



**Faculty of Engineering – Assiut University
Bachelor Degree**

Mechatronics Engineering Program

Dept. of Mechanical Engineering

Course specification

Measurements and Transducers MT 322

1. Course Aim

Main Aim	Introduce basic concepts and theory of measuring instruments to mechanical engineering students and emphasizing the necessity of transducers and measuring instruments. Measuring instruments characteristics and sensors form the corner stones of the course and cast the minimum knowledge requirements for mechanical engineering graduates to understand measurement systems. The static and dynamic characteristics of transducers are highlighted. The fundamentals and governing equations of flow, pressure, level, position and speed transducers are presented.
Sub-Aims	<ul style="list-style-type: none">• Practice the students with the necessary experimental skills, to obtain and analyze data, assess data reliability and sources of error, and report experimental findings.• To give students an understanding of the relationship between the measured and theoretically predicted behavior of systems.• To reinforce the knowledge of students in relation to methods of measurements, equipment and instrumentation associated with the experimental work appropriate to the units being studied.

2. Course Content

Static and dynamic characteristics of transducers, Pressure, flow, level and temperature transducers, Linear and angular displacement transducers, Tachogenerators, Strain measurements and temperature compensation, Force and torque transducers, Design of measuring circuits, Case studies

3. Course Topics

	Topic	Week
1 st topic	1. Static and dynamic characteristics of transducers	1, 2
2 nd topic	2. Pressure, flow, level and temperature transducers	3, 4
3 rd topic	3. Linear and angular displacement transducers	5, 6
4 th topic	4. Tachogenerators	7, 8
5 th topic	5. Strain measurements and temperature compensation	9, 10
6 th topic	6. Force and torque transducers	11, 12
7 th topic	7. Design of measuring circuits	13
8 th topic	8. Case studies	14, 15

4. 11.2 Grades Distribution

Assesment Methods		Percentage	
Final Exam		According to Bylaws 66.67%	
Semester Work		33.3%	
Assessments	Written Exams	9%	33.3%
	Oral Exam	-	
	Tutorial assessment	-	
	Project assessment	4%	
	Model assessment	-	
	Report assessment	9%	
	Quiz assessment	5%	
	Presentation assessment	-	
	Discussion	6.3%	
	Laboratory test	-	
	Home Exam	-	
Monitoring	-		
Total		%100	

5. List of References

Course notes	- Lectures handout
Text books	- Experimental Methods for Engineers, J. P. Holman, McGraw Hill Book Co., 1989
Recommended books	1- E. O. Doebelin, Measurement Systems, 4th ed., New York: McGraw-Hill, 1990. 2- R. S. Figliola and D. E. Beasley, Theory and Design for Mechanical Measurements, 2nd ed., New York: Wiley, 1995. 3- E.B. Jones, Instrument Technology, Vol. 1, Measurement of Pressure, Level and Temperature, London: Butterworth & Co., 1974. 4- E. L. Upp, Fluid Flow Measurement, Houston: Gulf Publishing, 1993.
Periodicals, web sites. etc.	