



**Module (Course Syllabus) Catalogue
2023-2024**

College/ Institute	Erbil Technology College	
Department	Department of Automotive Industrial Technology Engineering	
Module Name	Measurement and Transducer	
Module Code	MET503	
Semester	5	
Credits	6	
Module type	Core	
Weekly hours	4	
Weekly hours (Theory)	(2)hr Class	(86)hr Workload
Weekly hours (Practical)	(2)hr Class	(64)hr Workload
Lecturer (Theory)	Truska Khalid M. Salih	
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Lecturer (Practical)	Truska Khalid M. Salih	
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Course Book

Course Description	<p>The course provide the students with</p> <ul style="list-style-type: none"> • The principle of measurement, performance and characteristics of measurement devices. • The transducers types and their application
Course Objectives	<ul style="list-style-type: none"> • To make students aware about measuring instruments and the methods of measurement. • To make student familiar with with the construction and working of different types of transducers and sensors
Student's Obligation	<p>Respect A student has an obligation to exhibit honesty and to respect the ethical standards of the profession in carrying out his/her academic assignments. Without limiting the application of this principle.</p> <p>Attendance The student's absence must not exceed 10%. In the event that this percentage is exceeded, the student is considered to have failed in this module.</p> <p>Questions Asking questions about unclear material is an important part of the classroom experience. It is not uncommon for students to have similar difficulties, so speaking up will help everyone understand the discussed information. Teachers can also benefit from a student's questions. By finding out what subjects are hard to understand, instructors can adjust their lectures to clear up confusing topics.</p> <p>Assignment A student must submit the assignment on Moodle app. every week and also write a report about what he/she was studied in the laboratory</p>
Assessment Scheme	<p>16% Mid Term (Theory and practical) 4% Quiz 40% Assignment (report, paper, homework, seminar...) 25% final practical 15% final theory</p>
Specific Learning Outcome:	<p>1. Understand the principles of measurement systems including static and dynamic characteristics, type of errors, and error manipulation</p>

	<ol style="list-style-type: none"> 2. Use concepts in common methods for converting a physical parameter into an electrical quantity 3. Classify and explain with examples of transducers, including those for measurement of temperature, strain, motion, position and light 4. Understand the concepts and principles of different types of transducers and their associated signal conditioning circuits 5. Design signal conditioning circuit 	
Course References:	<ul style="list-style-type: none"> • “Process Control Instrumentation Technology” C.D. Johnson, Seventh Edition Prentice Hall 2003. • “Transducers and Instrumentation” D.V.S Murty, Prentice Hall 1995. • “Instrumentation, Measurement, and Analysis” B.C. Nakra, Second Edition McGraw-Hill 2004 • “Advanced Measurements and Instrumentation”, J.B. Gupta, Second Edition, 2005. • “Instrumentation for Engineering Measurement” J.W. Dally, Second Edition John Wiley 2004. • “Principles of Measurement Systems”, John P. Bentley, Pearson Prentice Hall, Fourth Edition 2005. 	
Course Topics (Theory)	Week	Learning Outcome
Introduction to measurement <ul style="list-style-type: none"> ➤ Measurement System Application ➤ Elements of Measurement System ➤ Choosing Appropriate Measuring Instrument ➤ Measurement Unit 	1	
<i>INSTRUMENT TYPES AND</i> Instrument Types <ul style="list-style-type: none"> ➤ Active and Passive Instruments ➤ Null-Type and Deflection-Type Instruments ➤ Analogue and Digital Instruments ➤ Indicating Instruments and Instruments with a Signal Output ➤ Smart and Non-Smart Instruments 	2	
Measurement instruments performance and characteristics <ul style="list-style-type: none"> ➤ Static Characteristics ➤ Dynamic Characteristics 	3	

Measurement bridges (part 1) <ul style="list-style-type: none"> ➤ Maxwell Bridge, ➤ Maxwell-Wien Bridge, ➤ Anderson Bridge, ➤ Hay's Bridge. 	4	
Measurement bridges (part 2) <ul style="list-style-type: none"> ➤ Owen Bridge, ➤ De Sauty Bridge, ➤ Shering bridge, ➤ Wien Series Bridge. 	5	
Solving examples	6	
Transducers <ul style="list-style-type: none"> ➤ Introduction ➤ Examples of transducer ➤ Classification of transducer 	7	
Characteristic of transducers	8	
Transducer types (part 1) <ul style="list-style-type: none"> ➤ optical transducer-LDR ➤ Temperature transducer ➤ Humidity transducer ➤ Load-cell transducer 	9	
Transducer types (part 2) <ul style="list-style-type: none"> ➤ LVD transducer ➤ Infrared transducer ➤ Ultrasonic transducer 	10	
Applications of traducers	11	
Topics	Week	Learning Outcome
Wheatstone bridges	1	
Loading effect of potentiometer	2	
Lissajous pattern	3	

General transducer characteristics	4	
Characteristic of optical transducer-LDR	5	
Temperature transducer	6	
Humidity transducer	7	
Load-cell transducer	8	
LVD transducer	9	
Linear scale	10	
Infrared transducer	11	
Ultrasonic transducer	12	