Program	Engineering
Specialty	Electro-pneumatic and Electro-hydraulic Control
Course Number	20308222
Course Title	Pneumatic Logic Lab
Credit Hours	1
Theoretical Hours	0
Practical Hours	3

Brief Course Description:

The course covers the implementation of different air logic functions in order drive single acting and double acting cylinders as shown in course detailed outlines

Course Objectives:

The course aims at giving the student the practical skills in order to use the different air logic elements in building and commissioning pneumatic drive systems

Detailed Course Description:

Unite number	Unite name	Unite content	Time Needed
	Single acting cylinder control with	▪ 2 positions, 3 way single stable valves with manual action ▪ Bistable valve 3/2 and limit	
	Control of double acting cylinder with	▪ - Bistable 4/2 at impulsions ▪ - Bistable 4/2 and limit switch.	
		▪ Practical investigation of the AND gate and OR gate in accordance with the given pneumatic circuit	
		▪ Practical investigation of the logic air functions: NOT, YES and inhibition according to the given circuits	
		▪ Emergency blocking of the piston with block interception devices and not logic cell	
		▪ Blocking in intermediate position of the piston with block interception devices and OR cell	
		▪ 2 points simultaneous control of a double-acting cylinder with AND cell ▪ Control of a double-acting cylinder with 1 NOT cell, 1 bistable and 1 limit switch.	

		Control of a double-acting cylinder with 2 NOT cells	
		- Double acting cylinder stroke commutation with storage and OR NOT cells - Continuous commutation with storage, NOT, and OR cells - Stroke commutation of double-acting cylinder with bistable, 2 AND/YES cells and 2 limits switches	
		Using PLC logic functions to realize sequential processes	

☐ **Evaluation Strategies:**

		Percentage	Date
1. Exams	Reports	30%	
	Midterm Exam	20%	
	Final Exam	50%	

☐ **Teaching Methodology:**

1. Lab

Text Books & References:

References:
1. Modular pneumatic logic tutor , Didacta, India
2. Lab Sheets prepared by the teacher

Program	Engineering
Specialty	Electro-pneumatic and Electro-hydraulic Control
Course Number	20308221
Course Title	Pneumatic Logic
Credit Hours	3
Theoretical Hours	3
Practical Hours	0

Brief Course Description:

Introduction to air logic. Industrial applications and control characteristics. Fundamentals of logic elements. Concepts and components of moving part logic (MPL). Signal transmission and communications, symbology, schematics and flow diagram. Applications of pneumatic logic like bottle filling system, parts sorting system and press control system

Course Objectives:

1. To provide an overview of pneumatic logic elements and industrial pneumatic logic systems. Emphasis will be on the analysis and application of pneumatic logic in industrial projects.
2. After taking the course the student should be able to; describe air logic function elements and their Boolean equations and symbols. Analyze the work of common industrial logic processes. Build and assemble and troubleshoot logic pneumatic industrial control systems

Detailed Course Description:

Unit number	Unite name	Unite content	Time Needed
1.	**Introduction to air logic control**	▪ Industrial applications .control characteristics, moving part logic, and fluidics	
2.	**Fundamentals of logic systems**	▪ Boolean postulates. Basic operations. Algebraic expressions. ▪ Mathematical symbolism. Combining devices. Defined functions	
3.	**MPL concepts and components:**	▪ Concepts. MPL classes. Typical MPL valve operation	
4.	**Non MPL concepts and components**	▪ Fluids concepts. Jet deflection destruction. Device packages	
5.	**Logic elements**	▪ Yes. Not , AND , OR ,NAND , NOR , and XOR, coincidence . inhibitor , timers , flip- flops	
6.	**Signal transmission and communication**	▪ Pressure attenuation. Time delay phase delay. And pulse energy	
7.	**Simbology, schematics and flow diagrams**	▪ Standards, symbols, convention, schematics, logic diagram, flow chart, connection diagrams, truth tables and relay logic	
8.	**Applications**	▪ Press control system ▪ Parts storing system. ▪ Bottle filling system. ▪ Other systems	

□ **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:

1. Air Logic Control for Automated Systems, Rudy G. Wojtecki, P.E, CRC Press.1999 Newyork. ISBN 0-8493-2057-7
2. An introduction to fluid logic, N.M Morris, McGraw Hill Book Company. 1995, U.K