



# Philadelphia University

Faculty of Engineering - Department of Communications and  
Electronics Engineering

## Course Information

<b>Title:</b>	Electronic Measurement Instruments (650346)
<b>Prerequisite:</b>	Electronics 2 and Engineering Analysis 2 (650342 + 630262)
<b>Credit Hours:</b>	3 credit hours (16 weeks per semester, approximately 44 contact hours)
<b>Textbook:</b>	"Electronic Instruments and Measurements" , Larry D. Jones and A. foster Chin, Prentice Hall, 1991  D.A. Bell, 2007. Electronic Instrumentation and Measurements. Oxford University Press: Canada.
<b>References:</b>	R.A. White, 2002. Electronic Test Instruments: Analog and Digital Measurements. Prentice-Hall: Englewood Cliffs, NJ.  Instrumentation -Reference Book 4th Edition: Walt Boyes (2010)
<b>Catalog Description:</b>	To understand the basic measurement techniques, instrument construction, Principle of operation, and measurement calculation.

## Course Topics

Week	Topic
1,2,3	Definition of Instrument, accuracy, precision, sensitivity, resolution and error. Systems of units. Electric and magnetic units. International system of units. Conversion of units. Standard of units. Significant figures. Types of error. Statistical analysis. Probability of error. Limiting error.
4,5,6	DC ammeters (Shunt resistor, Aytron shunt). DC voltmeter (multi-range voltmeter, voltmeter sensitivity, loading effect). Series type ohmmeter. Shunt type ohmmeter. Multi-meters (VOM). Calibration of DC instruments. Digital voltmeter. Digital multi-meter
7,8,9	DC bridges (Wheatstone bridge, Kelvin bridge). AC bridges (Maxwell bridge, Hay bridge).
10,11,12	Selecting transducers. Resistive changing transducer. Self generating transducer. Capacitive transducer. Inductive transducer.
13	Cathode-Ray Tube (CRT). CRT circuits. Vertical deflection system. Delay line. Multiple trace. Horizontal deflection system. Oscilloscope probes
14,15	Frequency-selective wave analyzer. Harmonic distortion analyzers. Spectrum analysis
16	<b>Review, and final exam</b>

## Course Learning Outcomes and Relation to ABET Student Outcomes:

Upon successful completion of this course, a student should be able to:

1.	Understand instruments, measurements, and error calculations.	[a , e]
2.	Use and design instruments to measure parameters such as, power, voltage, and current.	[c, e]
3.	Understand and evaluate the impact of instrument design on the instrument accuracy and precision.	[c, h]
4.	Select suitable transducers for different applications	[e]

### Assessment Instruments:

Evaluation of students' performance (final grade) will be based on the following categories:

**Exams:** Two written exams will be given. Each will cover about 4-weeks of lectures

**Quizzes:** 10-minute quizzes will be given to the students during the semester. These quizzes will cover material discussed during the previous lecture(s).

**Homework:** Problem sets will be given to students. Homework should be solved individually and submitted before the due date.

Copying homework is forbidden, any student caught copying the homework or any part of the homework will receive zero mark for that homework

**Final Exam:** The final exam will cover all the class material.

### Grading policy:

First Exam	20%
Second Exam	20%
Quizzes and Homework	20%
Final Exam	40%

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Total: 100%

### Attendance policy:

Absence from classes and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse, acceptable to and approved by the Dean of the relevant college/faculty, shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

February, 2017