

Syllabus

EE 283 Electrical Measurements Lab

Fall, 2018



Engineering/Physics Department

Instructor: Dr. Shi Sha (Sections C, E1, F and H)

Email: Shi.Sha@Wilkes.edu

Phone: [570-408-4039](tel:570-408-4039)

Office: SLC-239

Office Hours: By Appointment

Instructor: Mr. William Schlosser (Sections A, B, D and G)

Email: patandbill@shrimpburrrito.com or

William.Schlosser@Wilkes.edu

Phone: [570-408-XXXX](tel:570-408-XXXX)

Office: SLC-271

Office Hours: By Appointment

Textbook: None Required

Lab Time and Location: One 1 hour 50 Minute lab. SLC-125

Section	Day	Time
A	Thursday	9:00 to 10:50 a.m.
B	Thursday	12:00 to 2:50 p.m.
C	Thursday	3:10 to 5:00 p.m.
D	Friday	9:00 to 10:50 a.m.
E1	Friday	6:00 to 7:50 p.m.
F	Friday	1:00 to 2:50 p.m.
G	Friday	11:00 a.m. to 12:50 p.m.
H	Friday	3:00 to 4:50 p.m.

Co-Requisites: EE211 Electrical Circuits and Devices

Objectives: The formal objectives of EE 283, Electrical Measurements Lab, are that the students will:

1. Develop competency in the use of common electrical measurement instrumentation.
2. Be able to construct circuits as represented on a circuit diagram.
3. Use common methods of signal conditioning.
4. Document laboratory activities and observations and analyze laboratory data.
5. Construct and analyze (troubleshoot) model engineering systems (projects).
6. Use simulation (either LTSpice or PSpice) for circuit analysis.

Reading Assignments: Students are expected to read the assigned lab exercise by the assigned class period. Failure to prepare for the lab will result in a failure to complete the lab during the lab period.

Computer Use: Students are expected to use computers to do analyses and to prepare reports. Computers will be used to analyze data, prepare engineering graphs for reports, and perform analytic studies. Knowledge of word-processing, spreadsheet, and analysis software (i.e., Word, Excel, Matlab, etc.) is required.

The circuit analysis software that we will be using is LTSpice from Linear Technology Inc. This software is free, is available for both Windows and Mac operating systems, and can be downloaded here:

<http://www.linear.com/designtools/software/>

A free student version of PSpice (another circuit analysis software program similar to LTSpice) is also available. LTSpice and the full version of PSpice are available in the SLC computer lab and on the computers in SLC-125.

Syllabus

EE 283 Electrical Measurements Lab

Fall, 2018

Lab Reports: Graded material will include formal lab reports that are handed in at the beginning of the next laboratory session. The reports are to be handed in on paper. No emailed reports will be accepted. Reports that are not handed in on time will have 10% deducted from the grade for every week that they are late.

The reports will usually include figures for circuits, and graphs for results. Values given are to have appropriate units, and are to be presented with an appropriate number of significant digits. Graphs and figures are to be properly annotated and have a white background. Students will be expected to construct graphs in Excel using the lab exercise results, and include the graphs and data in the report. The format for the reports is shown in the appendix. The instructor or an assistant will visit your station to observe the correct operation of your circuit.

Grading: There will be two practical examinations. The first is before mid-term, concerning DC circuits. The second is at the time of final examinations, concerning AC circuits. Each exam will count for 20% of the final grade and each lab exercise report will count for 5% of the final grade.

All materials will be collected and graded on the basis of 100 points. Graded material will be averaged with the weightings given above, then converted to Wilkes's 4.0 scale as follows:

90-100	4.0
85-89	3.5
80-84	3.0
75-79	2.5
70-74	2.0
65-69	1.5
60-64	1.0
below 60	0.0

Laboratory reports, graphs, simulation results, and other submitted graded material is to be the work only of the individual student. If there are two students at a lab station each partner can use the same data but each student must write his own report. You may get help of a general nature from other students, such as the general approach to solving a problem, but not any data, text, figures, or other material specific to the problem. If a student has been found to have inappropriately copied from another student, or has furnished another student with material from which a copy was made, a grade of zero will be awarded for that exercise or perhaps the entire course if that seems to be warranted. If the work in question is an obvious copy of another student's work, that violation of academic integrity is flagrant enough to earn a zero in the course. Attendance is mandatory. Missing two lab sessions, unless excused, will result in a failing grade for the course. Missed lab sessions must be made up, or will be given a zero grade.

Syllabus

EE 283 Electrical Measurements Lab

Fall, 2018

Schedule:

Week (Dates)	Topic	Notes
1 (8-30 or 31)	Introduction to LTspice, Equipment Operation and Resistance Measurements	Power Supply, DMM, resistor color code, voltage and current for a resistor and a lamp. Explain breadboard.
2 (9-6 or 7)	Voltage and Current Measurements, Maximum Power Measurement	Using a DMM and VOM for different impedance levels. Maximum power calculation and measurement.
3 (9-13 or 14)	KCL and KVL Measurements, Node Analysis	MatLab, Excel, hand calculation
4 (9-20 or 21)	Superposition, Thevenin and Norton Theorems	
5 (9-27 or 28)	Practical Exam#1	
6 (10-4 or 5)	RL and RC circuits	Gain and Phase shift.
7 (10-11 to 10-14)	Fall Recess	
8 (10-18 or 19)	RLC Node Analysis	MatLab, Excel, hand calculation
9 (10-25 or 26)	OP AMPS	Inverting, Noninverting
10 (11-1 or 2)	OP AMPS	Active Filter
11 (11-8 or 9)	RLC circuits, Resonance, Bandwidth	Impedance measurement
12 (11-15 or 16)	Digital Project	
13 (11-20 or 30)	Digital Project	
14 (11-29 or 12-7)	Full Wave Rectifier	FWR plus voltage regulator
15 (12-6 or 10)	Practical Final Exam	

Syllabus

EE 283 Electrical Measurements Lab

Fall, 2018

Appendix:

Format of Lab Report:

LABORATORY XX

TITLE

(Indicate the lab title and week number)

NAME - Give your name.

DATE - Indicate the date the lab was performed.

OBJECTIVE - Clearly state the objective of performing the lab.

EQUIPMENT USED - Indicate which equipment was used in performing the experiment. The manufacturer and model number should be specified.

PROCEDURE - Provide a concise summary of the procedure used in the lab. Include any modifications to the experiment.

DATA - Provide a record of the data obtained during the experiment. Data should be retrieved from the lab notebook and presented in a clear manner using tables. All tables should try and fit on one page.

OBSERVATIONS AND DISCUSSIONS - The student should state what conclusions can be drawn from the experiment. Plots, charts, other graphical medium, and equations should be employed to illustrate the student's viewpoint. Sources of error and percent error should be noted here.

QUESTIONS - Questions pertaining to the lab may be answered here. These questions may be answered after the lab is over.

CONCLUSIONS - The student should present conclusions which may be logically deduced from his/her data and observations.

SIGNATURE - Sign your report at the end. Include the statement - "This report is accurate to the best of my knowledge and is a true representation of my laboratory results."