

Faculty of Engineering & Technology
Electrical and Electronic Measurements

Information :

Course Code : EPR 364

Level : Undergraduate

Course Hours : 3.00- Hours

Department : Department of Electrical Engineering

Instructor Information :

Title	Name	Office hours
Associate Professor	Omar Alfarouk Mamdouh Ibrahim	4
Associate Professor	Omar Alfarouk Mamdouh Ibrahim	4
Teaching Assistant	Mostafa Mohamed Salaheldin Abdelkhalek	5
Teaching Assistant	Mostafa Mohamed Salaheldin Abdelkhalek	5

Area Of Study :

- Develop the students' knowledge about Analog & Digital instruments and transducers.
- Develop students' practical skills for designing and building up a complete application circuit.
- Train students to perform basic experiments on Analog & Digital instruments.

Description :

Introduction to Units, Standards, and Measurements Errors. Electromechanical Instruments and DC meters. Resistance, Inductance and Capacitance measurements, DC/AC bridges. Digital Basic Instruments, Digital counters, A/D & D/A converters. Digital measuring instruments: digital multimeters and frequency meters. Cathode Ray Oscilloscopes and its applications in phase and frequency measurements, Digital Storage Oscilloscopes, Spectrum Analyzer.

Electromechanical Transducers: Variable resistance, capacitance and inductance transducers, Strain Gauge, Linear Variable Differential Transformer.

Temperature Transducers: The Thermocouple and the Thermistor.

Light Transducers: The photoconductive cell and photodiode.

Course outcomes :

a. Knowledge and Understanding: :

1 -	a1. Explain the analog multi-meters and its applications as well as the DC and AC bridges.
2 -	a2. Explain digital multi-meters, digital counters, and frequency meters.
3 -	a3. Explain the cathode ray oscilloscope and digital oscilloscope and its applications in different measurements.
4 -	a4. Explain signal generators and spectrum analyzers.
5 -	a5. Classify electrical and electronic transducers

b. Intellectual Skills: :

1 -	b1. Prepare a technical report for lab experiments.
2 -	b2. Apply different techniques to solve DC/AC circuit problems.
3 -	b3. Investigate the failure of the labs equipment and transducers.

c. Professional and Practical Skills: :

1 -	c1. Build experiments, and interpret their results using analog & digital measuring instruments and relevant laboratory equipment.
2 -	c2. Develop troubleshooting experiments using the laboratory tools in the course project.
3 -	c3. Practice main functions of analog & digital instruments and transducers.
4 -	c4. Follow up safety requirements at lab.

d. General and Transferable Skills: :

1 -	d1. Collaborate effectively within multidisciplinary team.
2 -	d2. Work coherently and successfully as a part of a team in the Lab and assignments.
3 -	d3. Effectively manage tasks, time, and resources during the project and lab experiments.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Electromechanical Instruments	5	3	2
Electromechanical Applications	5	3	2
Digital Basics	5	3	2
Digital Instruments and Frequency meters	10	6	4
Cathode Ray Oscilloscope	15	9	6
Digital Oscilloscope.	10	6	4
Function Generators & Spectrum Analyzers.	10	6	4
Review on Measurements Units & Errors.	5	3	2
Sensors & Transducers	10	6	4

Teaching And Learning Methodologies :

Lectures
Tutorials
Laboratories

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Final Written exam	40.00	15	to assess the comprehensive understanding of the scientific background of the course, to assess the ability of problem solving with different techniques studied

Laboratory Tutorials	10.00	6	to assess the ability of implementing a simple electric circuit that shows knowledge and understanding of different technical issues.
Mid- Term 2	15.00	11	to assess the skills of problem solving, understanding of related topics.
Mid-Term 1	15.00	7	to assess the skills of problem solving, understanding of related topics.
Performance	10.00	14	to assess the Performance of the student through overall term
Quiz 1 & Assignment 1	5.00	5	to assess the skills of problem solving, understanding of related topics.
Quiz 2 & Assignment 2	5.00	9	to assess the skills of problem solving, understanding of related topics.

Books :

Book	Author	Publisher
Electronic Instrumentation and Measurements	David A. Bell	Oxford

Recommended books :

1. "Electronic Instrumentation and Measurements", David A Bell, PHI/ Pearson Education, 2006
2. "Electronic Instrumentation", H. S. Kalsi, TMH, 2004