

ENEL 343 ELECTRIC CIRCUITS II

Tentative schedule - winter 2004

Course Instructors:

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U of C Calendar description

Electrical Engineering 343 H(3-1T-3/2) Circuits II

Applications of the operational amplifier. Natural and step responses of first order RL and RC circuits. Natural and step responses of RLC circuits. Series and parallel resonance. Laplace transform methods. The Laplace transform in circuit analysis. The transfer function. Fourier series. The Fourier transform. Two-port circuits. Two-port circuit parameters: admittance, impedance and hybrid parameters.

Prerequisites: [Electrical Engineering 341](#) and Applied Mathematics 307.

Textbook:

James Nilsson & Susan Riedel, "Electric Circuits," Addison-Wesley 6th Edition, 2000, 2001

Reference Textbooks:

Charles K. Alexander and Mathew N. O. Sadiku. "Fundamentals of Electric Circuits," McGraw-Hill, 2000; ISBN 0-256-25379-X

Charles K. Alexander and Mathew N. O. Sadiku. "Problem Solving Made Easy. A Companion to Fundamentals of Electric Circuits," McGraw-Hill, 2000; ISBN 0-07-236144-1

Raymond De Carlo/Pen-Min Lin, "Linear circuit analysis", Vols. 1 & 2, Prentice Hall, 1995.

J. David Irwin, "Basic Engineering Circuit Analysis," Macmillan Publishing Company, 1984

Goals:

The course is designed to introduce second year students to circuit techniques that will allow them to analyze electric circuits in both the frequency and time domains. With the use of Laplace and Fourier transforms students will be able to analyze a variety of circuits. Sample problems and solutions, tutorials and problems for students to try are

2 ENEL 343 – course outline 2004

available on the web at [for ENEL 343](http://www.enel.ucalgary.ca/People/ciubotar/ENEL343WEB/ENEL343page.html) during the semester to assist students. Finally, students are encouraged to attempt problems other than the usual ones assigned to them during the winter term. You may find useful the problems and solutions posted at <http://www.enel.ucalgary.ca/People/ciubotar/ENEL343WEB/ENEL343page.html>

Topics:

The course has three hours lecture and one hour tutorial per week. Topics by Chapter are 7, 8, 13 through 18. Topics by subject and estimated time are as follows:

- Sum and difference amplifier circuits, the realistic op-amp model (1 class)
- Natural and step responses of RL and RC circuits, a general solution (5 classes)
- Natural and Step responses of series and parallel RLC circuits, characteristic equations (6 classes)
- Definition of the Laplace transform, the step and impulse functions, functional and operation transforms, inverse Laplace transform, poles and zeros of $F(s)$, Initial and Final value theorems (8 classes)
- Circuit elements and analysis in the s-domain, transfer functions, the convolution integral, introduction to frequency selective circuits (6 classes)
- Fourier series, trigonometric and exponential forms, the fourier transform, properties, the Laplace-Fourier transform connection (7-8 classes)
- Two port parameters, analysis of the terminated two port network, interconnected two port networks (5 classes)

Midterm Exam:

This closed book exam will be held on March 3, 2004. No programmable calculators are allowed. Solutions to the Midterm exam are available on the web from [for ENEL 343](http://www.enel.ucalgary.ca/People/ciubotar/ENEL343WEB/ENEL343page.html)

Final Exam:

This 3 hour exam closed book exam will be scheduled at a date in April by the Registrar's Office. No programmable calculators are allowed. Solutions to previous final exams can also be found at [for ENEL 343](http://www.enel.ucalgary.ca/People/ciubotar/ENEL343WEB/ENEL343page.html).

Marking Scheme:

The proposed marking scheme is as follows:

Assignments weight = 10%

Laboratory weight = 15%

Midterm Exam Weight = 25%

Final Exam Weight = 50%

Office Hours: Monday and Wednesday, from 4:00 pm to 5:00 pm and Friday from 3:30 to 4:30 pm.

Problem Assignments:

A problem assignment will be announced in class each week. Normally there will be 10 - 12 Assignments during the term. All assignments are due at 12PM on the Friday following the allocation of the assignment. In cases of public holidays a day extra may be allocated for handing in assignments.

