Program	Engineering
Specialization	Common
Course Number	20307221
Course Title	Programmable Logic Controllers
Credit Hours	3
Theoretical Hours	3
Practical Hours	0

Brief Course Description:

Comparison between relays and programmable controllers ,basic structure of PLC,cycle-scan, CPU,memory,registers,timers and counters addresses , I/O modules, interfacing, programming instructions ,programming devices ,programming procedures, peripheral equipment, troubleshooting and maintenance

Course Objectives:

The objective of this course is to provide the necessary background information which will allow the student to have a good idea about programmable logic controllers .The student will be able to work well with PLCs, write programs. Make electrical wiring and do well with troubleshooting

Detailed Course Description

number	Unite name	Unite content	Time neded
1	**PLC architecture**	▪ Block diagram of a general purpose PLC ▪ Memory types and the memory map of the PLC ▪ Describe I/O modules ▪ Analysis of I/O modules ▪ Purchasing PLCs	
2	**General PLC Programming procedures**	▪ Programming equipment ▪ Programming formats Process Scanning Considerations	
3	**PLC Programming Languages**	▪ Electrical wiring ladder diagrams ▪ Logic ladder diagrams ▪ Ladder diagram rules ▪ Instruction sets ▪ Examples	
4	**Program control instructions**	▪ Latching relay instruction ▪ Master control input instruction ▪ Immediate output instruction ▪ One shot instruction ▪ Jump instruction ▪ Other instructions ▪ Examples	
5	**Arithmetic and logic operations and data manipulation**	▪ Addition, subtraction, multiplication and division instructions ▪ Increment and decrement instructions ▪ Logic AND, OR, NOR, XOR instructions ▪ Duty cycle generator ▪ Timers instructions	

❖ **تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2008/2009**

		▪ Set, reset instruction ▪ Move, compare, rotate and shift register instructions Examples	
6	**Programming counters**	▪ Programming UP counters ▪ Programming Down counters ▪ Programming Up-Down counters ▪ Programming ring countersExamples	
7	**Programming timers**	▪ Programming TON and TOFF timers ▪ Programming accumulator timers (TMR) ▪ Programming monostable (TMON) and retriggerable monostable timersExamples	
8	**Installation, trouble- shooting and maintenance**	▪ Introduction ▪ PLC status indicators and alarms ▪ Troubleshooting flow charts and tables ▪ System troubleshooting techniques. ▪ PLC maintenance techniques	

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☐ **Evaluation Strategies:**

			Percentage	Date
1. Exams		First Exam	20%	--/--/----
		Second Exam	20%	--/--/----
		Assignments	10%	
		Final Exam	50%	--/--/----
2. Homework and Projects				
3.Discussions and lecture Presentations				

☐ **Teaching Methodology:**

1. Lecture

Text Books & References:

Text book:
1. Programmable Logic Controllers, Dr.Mazzoz Sulahat, Eng.Khaled Soboh, Eng Zeid Alhjazeen

References:-
1. Technicians guide to programmable controllers , third edition, Delmar publishers, 1995 Toronto Canada
2. Programmable logic controllers, principles and applications, third edition, Prentice Hall, 1995, U.S.A, John W.Webb, Ronald A.Reis.
3. The PLC workbook, programmable logic controllers made easy, prentice Hall. 1996, U.K, K.Flements –Jewery.W.Jeffcoat

Program	Engineering
Specialization	Common
Course Number	20307222
Course Title	PLCs Lab
Credit Hours	1
Theoretical Hours	0
Practical Hours	3

Brief Course Description:

The lab must support the PLC technology course.
The students should be conducted in small groups; each student must complete the assigned work in the given time

Course Objectives:

At the conclusion of this course the student will be able to:
1. Write the ladder diagrams which is necessary to carry out an automatic process.
2. Write programs in instruction list language which is necessary to cary out an automatic process.
3. Down load the programs to the PLC RAM using hand programmer or PC.
4. Troubleshoot the written programs and do the necessary correction

Detailed Course Description:

Lab number	Lab name	Lab conttent	Time Needed
1	**Realizing a definite number of cycles for two double-acting cylinders**		
2	**Realizing discrete event-driven sequential control systems by using limit switches or proximity switches**		
3	**Realizing a discrete time-driven sequential coutrol system**		
4	**Investigating TON and TOFF timers with practical application**		
5	**Investigating TRTG and TMON timers with practical applications**		
6	**Investigating UP and down counters with practical applications**		
7	**Investigating UP-down and ring counter with practical applications**		
8	**Application of duty-cycle generators to generate train of pulses**		
9	**Application of the functions: move, compare, rotate and shift, registers and set-reset function**		

□ **Evaluation Strategies:**

		Percentage	Date
1. Exams	Reports	20%	--/--/----
	Midterm Exam	20%	--/--/----
	Assignments	10%	
	Final Exam	50%	--/--/----

□ **Teaching Methodology:**

1. Lab

Text Books & References:
1. ELC-2001 Programmable Controller, Hardware Manual, Carlo Gavazzi Denmark.
2. S7-200 Programmable Controller, Quick Start manual, Semens 1995