

GENERAL INFORMATION

This studio course combines circuit analysis techniques, simulations, and experiments, including some design aspects. Most of the class time will be devoted to various learning activities, including paper-and-pencil exercises, in-class problems, circuit measurements, and computer work using PSpice and Maple -- all done by teams of two students. There will also be mini-lectures and discussions, but you are expected to do the assigned reading and preparation *in advance*. You should devote about 5-6 hours per week outside of the classroom -- 1-2 hours reading and 4-5 hours on the preparation, homework, and reports.

- STAFF:** Prof. Bruce Carlson, course director, JEC 6052, x6089, carlson@ecse.rpi.edu
Prof. William Jennings, lecturer and webmaster, CII 4011, x4795, jenniw@rpi.edu
Ms. Priscilla Magilligan, administrative assistant, JEC 6049, x6225, pris@ecse.rpi.edu
TAs TBA
- PREREQUISITES:** MATH-2400 Intro. to Differential Equations and PHYS-1200 Physics II.
- TEXTS:** Carlson, *CIRCUITS*, Brooks/Cole
SUPPLEMENT, purchase in JEC 6049 for \$5
(please have exact change or a check payable to ECSE Department, RPI)
- CLASSES:** All classes (except exams) meet in JEC 4104 on the following schedule:
Sect. 1 (Carlson) - Mondays, Tuesdays, and Thursdays at 10-11:50 am,
Sect. 2 (Jennings) - Mondays, Wednesdays, and Thursdays at 4-5:50 pm
Sect. 3 (Carlson) - Mondays, Tuesdays, and Thursdays at 2-3:50 pm
- CLASS MATERIALS:** You should bring this package, the *SUPPLEMENT* and your calculator to all class sessions.
You may also want to bring the text when in-class problems are scheduled.
- OPEN SHOP HOURS:** Starting in the second week, the studio classroom will be available for extra time on the experiments and computer projects or instructor consultations as follows:
Tuesdays, 9-10 am (Carlson)
Wednesdays, 9-10 am (Jennings)
Fridays, 11-noon (Savic)
Additional times are available by appointment; check with your instructor.
- HOMEWORK:** Homework problems (at end of chapters) are due as indicated on the schedules provided for each of the three units. Homework or reports are due almost every class day. *Late homework will not be accepted.*
- REPORTS:** Experiment and computer reports are due as indicated on the schedules, and preparation problems are given on the corresponding pages of the supplement. These problems should be done *in advance*, but they are due on a subsequent date as part of reports. Information on report contents is given in the supplement. *Late reports will be penalized at the rate of 5 points per class day*, unless you have an excused absence.
- PRACTICE PROBLEMS:** You should do the exercises in the text as you come to them. They will not be collected, but the solutions are given at the back of the text. For further practice, answers (but not solutions) are provided at the back of the text for the chapter problems marked *.
- EXAMS:** Tuesday, February 19 and Monday, April 1, 7-9 pm, location TBA, (the only times the Monday evening session is used). One crib sheet is permitted at each exam (8.5 x 11", both sides). There are no make-ups for the exams, but you may qualify for an excused absence. Final Exam TBA during exam week. Two crib sheets are permitted. Sample exams with answers (but not solutions) will be posted and on the web. Each exam will include a *take-home part* due at the scheduled exam time. The take-home part will be distributed at the class before the exam, and any student absent from this class must get the take-home exam in JEC 6049.

COURSE POLICIES AND PROCEDURES

- SOLUTIONS:** Homework and problem solutions will be posted on the bulletin board outside JEC 4104, along with sample exams. They will also be put in the course web site under <http://www.ecse.rpi.edu/Courses/>
- PARTNERS:** You are required to work with a partner on the in-class problems, homework, and experiment and computer projects. The two of you will submit just ONE PAPER with BOTH NAMES.
- You may also work with a partner on the take-home exams. This person may be the same or different from your in-class partner, since each of you must submit separate exam papers.
- Please PRINT YOUR NAME(S), SECTION NUMBER, and ASSIGNMENT clearly on all papers so we can grade and return them to you efficiently.
- CLEAN-UP:** No food or drink in the studio, please, as it gets into the rug. We want to keep our studio classroom clean because it is used for several sections and often has visitors. Rather than setting down a list of clean-up rules, we simply ask you to leave your work area in the condition you would like to find it when you come to class.
- EXCUSES:** For absence from a graded class activity, give the course director a copy of your excuse signed by the infirmary, dean of students, coach, etc. Note that the infirmary does not give excuses for simple visits, and only excuses authorized by RPI are allowed. *Plant trips and other functions under your control do not qualify for an excused absence, so plan accordingly.*
- REGRADING:** To submit a paper for regrading (after checking the posted solution) attach a note explaining your request and give it to the course director. *This must be done no later than one week after the paper was returned.* You may review your final exam. However, except for gross grading errors, final exams cannot be regraded since the TAs who did the grading may not be available.
- CONFLICTS:** In the case of an exam conflict, please notify the course director as soon as possible.

COURSE GOALS AND OBJECTIVES

This course is designed to help you master three major goals:

1. The engineering approach to problem-solving, in the context of circuits;
2. Important concepts used in electrical and computer engineering for circuits and systems;
3. Techniques of circuit analysis.

The course has been divided into three units as shown on the attached pages. Specific techniques of circuit analysis are stated as objectives at the beginning of the chapters in the text. The objectives covered in each of the three units and the exams are indicated below, where chapters and pages refer to the text.

UNIT I :

- Chapter 1 (all objectives, pp. 2-3)
- Chapter 2 (all objectives, p. 41)
- Chapter 3 (objectives 1-7, pp. 85-86)
- Chapter 4 (objectives 1, 3, 4, 6, 7, p. 132)
- Chapter 5 (objectives 1-5, p. 191)

UNIT II :

- Chapter 6 (objectives 1-8, p. 234)
- Chapter 7 (objectives 1-8, p. 295)
- Chapter 8 (objectives 1-7, p. 349)
- Chapter 9 (objectives 1-3, p. 393)

UNIT III :

- Chapter 9 (objectives 5-7, p. 395)
- Chapter 10 (objectives 1-4, 6-8, p. 437)
- Chapter 11 (objectives 1-4, 6-7, p. 477)
- Chapter 13 (objectives 1-8, pp. 576-577)

GRADING

In-class problems are graded on a 5-point scale. Homework sets consist of two problems and count 10 points per set. Experiments are graded on a 20-point scale, and computer projects are graded on a 25-point scale.

Grade weightings are as follows:

In-class problems (best 17 @ 5)	85 points
Homework sets (best 17 @ 10)	170
Experiment reports (best 10 @ 20)	200
Computer projects (best 4 @ 25)	100
Exam I	150
Exam II	150
Final exam	230

A record sheet is attached for your convenience. You can check our records of your scores by seeing Ms. Magilligan in JEC 6049.

Course grades are based on total scores at the end of the term (1085 maximum). The B/C borderline will be set at about the class median. Individual consideration will be given those students whose scores are just below a borderline.

COLLABORATION AND ACADEMIC HONESTY

The only way to master circuit analysis is to *do circuit problems*, so the class activities and homework are important parts of this course. Since students often learn from each other, you are expected to work with a partner as detailed above. Working with a partner has many advantages, and we recognize that on any particular assignment one partner may contribute more than a normal percentage of the effort. However,

- Both partners should work on all problems to learn by doing;
- Homework problems should be done at “home,” not during class;
- Each partner must be present and working throughout the class session to get credit for it. If your partner did not participate in something, then **DO NOT PUT HIS/HER NAME ON THE PAPER**. (Doing so is considered to be a violation of academic honesty.)

Furthermore, all papers submitted for grading must be original work by you and your partner, not copied material.

Collaboration of any sort is not allowed on the in-class portion of the exams.

Any instances of academic dishonesty may result in a zero score for that assignment.

CALCULATORS FOR CIRCUITS

An appropriate calculator can be a real time-saver because you will often need to carry out

- polar/rectangular conversions
- solution of simultaneous equations
- operations with complex numbers

If your calculator cannot at least do polar/rectangular conversions and solve three simultaneous equations, then you should consider upgrading. In any case, it is *your responsibility* to learn how to use your calculator for the various operations needed in this course. (When all else fails, consult the instruction book!)

Startup:

1. Press the power switches on the unit and the monitor (lower right below the screen)
2. When asked for username and password, enter your RCS login id and password
3. Double click **Studio Applications** for access to the programs.

Shutdown: *Please shutdown your computer before you leave the studio, using the following procedure.*

1. Click the **Start button** on the lower left of the screen, select **Shut Down...**
2. Select **Shut down**
3. Press the monitor's power switch

Initialization: This procedure must be done at the beginning of the term to allow you to access your RCS files.

1. Follow steps 1-3 of the startup procedure
2. Double click on RCS icon (bow & arrow)
3. Click on **Connect to Rensselaer Home Directory**
4. Enter your RCS password

Accessing RCS files:

After the above initialization, you should always log in with your RCS id at the *same* computer. You can then access your RCS files at any time by opening **Homes on 'Sambasrv' (H:)**. Since most computer work is done by teams of two, you and your partner should decide how RCS files will be saved.

Please do not save anything on the studio computers.

Laptops: *Please do NOT use laptops in the studio since they will not have the appropriate software.*

PSPICE PROCEDURE

1. Select **Studio Applications**
2. Select **PSpice AD** and maximize if needed
3. Open the file in question
(xxx.cir and xxx.dat files for activities are found under **C:Files/c-e studio/Circuits**)
4. If xxx.cir file, chose **Simulation + Run**
5. If needed for a bigger display, chose **View + Alternate display** and/or maximize
(Cursors are under **Trace**.)

AVAILABILITY OF PSPICE

Several of the computer projects involve the circuit simulation program PSpice for Windows, evaluation or student version 7.0 or later. Besides being on the studio classroom computers, this program is available on the PCs in the public computing labs. The computers in the public labs are networked, so you can access your RCS files.

If you have an appropriate machine, you may also obtain a free copy of the simulation program from the web site

<http://pcb.cadence.com/Product/simulation/PSpice/download.asp>

PSpice is part of a large package of programs. We will only be using *PSpice A/D* and *Probe*. Note that Microsim, the originator of PSpice, has been merged with OrCAD, a part of Cadence.

Name:

Sect. No.:

Prob 1		HW 1		Expt 1	
Prob 2		HW 2		Expt 2	
Prob 3		HW 3		Expt 3	
Prob 4		HW 4		Expt 4	
Prob 5		HW 5		Expt 5	
Prob 6		HW 6		Expt 6	
Prob 7		HW 7		Expt 7	
Prob 8		HW 8		Expt 8	
Prob 9		HW 9		Expt 9	
Prob 10		HW 10		Expt 10	
Prob 11		HW 11		Expt 11	
Prob 12		HW 12		Best 10 Expt	
Prob 13		HW 13			
Prob 14		HW 14		Cptr Proj 1	
Prob 15		HW 15		Cptr Proj 2	
Prob 16		HW 16		Cptr Proj 3	
Prob 17		HW 17		Cptr Proj 4	
Prob 18		HW 18		Cptr Proj 5	
Best 17 Probs		Best 17 HW		Best 4 Proj	

Best 17 Problems	85 max	
Best 17 HW Sets	170 max	
Best 10 Experiments	200 max	
Best 4 Computer Projects	100 max	
Exam I	150 max	
Exam II	150 max	
Pre-Final Total	855 max	