

ECET 3000 Electrical Principles

Course Syllabus

Spring 2012

3-3-4

Catalog Description:

This course covers basic circuit theory including the ac and dc characteristics of resistors, capacitors and inductors as used in elementary single and three-phase circuits. Characteristics of basic industrial electric motors and single and three-phase connections are studied. Basic factory automation is covered including sensors, relay control and programmable logic controllers. Laboratory exercises supplement the material discussed in class. This course cannot be used for credit by CpET, EET, or TCET majors.

Prerequisite:

PHYS 1112K

Required Text

[Fundamentals of Electrical Engineering and Technology](#), 1st Edition, William D. Stanley, John R. Hackworth, and Richard L. Jones, Thomson Delmar Learning, 2007.

Course Outcomes

After successfully completing this course, students will be able to demonstrate that they can do the following:

1. Given a simple rectangular or circular cylindrical solid with resistivity ρ , compute the resistance from end to end.
2. Given a parallel plate structure and the dielectric properties of the insulating medium, calculate the capacitance of the structure.
3. Calculate the voltage induced in a closed circuit due to a time varying magnetic flux through the circuit. Both normal and oblique angles of incidence should be handled.
4. Calculate the force developed upon a linear current flowing in a uniform magnetic field.
5. Calculate the equivalent impedance of relatively simple series and parallel combinations of resistors, capacitors or inductors. Includes prediction of resonant frequency in series and parallel L-C circuits.
6. Develop the Thévenin and Norton equivalent circuits of a simple network of voltage sources

and resistors.

7. Calculate the load impedance for a given network that will result in maximum power transfer (MPT) to the load. Apply Thévenin's theorem to MPT.
8. Predict the speed and efficiency of a dc shunt motor driving a load of constant torque or horsepower.
9. Describe the general torque-speed (slip) characteristics of an induction motor and solve for the running speed of an induction motor given a linear model of the τ -s curve in rated operation range and particular load characteristics, e.g., constant torque, constant power.
10. Draw and wire a rudimentary across-the-line starter incorporating discrete control circuit elements.

Topics Covered

1. Basic DC circuits and general DC circuit analysis.
2. Transient circuits.
3. AC circuits and steady-state AC circuit analysis.
4. Diodes and their application.
5. Transistors.
6. Operational amplifiers.
7. Digital circuits: basic and advanced combinational forms.
8. Magnetic circuits.
9. Three-phase circuits.
10. Transformers.
11. DC and AC machines.
12. Programmable Logic Controllers.

Assessment and Policies

Attendance

Roll will be taken daily. No makeup assignments will be given unless previous arrangements are made with your instructor. Otherwise, a grade of zero will be recorded for any missed grades. In the case of extreme emergencies, contact your instructor as soon as possible. **YOU ARE RESPONSIBLE** for any missed notes, handouts, assignments, announcements, etc.

Homework

Homework problems will be assigned, collected, and graded. The purpose of the homework is to learn the methods of problem solving, rather than being absolutely correct. More emphasis will be placed on how the problem is solved as opposed to simply arriving at a correct answer. **NO CREDIT WILL BE GIVEN FOR LATE HOMEWORK.**

Homework must be submitted on green Engineering Computation Notepad paper. Each homework problem will be worth three points. One point will be given for writing out the problem in its entirety, including any associated diagrams. One point will be given for showing your work. One point will be given for the correct answer. Giving only the answer is not worth any points.

Exams

There will be three mid-term exams. They will be announced in class one week in advance. You will be given fifty minutes of class time to take each exam. No makeup exams will be given unless previous arrangements are made with your instructor. Otherwise, a grade of zero will be recorded for any missed exams. In the case of extreme emergencies, contact your instructor as soon as possible. **ALL ELECTRONIC DEVICES MUST BE TURNED OFF AND PUT AWAY DURING ALL EXAMS.**

Laboratory Experiments and Reporting

Laboratory experiments are an essential part of ECET courses. 20% of the laboratory experiments are simulation, 80% of the experiments are real-time performed on physical devices. The ability to report technical information in a clear and concise manner is one of the most important practical skills that a technically trained person can develop.

If we were to rate the skills possessed by an individual trained to use and understand electrical and electronic theory, the ability to communicate effectively in written English would surely rank as high as, if not higher than the ability to construct reliable circuits, make accurate measurements, and understand the results of the experiments. The results and conclusions drawn from experimental procedures are of little value unless they can be communicated to others.

Students are required to document all laboratory activity in a bound, quadrule, composition notebook. Adherence to the format will help ensure that the report is complete and well organized. Students are graded for format, procedure, clarity and coherence, originality, grammar and spelling, accuracy, effort, completeness, neatness and promptness.

SPSU requires a passing lab grade in order to pass the class. Roll will be taken in each lab. No makeup labs will be given unless previous arrangements are made with your instructor. Otherwise, a grade of zero will be recorded for any missed labs. In the case of extreme emergencies, contact your instructor as soon as possible.

Final Exam

The final exam will be comprehensive covering all topics discussed in class. You will be given one

hour and fifty minutes to take the exam. Taking the final exam is mandatory. There will be no exemptions.

Evaluation Method

Course Evaluation	Grade Composition	Grade Scale	
Attendance/Participation	5%	90 – 100	A
Homework	10%	80 – 89	B
Exams	40%	70 – 79	C
Lab	20%	60 – 69	D
Final Exam	25%	Below 60	F

General Information

Use of electronic devices during class is a distraction to you and your classmates. Be considerate. Please turn off all electronic devices during all classes. **ALL ELECTRONIC DEVICES MUST BE TURNED OFF AND PUT AWAY DURING ALL EXAMS.**

Neatness on submitted work is important. Work that is sloppy and/or contains spelling and grammatical errors will be penalized.

You may appeal any grade received. If you choose to appeal a grade, the instructor reserves the right to re-grade the entire test or assignment. **ALL APPEALS FOR RE-EVALUATION OF A GRADE MUST BE MADE WITHIN ONE WEEK OF THE ASSIGNMENT BEING RETURNED TO YOU.**

You are responsible for being academically honest as defined by the academic dishonesty rules in the general catalog. **CHEATING WILL NOT BE TOLERATED.**

Students with disabilities who believe that they may need accommodations in this class are encouraged to contact the counselor working with disabilities at (678) 915-7244 as soon as possible to better ensure that such accommodations are implemented in a timely fashion.