Assignments should be placed in the ENEL343 Tutorial box in the main corridor of the second floor of ICT building. Marked assignments will be returned during the tutorial sessions scheduled for Tuesday of each week.

Penalties for late assignments will be enforced. Assignments that are submitted after the deadline but within 4 hours of being late will automatically have a mark deducted. Assignments handed in later than 24 hours will be allocated zero marks.

Solutions and answers to the assignment problems will be available on my web page at <http://www.enel.ucalgary.ca/People/ciubotar/answers2004.html> Please note that solutions appear one week after answers are posted.

Tutorials:

These will deal with all aspects of the course through the review of the lecture material, additional worked examples, assistance with problem assignments, discussion of laboratory assignments, demonstrations, examination preparation, etc. To derive maximum benefit from the tutorial sessions, students are expected to attempt the problems prior to the tutorial. Tutorial problems are usually allocated on or around the same time as assignment problems.

Laboratory Exercises:

The laboratory is scheduled for students as three hours every two weeks. This means that we handle the lab with half of the class every week. Normally there is time for five laboratories. Students must attend the sessions (Lab01/Lab02) in which they have been assigned.

The laboratory consists of five experiments designed to support and extend the material presented in class as well as to provide practical experience in using electronic experiments. The Laboratory manual containing the experiments will be available for sale at the Department office, at a designated date and time to be announced. **All students must purchase a laboratory manual.** Students are expected to study the experiment instructions prior to performing the laboratory. Labs can be written up in the lab manual and if extra pages are needed they must be stapled on to the manual appropriately.

The lab manual (one submitted per group) should contain a detailed description of the experiment performed including diagrams drawn or printed, calculations, results, observations, comments, and discussions. Results are not to be presented in point form! Students are expected to write clearly and legibly for the person(s) marking their labs.

All labs are due at 12PM on the Thursday following the lab. This means that lab manuals are expected to be submitted one week after completion of the lab for marking and will be returned one week later at the start of the next experiment. The location for submitting the lab report is the 2nd floor, ICT building in the ENEL343 Laboratory box. Lab manuals submitted within 24 hours after the specified deadline will be deducted 3 marks, and beyond 24 hours a mark of zero will be allotted.

Lab Experiments (Winter 2003)

- 1) Operational Amplifiers
- 2) Transient response of RC, RL circuits
- 3) Second Order RLC circuits
- 4) Frequency selective circuits
- 5) Two port circuit parameters

FACULTY OF ENGINEERING

UNIVERSITY OF CALGARY

POLICY FOR IMPLEMENTATION OF FOIP REQUIREMENTS

Protection of Student Examinations and Course Work Under the Freedom of Information and Protection of Privacy Act of the Province of Alberta (FIOP)

The following outlines the Faculty of Engineering policy that will ensure that examinations and term-work of students in engineering courses are protected with respect to privacy. The philosophy behind the policy is that marked student examinations and term-work (hereafter called "student's work") should be available only to the student and to staff in the Faculty of Engineering who have a need to see the material. This includes academic staff, graduate assistants and support staff.

- * All students' work will be returned in class, laboratories, or tutorials, (hereafter called classrooms), as appropriate.
- * Staff members will take reasonable steps to supervise the return of the students' work in classrooms. It is not required that each student be called up by name to receive his/her work.
- * The person returning the student's work in the classroom has the right to see identification from the student before the work is returned.
- * Material that is not collected by a student during the first occasion when it is brought back to a classroom will be returned to the classroom at reasonable intervals by a staff member.
- * Students shall not approach instructors, graduate students or support staff in their offices to pick up their work.
- * Term-work not picked up by a student at the end of the term shall be retained on file by the department responsible for the course for a period of one year. The Faculty will retain final-examination papers for a period of one year.
- * Any student's work that may be exposed to the view of other students shall not have the grade or mark displayed on the front page.
- * A student's name and U of C ID number shall not both be written by the student on the cover page of any work submitted for evaluation.
- * A student shall not pick up any marked work that does not belong to the student.

This statement shall be attached to every course outline handed out in the Faculty of Engineering. Departments may attach additional statements to courses controlled by them.