MEMORIAL UNIVERSITY

Department of Electrical and Computer Engineering
Faculty of Engineering and Applied Science

Course Outline

ECE 5300-Electronic Circuits II

Winter 2022

ECE 5300: Electronic Circuits II

Instructor	**Mohsin Jamil**	**Teaching Assistants:**	**1. Sheikh Usman Uddin** **2. Rasool Kahani**
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Office Hours	**TBD**	**Office Hours**	**TBD**

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Website **http://online.mun.ca (D2L)**

CALENDAR ENTRY:

ECE 5300 Electronic Circuits II provides an introduction circuit using operational amplifiers. Topics covered include operational amplifier configurations, analysis, and design; transient and frequency response of amplifier circuits; feedback amplifier analysis and design, stability and compensation techniques; noise and distortion in electronic circuits; analysis and design of data converters; and an introduction to analog filter design. CAD tools are used to illustrate the analysis and design of electronic circuits.
PR: ECE 4300 Electronic Circuits I
LH: Eight 3-hour sessions per semester

LAB EXPERIENCE: Hands on and/or Simulation

Mandatory laboratory experiments using Lab equipment and/or simulation software (Multisim) are completed by groups of two students (in lab) or individually (simulation) under the watch of teaching assistant. Students perform analysis and design of interface circuits, implement program them using hardware components in SPICE, and debug and test the circuits simulate the circuit response in steady-state, time transient or frequency domain. Written report is submitted by each individual student within one week from the scheduled day of the lab.

CREDIT VALUE: 3 credit hours
COURSE TYPE: Compulsory
ACCREDITATION UNITS: 3/1/0

CONTENT CATEGORIES:

Math	Natural Science	Complementary Studies	Engineering Science	Engineering Design
			75%	25%

SCHEDULE: LECTURE: Tuesday and Thursday 2:30-3:45pm, Room: Online
Tutorial: Tuesday 9:00-9:50am
LABS: Monday and Wednesday 9:00-12:00 AM, Room: Online

RESOURCES:

1. Microelectronic Circuits, 7th Edition Adel S. Sedra, and Kenneth C. Smith Oxford University Press, Dec. 2014 ISBN: 978-0-19-933913-6
2. Electronic Devices and Circuit Theory, 10th Edition, Robert Boylestad and Louis Nashelsky, Prentice Hall, Aug 2008, ISBN:978-0136064633
3. Electric Circuits, 10th Edition, James W. Nilsson and Susan A. Riedel, 2015. ISBN: 978-0-13-376003-3.
4. Electronic Devices (Conventional Current Version), 7th Edition, Thomas L. Floyd. 2005. ISBN: 978-0-13-1140806.
5. Handouts-Provided by instructor and posted on D2L

Software: Multisim Live

MAJOR TOPICS:

- Operational Amplifiers (Op Amp): Ideal Op Amp; Op Amp configurations, examples of Op Amp circuits; practical Op Amps
- Basic Op Amp Circuits: Summing Amplifier, Adders, Integrator, Differentiator,
- Effect of finite gain, bandwidth, CMRR, bias and offset, and large signal operation, frequency response, noise and distortion, practical design.
- Active filters: Basic Filter responses, filter transfer function, types of active filters; filter design.
- Differential and Multistage Amplifiers: MOS \& BJT differential pair, differential amplifier with active load, multistage amplifiers.
- Feedback: feedback topologies; analysis of feedback amplifiers; stability analysis; compensation techniques; feedback circuit design.
- Applications: Signal generators and waveform-shaping circuits: oscillators, multivibrators, 555 circuit, precision rectifiers and peak detectors.

