



Philadelphia University
Faculty of Engineering, Department of Mechatronics Engineering.
Course Syllabus

Course Title: Electronics and Transducers (0640412), Fourth Year.

Prerequisite: 1- Instruments and Transducers (640242).
2- Electrical Circuit Lab (610216).

Credit Hours: 1-credit hours (14 weeks per semester, approximately 45 contact hours).

Course description: Measurement principles; Analogue signal conditioning; Displacement and Level transducers; Digital transducers; Force and Strain transducers; Temperature transducers; interfacing microcontroller systems with sensors and actuators (DC motors); Programming microcontroller (PIC & Arduino); DC Motor Control; Programming C-Language.

Website: <http://www.philadelphia.edu.jo/academics/ssalah/>

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Laboratory Outlines:

Week	Exp.#	Experiment Name
1	1	Introduction.
2	2	(OP AMP + Experimental data analysis).
3	3	Simulation of measurement systems using Protues.
4	4	Investigation of strain gauges characteristics.
5	5	Investigation of LVDT Characteristics.
6	6	Investigation of RTD characteristics
7	---	Free laboratory.
8	7	Investigation of Thermistors Characteristics part one
9	8	Investigation of Thermistors Characteristics part two
10	9	Proximity Transducers characteristics.
11	10	Potentiometric Transducer characteristics.
12	11	Ultrasonic transducer characteristics.
13	---	Free laboratory.
14	---	Final Exam.

Course Learning Outcomes with reference to ABET Student Outcomes:

Upon successful completion of this Laboratory, student should:

1.	Study and use the OP AMP circuits in transducer signal conditioning.	[6]
2.	Use Proteus software as simulator for transducers circuits.	[6]
3.	Build the conditioning circuits of different sensors and transducers.	[6]
4.	Measure transducers response which include; hysteresis, non linearity, sensitivity, and the repeatability.	[6]
5.	Find the transfer function of different transducers using measured data.	[6]

Assessment Guidance:

Evaluation of the student performance during the semester (total final mark) will be conducted according to the following activities:

Reports: The students should deliver full printed report after finishing the experiment within one week; the delivering is due at the beginning of the class. Late two days report will be graded from half of the total mark. Other late reports(over 2 days) will not be accepted.

Quizzes: 3-quizzes of 10-minutes will be conducted during the semester. The materials of the quizzes are set by the lecturer.

Final Exam: The students will undergo a scheduled final exam at the end of the semester covering the whole materials taught in the course.

Grading policy:

Reports	30%
Quizzes	30%
Final Exam	40%
Total:	100%

Final Exam Category	Mark
Theoretical part	10
Practical part	30
Total	40

Report (Marks distribution):

Report part	Ideal mark	Your mark
Cover page	0.25	
Objective	0.25	
Theory	0.25	
Apparatus	0.25	
Data	6	
Analysis	7	
Discussion	3	
Conclusion	3	
Total	20	

References Books:

1. "Measurement, Instrumentation, and Sensors Handbook" J.G. Webster, CRC Press 1999.
2. "Transducers and Instrumentation" D.V.S Murty, Prentice Hall 1995.
3. "Instrumentation, Measurement, and Analysis" B.C. Nakra, Second Edition McGrawHill 2004.
4. "Measurement & Instrumentation Principles", Alan S. Morris, Elsevier, 2001.
5. "Measurement Systems: Application and Design", Ernest O. Doebelin, Fifth Edition, McGraw Hill, 2003.