

ECE 3274 Electronic Lab. II Spring 2022
Department of Electrical & Computer Engineering, Virginia Tech.

Classroom Expectations

Virginia Tech is committed to protecting the health and safety of all members of its community. **By participating in this class, all students agree to abide by the Virginia Tech Wellness principles** (<https://ready.vt.edu/public-health-guidelines.html#wellness>). You must do the following in this class:

- Wear a mask at all times while in class.
- Wear a mask during all other activities conducted for the class in public indoor areas.
- Isolate yourself from campus if you test positive for COVID or begin to feel symptoms that might be related to COVID (see: <https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>).
- Be respectful of the well-being of others by practicing appropriate personal hygiene and by providing appropriate physical distance when feasible.

Masks may be reusable or homemade cloth masks, dust masks, or surgical masks and should fit close to the face to provide thorough filtration of breathed air. Face shields that are open around the sides do not satisfy this requirement and are currently not accepted as a viable alternative by the university (see: <https://ready.vt.edu/faq.html>).

If a student feels that they cannot wear a mask for health concerns and must use an alternative form of face covering such as a face shield, they should contact Services for Students with Disabilities to request an accommodation. No exceptions for masks will be provided unless there is an official accommodation notice provided by SSD to the instructor.

These requirements will not be waived. The instructor has the authority to terminate the class session early if the health and safety requirements are not maintained. Students who fail to follow the requirements will be reported to the Office of Student Conduct.

If a student will miss significant class activities because of the need to self-isolate, then the Dean of Students Office should be contacted for an official absence verification. Prolonged absences may be difficult to make-up. Students should consult with their advisor about possible options if too much course work is missed to feasibly make-up. As pandemic conditions continue to evolve through the semester, these requirements may need to change. The guidance posted by the university at VT Ready should represent the most up-to-date requirements of the university and should be checked periodically for changes.

Honor Code:

The Undergraduate Honor Code pledge that each member of the university community agrees to abide by states: "As a Hokie, I will conduct myself with honor and integrity at all times. I will not lie, cheat, or steal, nor will I accept the actions of those who do." Students enrolled in this course are responsible for abiding by the Honor Code. A student who has doubts about how the Honor Code applies to any assignment is responsible for obtaining specific guidance from the course instructor before submitting the assignment for evaluation. Ignorance of the rules does not exclude any member of the University community from the requirements and expectations of the Honor Code. Academic integrity expectations are the same for online classes as they are for in person classes. All university policies and procedures apply in any Virginia Tech academic environment.

ACCOMMODATIONS FOR MEDICAL OR PERSONAL/FAMILY EMERGENCIES

If you become ill and have to miss class, especially in the case of an exam or some due date, you should see a professional in Schiffert Health Center in McComas Hall and acquire a medical excuse**. If you experience a personal or family emergency, you should contact the Dean of Students Office

**which is then provided via email to the instructor from the College of Engineering Dean's office.

I. Course Objective

Design amplifier related circuits based on BJT's and FET's. The design parameters included are gain, frequency response, and matching impedances.

Develop the skills to analyze electronic circuits and systems, as well as interpret experimental results.

Develop a better understanding of the theory of electronic devices and circuits through practical examples and testing.

- 1: BJT Common emitter amplifier.
- 2: BJT Common collector amplifier.
- 3: MOSFET Common source amplifier.
- 4: MOSFET Common drain amplifier.
- 5: Class B, and Class AB push pull amplifiers.
- 6: Two stage amplifier.

II. Text

ECE 3274 available online at www.courses.ece.vt.edu/ece3274

Donald A. Neamen, *Electronic Circuit Analysis and Design – 4th. ed.*, New York, McGraw-Hill, 2001

III. Honor Code

The Virginia Tech Honor Code will be enforced in this class. All graded work must be your own.

IV. Prerequisites / Co-requisites

All students are required to be taking ECE 3204, or have successfully completed this course, as a requirement for this lab.

Prelab:

The prelab must be **handwritten** and completed **prior** to the due date lab. The prelab will include the design, design assumptions, schematics with the components labeled to match the equations. **LTspice analysis of the design and LTspice schematic** at the same input conditions and output requirements as the lab procedure. **You must show all work including units.** Include all equations, component values, questions answered, **LTspice schematics, and labeled plots.** Do not use LTspice as a trial and error method of design. The prelab results and analysis must be your own work. Include your name, CRN number, Group number, date, project name shall be on the first page, and number all pages. Handwriting shall be clear enough for understanding. **Late submission may result in a 10% reduction of the grade for each day late maximum 3 day for total of 30%.**

Lab Experiment

Use scope, multimeter, power supply, software, parts and breadboard.

The lab shall include all preliminary design work (prelab), answers to the assigned questions. Analysis and conclusions associated with the result of the lab. The reports shall also include, when appropriate, the output plots for the lab. Each student must complete report/data sheet to be uploaded for a grade. The lab results and analysis must be your work. The data collected will be common between partners..

Upload the completed report with questions answered. Your name, group number, date of lab, project name, and CRN shall be on the first page. Number all pages and writing shall be clear enough for understanding.

Lab and Prelabs Format.

1) Heading (Cover Page): Lab title, CRN, student name and your assigned group number, date of report.

2) Theory / Approach / preliminary Design: Equations, assumptions and other materials used in preparing the lab. It should also include LTspice analysis and schematic for your design.

3) Answers to Assigned Questions:

4) Data Collection: Tables, charts, graphs and / or waveforms as necessary. Scope waveforms and various plots using your scope (velleman, digilent AD2).

5) Analysis:

This section shall include an analysis of the actual lab results along with explanation for any differences between the lab results and the initial design values or predicted results. You must recalculate the design values using the as built component values. Do not automatically attribute difference to the component values used. You must show all work.

Quizzes:

The quiz will be timed closed book and notes. Held in the class room during the scheduled time and day for your class. If you **miss a quiz** and are excused your final exam score will be substituted for the missed quiz score. You will be tested on reading components values (color code and capacitor values).

Final Exam:

The exam will be an individual practical exam build a circuit and measure it. Time limit 1:20 using the equipment in class.

Grading:

Final grade will be calculated based on the students completing all 6 labs. The lab instructor must approve make-up of any missed lab in advance. Failure to arrange the make-up will result in a grade of zero of that lab. A student must complete prelabs, labs, quizzes, and exam.

If you become ill and have to miss class, especially in the case of an exam or some due date, you should see a professional in Schiffert Health Center in McComas Hall and acquire a medical excuse. If you experience a personal or family emergency, you should contact the Dean of Students Office.

Percentage of Grade:

Prelab	30%	prelabs equal weight (individual work)
Lab Experiment	30%	reports equal weight (individual work)
Quizzes	20%	quizzes (individual work)
Final Exam	20%	practical exam (individual work)

A 100% to 93%	A- < 93% to 90%	
B+ < 90% to 87%	B < 87% to 83%	B- < 83% to 80%
C+ < 80% to 77%	C < 77% to 73%	C- < 73% to 70%
D+ < 70% to 67%	D < 67% to 63%	D- < 63% to 60%
F < 60% to 0%		