

## ECE 3354 POWER ENGINEERING LABORATORY FALL 2021

**Course Supervisor:** Dr. Jaime De La Reelopez.

**Laboratory Supervisor:** Richard Cooper, 244 Whittemore.

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>) **and the guidance stated in the Fall 2021 plans** (<https://ready.vt.edu/fall-2021-plans.html>). To adhere to these, 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.

**Objective:** The overall objective of this course is to enhance the students understanding of the concepts of electromechanical energy conversion and machine performance. Each experiment has a stated objective.

**Text:** ECE 3354, available online at <http://www.courses.ece.vt.edu/ece3354/>

**Bring a flash drive** with you to class to recode waveforms for your reports. Bring your lap top or a printed copy of the procedure to collect your data.

**Course Format:** This is a concept laboratory. Each student is expected to perform each experiment individually at home, document the observations, and write a report explaining the observations in terms of the theory learned in courses ECE 3304. Merely reporting the observations is not sufficient for successful completion of the course. The emphasis is on how and why a device responded the way it did.

Lab experiments.

- 1: Transformer equivalent circuit.
- 2: Transformer waveforms.
- 3: Transmission line.
- 4: Synchronous motor performed in the lab over a 4 week period, 4 students at a time.
- 5: Induction Motor MatLab program
- 6: Buck, Buck-Boost DC to DC converters.
- 7: Flyback Dc – DC converter.
- 8: Sine wave DC – AC inverter.

**Prelab:**

For preparation read the lab and answers assigned prelab questions, be familiar with the lab procedures and the concepts to be demonstrated. The prelab lecture will be in the class room. Run the LTspice simulation have with you at the time of the inclass experiment, include with report.

**Reports:**

Each student must submit a **handwritten report independent** of the other students. **Sharing of explanations and conclusions is a violation of the honor code. The reports will be uploaded in canvas.**

Reports must be handwritten, neat, legible, and must include the ordinal data sheets. Include LTspice simulation (schematics and plots). **Late reports** will be penalized at the rate of **10% for every day late**, with a maximum of 3 day grace period, so that the total points deducted can be 30% (after 3 days no submission allowed).

**Quiz:**

The in class quiz will replace the reports for some of the lab assignments. The quiz will be closed book and notes. Held in the class room during the scheduled time and day for your class.

**Exam:**

The final exam will be closed book and notes. Held in the class room during the last full week of classes at your class time. The exam will be an written with a mixture of multiple choice, fill in the blank, and problem solving with multiple answers.

**Grading:**

There will be a **50% deduction** of the Quiz or Report score if do not attend the day of the associated lab.

*Reports, and Quizzes.	85%
*Final exam:	15 %.
A 100% to 93%	A- < 93% to 90%
B+ < 90% to 87%	B < 87% to 83%
C+ < 80% to 77%	C < 77% to 73%
D+ < 70% to 67%	D < 67% to 63%
F < 60% to 0%	
	B- < 83% to 80%
	C- < 73% to 70%
	D- < 63% to 60%

The final exam will be based on the experiments and will measure the students understanding of the concepts. The exam will be in class.

**Honor Code:** Since students must work in groups, there will be sharing of measured data. Each student must **write a report independent** of the other students. **Sharing of explanations and conclusions is a violation of the honor code.**