The University of Jordan
School of Engineering

Department	Course Name	Course Number	Semester
Mechanical Engineering	Engineering Measurements	0904422	

2019 Course Catalog Description

Report writing, basics of metrology, inspection and measurements. Errors & error analysis, uncertainty analysis, Engineering Statistics and statistical methods, least squares method. Basics of transducers. Static and dynamic characteristics of systems. Measurement of flow, pressure, and temperature. Strain gauges, strain rosettes

Instructors

Name	E-mail	Sec	Office Hours		Lecture Time	

Text Books

	Text book 1	Text book 2
Title	Experimental methods for engineers	Handouts
Author(s)	J. P. Holman	-
Publisher, Year, Edition	McGraw-Hill, 2011, Eigheth Edition	-

References

Books	1. Doebelin, E. O., Measurement Systems: Application and Design. 4th Ed. McGraw-Hill. 2. Figliola and Beasley, Theory and Design for Mechanical Measurements. 2nd Ed. Wiley. 3. Beckwith, Buck, and Marangoni, Mechanical Measurements. 3rd Ed. Addison Wesley. 4. Cheremisinoff, N. P. and Cheremisinoff P. N., Flow Measurement for Engineers and Scientists. Marcel Dekker, New York. 5. Jain, Er. R. K., Mechanical and Industrial Measurements. 8th Ed. Khanna Publishers, Delhi. 6. Dally, J. W., Riley, W. F., and McConnell, K. G., Instrumentation for Engineering Measurements, Wiley.
Journals	International Journal of Measurement Technologies and Instrumentation Engineering (IJMTIE). Journal of Measurements in Engineering (JME).
Internet links	http://www.imeche.org/docs/default-source/virtual-archive/-beginner's-guide-to-measurement-in-mechanical-engineering.pdf?sfvrsn=0 http://controlmanuals.com/files/Measuring-Instruments/Measurement-Engineering-p1.html

Prerequisites

Prerequisites by topic	Fluid mechanics, System Dynamics and Control
Prerequisites by course	Fluid Mechanics (1) (0904361), System Dynamics and Control (0904418)
Co-requisites by course	-
Prerequisite for	Engineering Measurements Lab. (0904424), Introduction to Mechatronics (0904422)

Topics Covered

Week	Topics	Chapter in Text	Sections
1	Technical report writing and graph formats		14-15
2	Basics of metrology, measurements and Inspection		Handout
3-4	Errors in measurement, their sources and analysis with uncertainty		Handout
5-6	System characteristics and behavior modelling		
6-7	Basic Electrical and Mechanical Transducers		
8	Pressure-Measurement and calibration		
9-10	Flow Measurements and calibration		
11-12	Temperature Measurements and calibration		
	Elastic Elements for Force Measurements, Torque Measurements, Stress and Strain, Measurements, Electrical-Resistance Strain Gages		

Mapping of Course Outcomes to ABET Student Outcomes

SOs	Course Outcomes
1	1. Calculate the errors and uncertainty in an experimental data 2. Calculate the fluid velocity, flow, pressure and force, analyze these devices and calculate the errors and uncertainty of readings
6	3. Analyze certain types of errors using statistical methods 4. Choose the correct device for the least error or desired accuracy. 5. Analyze certain types of errors using statistical methods 6. Identify the parameters that control the behavior and response of a measurement system. 7. Ability to find parameters that characterizes the behavior of a thermometer and manometer. 8. Be familiar with various types of measurement devices and units of measurements. 9. Design a measurement device.
7	10. An ability to acquire and apply new knowledge as needed through project

Evaluation

Assessment Tools	Expected Due Date	Weight
Project		10%
Quizzes		10%
Midterm Exam		30%
Final Exam		50%

Contribution of Course to Meet the Professional Components

Building the fundamental basic concepts of measurements systems and designing a measurement device.

Relationship to Student Outcomes

SOs	1	2	3	4	5	6	7
Availability	X					X	X

Relationship to Mechanical Engineering Program Objectives (MEPOs)

MEPO1	MEPO2	MEPO3	MEPO4	MEPO5

ABET Student Outcomes (SOs)

1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3	An ability to communicate effectively with a range of audiences
4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Updated by ABET Committee, 2024