



CAMOSUN COLLEGE
Trades and Technology
Electronics and Computer Engineering

ELEX 145
DC Circuit Analysis and Devices

Fall 2019

COURSE OUTLINE

The calendar description is available on the web @

<http://camosun.ca/learn/calendar/current/web/elex.html>

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	Gurbinder Dhade	
(b) Office hours	Posted outside office	
(c) Location	CBA – 122B	
(d) Phone	370-4450	Alternative: -
(e) E-mail	DhadeG@camosun.ca	

2. Intended Learning Outcomes

Upon completion of this course the student will have a comprehensive understanding of DC electric circuit operation, including the analysis of circuits containing passive components (resistors, capacitors, inductors) and active components (diodes, transistors, FETs, and op-amps).

3. Required Materials

(a) Texts

None, All materials provided via D2L

(b) Other

Access to a PC.

4. Course Content

1. Introduction (review)
 - 1.1 SI Units
 - 1.2 Scientific Notation and Engineering Notation

2. Nature of Electricity (review)
 - 2.1 Theory of Electrical Charge
 - 2.2 Structure of the Atom
 - 2.2.1 Bohr's Model and Structure of atoms and ions
 - 2.2.2 States of Matter and Bonding
 - 2.2.3 Conductors, Insulators and Semi-Conductors
 - 2.2.4 Conventional versus Electron Current Flow
 - 2.3 Definition of the Coulomb, Ampere, Volt and Ohm

3. Basic Components, Resistance, Switches, Diodes
 - 3.1 Resistance Fundamentals-Resistivity, conductance, insulators and semiconductors. Ohm's Law.
 - 3.2 Open /Short Circuits, switches
 - 3.4 Diodes and LED's Introduction
 - 3.3 Work, Energy, Power in Resistive Circuits
 - 3.4 Resistor Color Code
 - 3.5 Resistance applications- sensors, fuses, wire table and variable

4. Simple Circuit Analysis with Introduction of Semiconductor Devices
 - 4.1 Series Circuits
 - 4.2 Kirchhoff's Voltage Law (KVL)
 - 4.3 KVL applied to BJT, MOSFET and Op Amp circuits with device introduction
 - 4.4 Parallel Circuits
 - 4.5 Kirchhoff's Current Law (KCL)
 - 4.6 KCL applied to BJT, MOSFET and Op Amp circuits
 - 4.7 Voltage Divider Rule (VDR)
 - 4.8 VDR applied to BJT, MOSFET
 - 4.9 Current Divider Law
 - 4.10 Series - Parallel Circuits
 - 4.11 Wheatstone Bridge Circuit
 - 4.10 Voltmeter, Ammeter, Ohmmeter and other DC Measuring Instruments

5. Circuit Analysis using Basic Network Theorems
 - 5.1 Equivalent Circuits
 - 5.2 Constant Voltage Sources
 - 5.3 Practical Sources
 - 5.4 Internal Resistance and Max. Power Transfer
 - 5.5 Constant Current Sources
 - 5.6 Current Sources in Parallel and Series
 - 5.7 Thevenin's Theorem

- 5.8 Norton's Theorem
- 5.9 Superposition Theorem
- 5.10 Diode Models and Zener Diode Introduction

- 6. Op Amp Circuits
 - 6.1 Ideal Op Amp Characteristics
 - 6.2 Op Amp Comparators
 - 6.3 Positive Feedback Comparators
 - 6.4 Negative Feedback Amplifiers
 - Examples of Application Circuits

- 7. Capacitance
 - 7.1 Electric Fields
 - 7.2 Electrostatic Induction
 - 7.3 Dielectrics
 - 7.4 Capacitance
 - 7.5 Capacitors in Series
 - 7.6 Capacitors in Parallel

- 8. Capacitance in DC Circuits
 - 8.1 Charging/Discharging
 - 8.2 Time Constant
 - 8.3 Stored Energy
 - 8.4 Capacitor Response to Step and Rectangular inputs
 - 8.5 Capacitor as an Integrator and Differentiator

- 9. Inductance
 - 9.1 Electromagnetic Inductance
 - 9.2 Faraday's Law
 - 9.3 Lenz's Law
 - 9.4 Self-Inductance
 - 9.5 Inductors in Series
 - 9.6 Inductors in Parallel

- 10. Inductance in DC CIRCUITS
 - 10.1 Rise/Fall of Current in an RL Circuit
 - 10.2 Time Constant
 - 10.3 Stored Energy
 - 10.4 RL Circuit Response to a Step Input

5. Basis of Student Assessment (Weighting)

Assignments:		10%
Quizzes:		10%
Labs:		10%
Exams:	Term-Test (x2)	30%
	Final:	40%
Total		100%

6. Grading System

- Standard Grading System (GPA)
- Competency Based Grading System

7. 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.