Module (Course Syllabus) Catalogue

2023-2024

College/ Institute	Erbil Technical Engineering College	
Department	Mechanical and Energy Engineering	
Module Name	Engineering Measurements	
Module Code	ENM30X	
Degree	Technical Diploma Bachler High Diploma Master PhD	
Semester	Third Semester	
Qualification	M.Sc. in Thermal Power	
Scientific Title	Lecturer	
ECTS (Credits)	5	
Module type	Prerequisite Core Assist.	
Weekly hours	4	
Weekly hours (Theory)	(2) hr Class	(28) Total hrs Workload
Weekly hours (Practical)	(2) hr Class	(26) Total hrs Workload
Number of Weeks	12	
Lecturer (Theory)	Mr. Mohammed A. Suliman	
E-Mail & Mobile NO.	Mohammed.sulaiman@epu.edu.iq & 772 214 9090	
Lecturer (Practical)		
E-Mail & Mobile NO.		
Websites	https://academicstaff.epu.edu.iq/faculty/mohammed.sulaiman	

Course Book

Course Description	Conducting experiments and making measurements is an essential aspect of all branches of science and engineering. Nearly all of our current quantitative understanding of the natural and engineered world has come from the interplay between theory and measurements. Models and simulations of systems require experimental validation and the performance of engineered systems must not only be predicted but also measured and tested. In this course, the student will learn the basic tools of making physical measurements and conducting experiments. We will collect data, analyze data, conduct basic error analysis, and design experimental systems. Using inexpensive components, we will build electrical and electronic circuits integrated with sensors and learn how they operate.
Course objectives	This course will introduce the function, operation, and application of common mechanical engineering measurement principles, and statistical analysis. The student will select and design simple measurement systems for a given application, based on different physical measurement principles, error analysis, signal conditioning, and data recording.
Student's obligation	Throughout the academic Semester, students will be obliged with the following duties: 1. Home works (No.: 1) 2. Quizzes (No.: 2) 3. Reports (No.:3) 4. Essays (No.:1) 5. Midterm and final examinations of the semester In addition, attendance and participation in the Theoretical and Experimental lectures will be mandatory.
Required Learning Materials	• The most important learning source will be the related Books, alongside the published lecture notes at the Lecturer's site in Moodle. • Other required learning materials include a whiteboard, computer, and projector.

Evaluation

Task		Weight (Marks)	Due Week	Relevant Learning Outcome
Paper Review				
Assignments	Homework	5%	3,7	
	Class Activity	2%	6	
	Report	2.5%	5	
	Essay	2.5%	7	
	Project	5%	10	
Quiz		8%	5,10	

	Lab.	10%	2,6,10	
	Midterm Exam	25%		
	Final Exam	40%		
	Total	100%		
Specific learning outcome:	1. Acquire the common mechanical measurement signals in the laboratory using either conventional measurement instruments or computer-based data acquisition system. 2. Design measurement system including the selection of appropriate transducers, signal conditioning units. 3. Understand dynamic characteristics of measurement signal (Fourier analysis) and instruments (frequency response/dynamic bandwidth) 4. Treat measurement data using statistics; probability theory; finite statistics; curve fitting of measurement data and goodness of fit. 5. Analyze the measurement data using uncertainty analysis (design stage and multiple measurement analysis); propagation of individual uncertainties to final measurement results using Taylor series.			
Course References:	1. Measurements, Instrumentation, and Sensors Handbook. John G.W. CRC Press LLC, 1999 2. Mechanical Measurement and Instrumentation. Rajput R.K. Kataria and Sons, New Delhi, 2013. 3. Mechanical Measurement and Control. Jalgaonkar R.V. Everest Publishing House, 2010			

Course Topics (Theoretical)	**Week**	**Learning Outcome**
Introduction	1	
Measurement Characteristics	2	
Mechanical Variables Measurement - Solid	3-4	
Mechanical Variables Measurement - Fluid	5-7	
Mechanical Variables Measurement - Thermal	8-9	
Electromagnetic Variables Measurement	10	
Radiation Measurement	11	
Signal Processing	12	

Course Topics (Practical)	Week	Learning Outcome
Measurement and calibration of Bourdon's pressure gauge	1-2	
Measurement of liquid flow by Rotameter and Ultrasonic flow meter	3-4	
Measurement of air property using a Psychrometer	5-6	
Measurement of absolute humidity using a Hygrometer	7-8	
Measurement of Solar radiation using Pyranometer	9-10	

External Evaluator

I hereby confirm that the syllbus is sufficient for the subject.

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