



CAMOSUN COLLEGE
Trades and Technology
Electronics and Computer Engineering

ELEX 150 – Data Transmission
Winter 2019

COURSE OUTLINE

The calendar description is available on the web @

Online.camosun.ca

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.

Instructor Information

(a) Instructor	<u>Dr. Sahitya Yadav Kandur</u>	
(b) Office hours	<u></u>	
(c) Location	<u>TC – 264</u>	
(d) Phone	<u>250-370-4420</u>	Alternative: <u></u>
(e) E-mail	<u>KandurS@camosun.bc.ca</u>	
(f) Website	<u>See D2L course site.</u>	

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.

Required Materials

Course Notes: [Electronic Communications CNET](#). Available on D2L for this course.

Circuit Analyses Program: NI MultiSim Circuit Design Suite

Course Content

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) Superheterodyne 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

Holidays

- Feb 18 - 22 Family Day/ Reading Break (Mon-Fri) – College Closed (Week 7)
- Apr 19 Good Friday – College Closed (Week 15)
- Apr 22 Easter Monday - College Closed (Week 16)

Basis of Student Assessment (Weighting)

Quizzes	6%	Bi-Weekly
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 end of the lab period or a mark of zero will be awarded.
- ***The Lab Exam is mandatory and must be completed during the time scheduled by the instructor.***
- Assignments will be questions 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 ¼ 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.

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.)

☒ Standard Grading System (GPA)

☐ Competency Based Grading System

Recommended Materials or Services to Assist Students to Succeed Throughout the Course

LEARNING SUPPORT AND SERVICES FOR STUDENTS

There are a variety of services available for students to assist them throughout their learning. This information is available in the College Calendar, Student Services or the College web site at <http://www.camosun.bc.ca>

STUDENT CONDUCT POLICY

There is a Student Conduct Policy. It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, Registration, and on the College web site in the Policy Section.
<http://www.camosun.bc.ca/policies/policies.html>

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	<i>Incomplete:</i> 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	<i>In progress:</i> 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	<i>Compulsory Withdrawal:</i> 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.