CAMOSUN COLLEGE
Trades and Technology
Electronics and Computer Engineering

ELEX 150 – Data Transmission

Winter 2018

COURSE OUTLINE

The calendar description is available on the web @ http://camosun.ca/learn/calendar/current/web/elex.html

Ω *Please note: This outline will not be kept indefinitely. It is recommended students keep this outline for their records, especially to assist in transfer credit to post-secondary institutions.*

1. Instructor Information

(a) Instructor Russ Warren
(b) Office hours
(c) Location T207
(d) Phone 250-370-4420
(e) E-mail warrenr@camosun.bc.ca
(f) Website

2. Intended Learning Outcomes

Upon successful completion of this course a student will be able to:

1. define communications terminology;
2. describe analog modulation methods;
3. discuss communications media and transmission line theory;
4. identify antenna characteristics;
5. describe digital communication techniques;
6. identify various wireless communication systems; and
7. operate basic communications test equipment

3. Required Materials

Course Notes: Electronic Communications CNET Analog and Digital.
Digital modulation from HP app notes.
Documents are available on D2L for this course.

Various other documents will be made available on the D2L site.

Circuit Analyses Program: NI MultiSim Circuit Design Suite

4. Course Content and Schedule

1. Introduction to Communication systems

a) Description of generic communication system
b) terminology

2. Signal Analysis

a) Frequency Domain vs Time Domain
b) Fourier analysis
c) Bandwidth of non-sinusoidal waveforms
d) Spectrum Analyzer operation

3. Noise

a) Types/sources of noise
b) Thermal noise
c) distortion
d) sensitivity
e) SINAD sensitivity

4. AM Transmitters

a) The AM waveform
b) Modulation index
c) AM modulator
d) Mixing and frequency tuning
e) VHF/UHF transmitter design
f) RF power amplifiers

5. AM Receivers

a) Tuned radio frequency receiver (TRF)
b) Tuned Receiver
c) Superhetrodyne Receivers
d) AM Detectors
e) Oscillators
f) Tuned circuits
g) Mixing and frequency tuning

6. SSB

a) advantages disadvantages
b) Transmitters and Receivers block diagram

7. FM and PM

a) Basic Principles of FM and PM
b) FM signal characteristics
c) Transmitters and Receivers

8. Transmission Lines

a) Types of transmission lines
b) Characteristic Impedance

c) SWR
d) Impedance matching
e) Cable termination
f) TDR

9. Antenna Systems

a) Antennas for VHF, UHF and wireless LAN
b) Radiation Pattern
c) EM wave propagation
d) Range calculations
e) Field strength measurement

10. Digital Radio Communications

a) Applications
b) OOK, FSK, BPSK, MPAM
c) Constellation diagrams
d) Multiplexing
e) Wireless data links
f) Error detection
g) Digital modulation Techniques
h) Spread Spectrum-DSSS, FHSS
i) IEEE 802 techniques

5. Basis of Student Assessment (Weighting)

(Should be directly linked to learning outcomes.)

Quizzes	6%	Every second week
Labs	10%	Weekly
Lab Test	5%	One
Mid Terms	30%	1) AM&FM 2) Tx Lines
Assignments	14%	Weekly
Final Exam	35%	One

- For a passing grade the student must achieve a passing grade (50%) for both the lab and theory portions of the course.
- Lab attendance and satisfactory completion of every lab is mandatory. Lab demonstration and write-ups are to be completed by the deadline specified by the lab instructor
- The Lab Exam is mandatory and must be completed during the time scheduled by the instructor.
- Assignments will be based on weekly material and submitted to the appropriate drop box on Camosun D2L website. Late submissions will be subject to a 50% deduction in marks. Submissions more than 3 days late will be subject to a mark of zero.
- There will be two term tests worth 15% each given around the middle of the term and ¾ of the way through the term.
- A three hour final will be given during the exam week at the end of the semester. A minimum mark of 50% on the final is required to pass the course.

6. Grading System

(If any changes are made to this part, then the Approved Course description must also be changed and sent through the approval process.)
(Mark with "X" in box below to show appropriate approved grading system – see last page of this template.)

[x] Standard Grading System (GPA)

[ ] Competency Based Grading System

7. Recommended Materials to Assist Students to Succeed Throughout the Course

8. College Supports, Services and Policies

Immediate, Urgent, or Emergency Support
If you or someone you know requires immediate, urgent, or emergency support (e.g. illness, injury, thoughts of suicide, sexual assault, etc.), **SEEK HELP**. Resource contacts @ http://camosun.ca/about/mental-health/emergency.html or http://camosun.ca/services/sexual-violence/get-support.html#urgent

College Services
Camosun offers a variety of health and academic support services, including counselling, dental, disability resource centre, help centre, learning skills, sexual violence support & education, library, and writing centre. For more information on each of these services, visit the **STUDENT SERVICES** link on the College website at http://camosun.ca/

College Policies
Camosun strives to provide clear, transparent, and easily accessible policies that exemplify the college's commitment to life-changing learning. It is the student's responsibility to become familiar with the content of College policies. Policies are available on the College website at http://camosun.ca/about/policies/. Education and academic policies include, but are not limited to, Academic Progress, Admission, Course Withdrawals, Standards for Awarding Credentials, Involuntary Health and Safety Leave of Absence, Prior Learning Assessment, Medical/Compassionate Withdrawal, Sexual Violence and Misconduct, Student Ancillary Fees, Student Appeals, Student Conduct, and Student Penalties and Fines.

A. GRADING SYSTEMS *http://www.camosun.bc.ca/policies/policies.php*

The following two grading systems are used at Camosun College:

1. Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7

77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D		1
0-49	F	Minimum level has not been achieved.	0

2. Competency Based Grading System (Non GPA)

This grading system is based on satisfactory acquisition of defined skills or successful completion of the course learning outcomes

Grade	Description
COM	The student has met the goals, criteria, or competencies established for this course, practicum or field placement.
DST	The student has met and exceeded, above and beyond expectation, the goals, criteria, or competencies established for this course, practicum or field placement.
NC	The student has not met the goals, criteria or competencies established for this course, practicum or field placement.

B. Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy at http://www.camosun.bc.ca/policies/E-1.5.pdf for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	*Incomplete*: A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family.
IP	*In progress*: A temporary grade assigned for courses that are designed to have an anticipated enrollment that extends beyond one term. No more than two IP grades will be assigned for the same course.
CW	*Compulsory Withdrawal*: A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement.