

University of Dayton
Dept. Electrical and Computer Engineering

ECE 202 – Signals & Systems Laboratory – Winter 2007

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Lab assistant: Agus Widjaja, widjazaz@notes.udayton.edu

Text: B.P. Lathi, *Linear Systems and Signals*, 2nd Ed., Oxford University Press, New York, 2005.

Reference: James W. Nilsson and Susan A Riedel, *Electric Circuits*, 7th edition. Prentice-Hall, 2005.

Objective: The goal of this course is to pursue investigative experimental and design-oriented activities to support studies in the course ECE 202, and to provide an introduction to engineering design. The goal complements that of ECE 202 by developing practice in experimental validation and assessment of the response of passive and active circuits to more generalized signals than those found in dc and ac circuits.

Specific Objectives: At the end of this course you should be able to:

- Design experiments to measure the response of passive RLC circuits to generalized excitations including transient, sinusoidal, and periodic inputs.
- Understand and correlate experimental observations of passive RLC circuits with fundamental system properties that influence the transient and steady-state response of LTI systems.
- Design and evaluate first-order and second-order passive filters.
- Construct, measure and analyze operational amplifier circuits.

Grading: There will be a total of five experiments this semester. At the end of each experiment you will turn in a report, following the report writing guidelines you learned in ECE 201. The lab assistant will grade the report, and the grade will be verified by the instructor. Each report is worth 20% of your grade.

Miscellaneous:

- *The lab assistant will be your main source of support and guidance for the laboratory.* If you need to meet him outside of laboratory hours, send him an email to set up an appointment.
- All reports must be completed as a course requirement; penalty for late work will be severe – however, talk to me if you have special circumstances.
- Attendance to all laboratory sessions is essential for your success in this class. Any foreseeable absences should be approved by the instructor in advance.
- Students will be expected to use PSpice and MATLAB as an integral part of the laboratory work.
- Laboratory projects developed in this course are generally related to material in the concurrent course ECE202.

Course homepage: <http://homepages.udayton.edu/~ordonez/courses.html> (click on the 'quickplace' link)

Outline of topics

1. Transient and impulse response of passive RLC circuits.
2. Transfer function analysis of passive RLC circuits.
3. Passive/Active filter design and evaluation.
4. Periodic response of passive RLC circuits.

LABORATORY SAFETY PROCEDURES

General Lab Safety Rules for Instructors and Students

- Familiarize yourself with your lab and the people that share it.
- Familiarize yourself with the exits and the routes to them.
- Know where telephones, fire extinguishers and first aid kits are around your work area.
- Read the safety labels on all equipment in the lab, including the fire extinguisher.
- Review the differences between extinguishing electrical fires and those used for paper or wood or other substances.
- Check all plugs and cords for wear damage prior to use.
- Identify person(s) who have had CPR training in your class.

Student Safety Responsibilities

- Inform your instructor and other students of any special medical or health conditions or needs you may have and if you have a doctor that must be informed in the event of a medical emergency.
- You are responsible for the proper use of all equipment that you use.
- No student is permitted in the lab alone at any time. The student must be accompanied at all times by a laboratory partner and/or the laboratory instructor.
- Ask questions and request clarification to ensure understanding about the proper use of all equipment.
- Report equipment malfunction immediately to the instructor.
- Immediately report all dangerous conditions (stripped 110V AC lines; sparks in laboratory equipment; loose wall socket; etc.) to your laboratory instructor.
- Use proper lifting techniques for heavy objects - lift with legs and arms, keeping the back straight. Do not attempt to lift anything weighing more than 40 lbs. without assistance.
- Pick up pencils, pens, wires and other objects on the floor that may cause someone to trip.
- Close drawers.
- Wipe up spills.
- Stay alert and on the lookout for any condition that might pose a health and/or safety threat. Report any such condition to the instructor.
- Keep food and liquids away from your lab station.
- Unless under direct instructor supervision, never place an instrument lead into direct contact with 110V AC line voltage.
- Report any worn, frayed, broken, or missing equipment to the instructor.
- Untangle the test leads of your bench instruments before leaving.
- Any student who knowingly imposes a dangerous electrical situation on himself/herself, other students or the lab instructor (e.g., stripping 110V lines; electrocuting himself/herself or other students, etc.) will be denied access to the laboratory.

Remember: Safety, Safety, Safety!
When in doubt, ask your instructor and do not touch it!