	JORDAN UNIVERSITY OF SCIENCE AND TECHNOLOGY **INDUSTRIAL ENGINEERING DEPARTMENT**	

Course Number and Name	IE 432 control and automation lab.
Course Description	PLC programming basics using ladder logic, Microcontroller programming using C, Servo motor control and performance response curves. Process Control and acquiring physical data from various sensors. On/Off control and PID Control basics. Basics of Robotics.
Credits and contact hours	1 Credit hours; 3 hours of lecture and lab
Pre- or Co-requisites	IE 431 control and automation
Required/ Elective	Required

Text Book(s)	
Software tools	V3.1 STEP 7 MicroWIN SP1
References	Handouts and lab material

Course Objectives	Upon completion of this Lab, the students will • Understand the working principles of PLC and connections between PLC , PC , sensors, and actuators • Understand ladder logic principles and applications using V3.1 STEP 7 MicroWIN SP1 software • Understand the basics of Microcontrollers • Understand the basics of Servo motor control • Understand the working principles of different types of sensors and actuators. • Understand the basics of On/Off and PID Feedback Control • Understand the Basics of robotics
Measured Outcomes	3b and 3k

Topics	**Experiment No.**	**Evaluation**		**Week**
Basics of ladder logic on Siemens PLC S7 200	Experiment 1	Quiz	All quizzes out of 30 points	1
Basics of ladder logic on Siemens PLC S7 200	Experiment 2	Quiz	All quizzes out of 30 points	2
Basics of ladder logic on Siemens PLC S7 300 (distribution station)	Experiment 3	Quiz	All quizzes out of 30 points	3
Basics of ladder logic on Siemens PLC S7 300 (sorting station)	Experiment 4	Quiz	All quizzes out of 30 points	4
Microcontroller basics (arduino)	Experiment 5	Quiz	All quizzes out of 30 points	5
Servo motor control	Experiment 6	Quiz	All quizzes out of 30 points	6
Midterm exam		exam	30 points	7
Acquiring Physical Phenomena	Experiment 7	Quiz	All quizzes out of 30 points	8
On/Off Control (Temperature and level).	Experiment 8	Quiz	All quizzes out of 30 points	9
PID Feedback Control (level and pressure).	Experiment 9	Quiz	All quizzes out of 30 points	10
Basics of Lego robot control	Experiment 10	Quiz	All quizzes out of 30 points	11
Basics of Lego robot control	Experiment 11	Quiz	All quizzes out of 30 points	12
Final exam		exam	40 points	13