



Faculty of Engineering – Assiut University
Bachelor Degree

Mechatronics Engineering Program

Dept. of Mechanical Engineering

Course specification

Mechatronics Laboratory (1) A, B MT 321

1. Course Aim

Main Aim	By the end of this course the student will be able to discuss the: <ul style="list-style-type: none">• Concepts of engineering measurement and experimentation in the process control, robotics, hydraulic and pneumatic systems, electronic circuits, PLCs and microcontrollers.
Sub-Aims	<ul style="list-style-type: none">• Analyze and evaluate the performance of different equipment in mechanical systems related to automatic control, robotics, and electronics.• Develop physical understanding through experimentation as students analyze raw data and organize the results into a comprehensive lab report.• Attain the above mentioned objectives efficiently under controlled guidance and supervision while gaining the experience through application and analysis of realistic data.

2. Course Content

Mechatronics Laboratories (1-A)

Applications and experiments in the field of mechatronics which include automatic control, robotics, hydraulic and pneumatic systems, and electronics.

Mechatronics Laboratories (1-B)

Applications and experiments in the field of mechatronics which include automatic control, robotics, hydraulic and pneumatic systems, and electronics.

3. Course Topics			
		experiment	weeks
Mechatronics Laboratories (1-A)	1 st topic	Calibration of Pressure, Flow, Temperature transducers	2
	2 nd topic	Calibration of Displacement transducers	1
	3 rd topic	Calibration of Force transducers	1
	4 th topic	Measurements of Pressure, Flow, Temperature.	2
	5 th topic	Measurements of Displacement and Force	2
	6 th topic	Training on Operational Amplifiers.	2
	7 th topic	Training on Operational signal modulation (PWM) and Logic circuits.	2
	8 th topic	Training on Operational Logic circuits.	2

		experiment	wee k
Mechatronics Laboratories (1-B)	1 st topic	Transient response of a pneumatic position servosystem.	2
	2 nd topic	Transient response of a level control system with different controllers P-PI- PID.	2
	3 rd topic	Transient response of flow control process.	1
	4 th topic	Transient response of temperature control process.	1
	5 th topic	Speed control of conveyors	2
	6 th topic	A/D and D/A converters.	2
	7 th topic	Computer Simulation of industrial process control systems.	2
	8 th topic	Computer Control of industrial process control systems.	2

4. Grades Distribution

1 Time Schedule

First semester: Final exam. : **January**

Second semester: Final exam.: **May**

2 Grading system

Assesment Methods	Mechatronics Laboratories (1-A)		Mechatronics Laboratories (1-B)	
	Grades, deg	%	Grades, deg	%
Year work (Laboratory test reports)	30	30	30	30
Practical and Oral Final Exam.	20	20	20	20
Written Final exam,	50	50	50	50
Total	100	100 %	100	100 %

5. List of References

Course notes	Instruction Sheet for each Lab-Experiment
Required books	-
Recommended books for the student to refer when he writes the report.	<p>12.1- Hamdy M. Shafey "<i>Technical Report Writing</i>" Lectures for the 1st year mechanical Engineering Students.</p> <p>12.2- John Billingsley "Essentials of Mechatronics" John Wiley & Sons, Inc., Publication, 2006.</p> <p>12.3- Robert H. Bishop "Mechatronics, an Introduction" Taylor & Francis Group, LLC, 2006.</p> <p>12.4- Robert H. Bishop "The Mechatronics Handbook" CRC PRESS, 2002.</p> <p>12.5- John Iovine " PIC Robotics " McGrawHill, 2004</p> <p>12.6- John Bird "Electrical and Electronic principles and</p>

	Technology" Newnes, 2003
Periodicals, web sites.. etc.	