

**Faculty of Engineering & Technology**  
**Measurements and Measuring Instruments**

**Information :**

**Course Code :** MPR 321      **Level :** Undergraduate      **Course Hours :** 2.00- Hours

**Department :** Department of Mechanical Engineering

**Instructor Information :**

Title	Name	Office hours
Professor	Abdelaziz Morgan Abdelaziz Ahmed	5
Teaching Assistant	Eman Mohamed Hammad Ahmed	2

**Area Of Study :**

- Upon the completion of the course, students should be able to:
1. Learn the basics ideas about the sensing elements for different transducers.
  2. Select the appropriate measuring instrument for certain physical measurement.
  3. Perform statistical error analysis.
  4. Deduce the governing equation for the measuring instruments.
  5. Design of measurement systems according to specific conditions.
  6. Ability to calibrate the measuring systems to reduce errors.

**Course outcomes :**

**a. Knowledge and Understanding: :**

1 -	Develop conceptual and detailed design of construction projects and fluid power systems.
2 -	Identify principles in the field of design of fluid flow, thermodynamics, gas dynamics, turbo- machinery, heat transfer engineering and fundamentals of thermal and fluid processes
3 -	Identify principles in the of design of mechanical components, different materials, and manufacturing technologies in the field of mechanical power engineering and some other engineering disciplines.
4 -	Identify basic applied and engineering science.

**b. Intellectual Skills: :**

1 -	Creative thinking.
2 -	Analyze the performance of the basic types of internal combustion engines, hydraulic machines, fluid power systems, subsystems and various control valves and actuators. Analyze the solution alternatives and choose the optimum one.
3 -	Derive different solution alternatives for the engineering problems, analyze, interpret data and design experiments to obtain new data, and evaluate the power losses in the fluid transmission lines and networks
4 -	Define the mechanical power engineering problems and evaluate designs, processes, and performance and propose improvements.

**c. Professional and Practical Skills: :**

1 -	Write computer programs pertaining to mechanical power and energy engineering to describe the basic thermal and fluid processes mathematically, and use the computer software for their simulation and analysis.
2 -	Prepare engineering drawings, computer graphics, and write specialized technical reports.
3 -	Analyze the record data in the laboratory.
4 -	Use laboratory, workshop equipment and field devices competently and safely.

**d. General and Transferable Skills: :**

1 -	Use digital libraries and/or Learning systems and demonstrate efficient IT capabilities.
2 -	Lead and motivate individuals and work with others according to the rules of the professional Ethics.
3 -	Share ideas, communicate effectively and work in stressful environment and within constraints.
4 -	Collaborate effectively within multidisciplinary team.

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Basic Concepts			
Analysis of Experimental data			
Transducers			
Displacement, Force, Torque, and strain measurements			
Pressure measurements			
Flow measurements			
Temperature Measurements			
Pollution and gases measurements			

**Teaching And Learning Methodologies :**

Lectures
Tutorials
Presentation & Discussion
Brain storming

**Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Assignments	10.00	4	
Attendance and Participation	10.00	6	
Final Exam	40.00	16	
Mid-term Exams	40.00	11	

**Recommended books :**

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J.P. Holman, Experimental methods for Engineers, McGraw-Hill, 7th edition, 2000.