SCHEME:

Assignment: 10%.

Lab.: 15%.

Midterm: 20%.

Lab test 5%

Final: 50%.

Midterm and Final Exams are open Book.

In order to pass the course, student must get at least 51% in total, at least 50% of the final exam, and at least 50% of the lab. Students should deliver assignments and lab reports on time.

Soft Skill E: Engineering Tool Usage, spectrum analyzer

1. How it is taught? The lectures (Lathi Chpt 4,5) and laboratories include amplitude and angle modulation techniques , spectrum analyzers among other instruments are vital to such experiments
2. How is it practiced? Students conduct Laboratories experiments, plus the final lab test on the use of spectrum analyzer
3. How is it evaluated? marks of Lab experiments and final lab testing

**ELEC 363/4 : FUNDAMENTALS OF TELECOMMUNICATION SYSTEMS
LABORATORY SCHEDULE , 3rd Jan - 9th Apr 2011**

DATE, LAB SECTION & START TIME ARE SHOWN WITHIN THE BLOCKS
EXPT.# & WHETHER Week(1) or Week(2) IS INDICATED IN THE LEFTMOST COLUMN

LAB LOCATION : H-801

DAY :	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
DATE : Week 1 EXPT # 1	JAN 17	JAN 18 UC 1845	JAN 19 UA 0845	JAN 20 UE 1845	JAN 21
DATE : Week 2 EXPT # 1	JAN 24	JAN 25 UD 1845	JAN 26 UB 0845	JAN 27 UF 1845	JAN 28
DATE : Week 1 EXPT # 2	JAN 31	FEB 1 UC 1845	FEB 2 UA 0845	FEB 3 UE 1845	FEB 4
DATE : Week 2 EXPT # 2	FEB 7	FEB 8 UD 1845	FEB 9 UB 0845	FEB 10 UF 1845	FEB 11
DATE : Week 1 EXPT # 3	FEB 14	FEB 15 UC 1845	FEB 16 UA 0845	FEB 17 UE 1845	FEB 18
	MID	TERM	BREAK	21st -to-25th February	
DATE : Week 2 EXPT # 3	FEB 28	MAR 1 UD 1845	MAR 2 UB 0845	MAR 3 UF 1845	MAR 4
DATE : Week 1 EXPT # 4	MAR 7	MAR 8 UC 1845	MAR 9 UA 0845	MAR 10 UE 1845	MAR 11
DATE : Week 2 EXPT # 4	MAR 14	MAR 15 UD 1845	MAR 16 UB 0845	MAR 17 UF 1845	MAR 18
DATE : Week 1 EXPT # 5	MAR 21	MAR 22 UC 1845	MAR 23 UA 0845	MAR 24 UE 1845	MAR 25
DATE : Week 2 EXPT # 5	MAR 28	MAR 29 UD 1845	MAR 30 UB 0845	MAR 31 UF 1845	APR 1

THE LAB TEST WILL BE HELD DURING THE PERIOD 4th to 8th APRIL

LAB RULES IN BRIEF

1. **Please attend only the lab that you are registered in , according to the schedule given on the front side of this sheet.**
2. **Students must fully prepare for each lab by reading the appropriate sections of the lab manual well before coming to the lab.** A copy of the manual must be in your possession when coming to the lab. All the rules regarding the lab are given in the first few pages of the lab manual and should be followed.
3. **Food and drinks are not allowed in the lab.** Disruptive behaviour of *any* kind will *not* be tolerated. Any student who disrupts the labwork or who misuses the lab equipment is warned that such behaviour can result in expulsion from the lab. **Cell phones must be switched off in the lab and students are not allowed to leave the lab to hold cell phone conversations.**
4. Students work in groups of two, but **must submit individual reports** .Reports must have a cover page clearly indicating the experiment #, your name & ID, the name of the lab partner , the lab section & instructor , and the date performed.

REPORTS ARE DUE ON EVERY SUBSEQUENTIAL SESSION.

5. **Missed labs: Only one lab absence is permitted.** If you miss more than one lab, you are not likely to obtain the average of 50% in the lab, which is required to pass the course. A student who misses a lab must preferably attend another lab within the same experimental cycle to make up for the missed experiment and must email the lab TA and the Lab Coordinator (suresh@ece.concordia.ca) about the substitution without delay. In general, a lab missed due to unavoidable *grave* circumstance, such as accident or illness, may be disregarded in calculating the average grade *provided that* an authentic document (police report, medical or hospital certificate etc) supporting the reason for being absent is furnished. Alternatively, upon providing the above document, the student could arrange with the TA to do a make-up during a time-slot suitable to both.

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