LEARNING OUTCOMES:

Course Level Graduate Attribute Focus: KB-D, Inv.-D, Des.-A

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

	LEARNING OUTCOMES	METHODS OF ASSESSEMENTS
1	Design a feedback-based signal amplifier	Labs, Tests
2	Analyze frequency response in feedback amplifiers	Labs, Tests
3	Recognize physical limitations of real devices	Labs, Tests

4	Design waveform shapers and signal converters	Tests
5	Understand active filters of different designs	Labs, Tests
6	Construct a graphical tool for multivibrator design	Tests
7	Design for stability of a feedback amplifier	Tests
8	Understand safety codes and standards	Labs, Tests
9	Verify numerical analysis by experiments	Labs
10	Communicate technical information effectively	Labs, Tests

Each Graduate Attribute for each learning outcome is rated at a Content Instructional Level of I=Introductory, D=Developed, or A=Applied).
See http://www.mun.ca/engineering/undergrad/graduateattributes.pdf for more information on the 12 Graduate Attributes you are expected to be proficient in upon graduation.

ASSESSMENT:

		Approximate Due Dates
Assignments (4)	**08%**	
Assignment 1		Jan 27
Assignment 2		Feb 17
Assignment 3		Mar 14
Assignment 4		Mar 31
Quizzes (4)	**12%**	
Quiz 1		Jan 27
Quiz 2		Feb 10
Quiz 3		Mar 10
Quiz 4		Mar 31
Midterm Exam 1	**10%**	**Feb 15**
Midterm Exam 2	**10%**	**Mar 24**
Lab Work (8)	**20%**	
Lab 1		Week 2 (17 Jan-21 Jan)
Lab 2		Week 3 (24 Jan-28 Jan)
Lab 3		Week 4 (31 Jan-04 Feb)
Lab 4		Week 5 (07 Feb-11 Feb)
Lab 5		Week 9(07 Mar-11 Mar)
Lab 6		Week 10 (14 Mar-18 Mar)
Lab 7		Week 11 (21 Mar- 25 Mar)
Lab 8		Week 12 (28 Mar- 01 Apr)
Final Exam	**40%**	**TBD (April 13- April 23)**

QUIZZES/TERM TESTS:
There will be no deferred or make-up quizzes or tests.
Changes and updates in the course will be announced in class and posted on the course D2L site.
The dates of assessment are tentative and subject to change with the consent of whole class.

CALCULATOR POLICY:
Only basic, non-programmable scientific calculators are allowed as aids during tests and exams. Other electronic aids, programmable calculators (e.g. TI-83 and TI-84) or calculators with symbolic manipulation, text storage and graphics capabilities, as well as other aids (books, notes, formula sheets electronic translators and devices, smart phones, etc.) are NOT allowed in term tests and final examinations. Unauthorized use of the above aids or devices during quizzes, test and examination will be considered as an academic offence.

ACADEMIC INTEGRITY AND PROFESSIONAL CONDUCT:
Students are expected to conduct themselves in all aspects of the course at the highest level of academic integrity. Any student found to commit academic misconduct will be dealt with according to the Faculty and University practices. More information is available at www.engr.mun.ca/undergrad/academicintegrity.
Students are encouraged to consult the Faculty of Engineering and Applied Science Student Code of Conduct at http://www.engr.mun.ca/policies/codeofconduct.php and Memorial University's Code of Student Conduct at http://www.mun.ca/student/home/conduct.php.
Individual work is expected of each student. Even if students work in groups, or discuss with others, assignments and reports should be independently prepared.

INCLUSION AND EQUITY:
Students who require physical or academic accommodations are encouraged to speak privately to the instructor so that appropriate arrangements can be made to ensure your full participation in the course. All conversations will remain confidential.
The university experience is enriched by the diversity of viewpoints, values, and backgrounds that each class participant possesses. In order for this course to encourage as much insightful and comprehensive discussion among class participants as possible, there is an expectation that dialogue will be collegial and respectful across disciplinary, cultural, and personal boundaries.

STUDENT ASSISTANCE: Student Affairs and Services offers help and support in a variety of areas, both academic and personal. More information can be found at www.mun.ca/student.