



COURSE: Industrial Automation		
DEGREE: Mechanical Engineering	YEAR: 3º	TERM: 1

WEEKLY PROGRAMMING									
WEEK	SESSION	DESCRIPTION	GROUPS (mark X)		SPECIAL ROOM FOR SESSION (Computer class room, audio-visual class room)	Indicate YES/NO If the session needs 2 teachers	WEEKLY PROGRAMMING FOR STUDENT		
			LECTURES	SEMINARS			DESCRIPTION	CLASS HOURS	HOMEWORK HOURS (Max. 7h week)
1	1	Presentation: The detailed content of the subject, the detailed chronogram, and the evaluation system will be explained.		X		NO		1,66	
1	2	Introduction and Logic systems: Logic systems. Basic concepts of the Boole algebra. Combinational and sequential logic systems.	X			NO	Previous reading of the lesson. Studying the concepts related to logic systems. Solving the proposed exercises of Boole algebra.	1,66	3
2									
2	3	System modelling: Logic system representation. State diagrams. System representation using functional diagrams.	X			NO	Previous reading of the lesson. To study the solved exercises about State Diagram. To study the concepts related to	1,66	3

							the system representation using functional diagrams. To study the solved exercises of functional diagrams.			
3	4	State Diagram exercises.		X			NO	Preparing the proposed exercises of State Diagrams before their resolution at the classroom.	1,66	6
3	5	Technologies: Wiring and programmable systems. PLC hardware.	X				NO	Previous reading of the lesson. Studying the concepts related to the automation technologies. To study the concepts related to the PLC hardware.	1,66	
4	6	SFC exercises.		X			NO	To prepare the proposed exercises of Functional Diagrams before their resolution at the classroom.	1,66	6
4	7	Programming I: Execution modes. Programming languages according to the norm IEC 61131-3. Common elements.	X				NO	Previous reading of the lesson. To study of the concepts related to the Programming languages according to the norm IEC 61131-3.	1,66	
5	8	System modelling exercises		X			NO	Preparing the proposed exercises of State Diagrams before their resolution at the classroom.	1,66	6
5	9	Ladder (contact language) programming: Examples of ladder (LD) programming. Unity Pro elements.	X				NO	Previous reading of the lesson. To study of the concepts related to ladder (LD) programming.	1,66	
6	10	State diagrams and LD exercises		X			NO	To prepare the proposed exercises of Ladder programming before their resolution at the classroom.	1,66	7
6	11	Midterm Exam 1: Contents: State and functional diagrams.	X				NO	To prepare the evaluation test.	1,66	
7	12	Simulation Software UnityPro:		X	PC Lab		NO	Previous reading of the proposed guiding notes.	1,66	6

		PLC programming introduction: hardware configuration, variables, execution modes, programming) PLC programming introduction: LD programming.					The student will program a simple script using LD so he will learn to use the simulation software in a practical way.			
7	13	SFC Programming: SFC program execution.	X				NO	Previous reading of the lesson. To study of the concepts related to SFC program execution.	1,66	
8	14	SFC – LD exercises		X			NO	Preparing the proposed exercises of SFC and LD programming before their resolution at the classroom.	1,66	
8	15	Programming III: PLC programming concepts extension. Examples: doubts about modelling and programming will be solved.	X				NO	Previous reading of the lesson. To study of the concepts related to programming examples.	1,66	7
8		Lab Session 1: Ladder programming	X		1.1L01/02		YES	Previous reading of the proposed guiding notes. The student will program a simple script using SFC and LD.	2	
9	16	Simulation Software UnityPro: SFC Programming.		X	PC Lab		NO	Previous reading of the proposed guiding notes. The student will program a simple script using SFC and LD. The UniPro tools for SFC programming will be introduced in a practical way.	1,66	6
9	17	Exercises Solutions: Questions related to proposed exercises will be answered. Moreover, the exercises from the Exam1 will be also solved.	X				NO		1,66	
10	18	SFC and LD Programming exercises		X			NO	Students will solve the proposed exercises. The solutions will be presented and discussed in class.	1,66	7

10	19	Sensors I: Classification. Features, presence/proximity sensors.	X			NO	Previous reading of the lesson. To study of the concepts related to sensors.	1,66	
10		Laboratory session 2: SFC Programming.		X	1.1L01/02	YES	Previous reading of the proposed guiding notes. The student will program a simple script using SFC and LD.	2	
11	20	SFC Programming exercises using Multi-token tools and Macro Steps		X		NO	Students will solve the proposed exercises. The solutions will be presented and discussed in class.	1,66	6
11	21	Sensors II: Position, strength, acceleration, pressure, flow, and temperature sensors.	X			NO	Previous reading of the lesson. To study of the concepts related to sensors.	1,66	
12	22	SFC Programming exercises using Multi-token tools and Macro Steps		X		NO	Students will solve the proposed exercises. The solutions will be presented and discussed in class.	1,66	7
12	23	Actuators: Electric engines. Hydraulic actuators. Pneumatic (actuators, valves, symbology)	X			NO	Previous reading of the lesson. To study of the concepts related to actuators.	1,66	
12		Laboratory session 3: PLC programming		X	1.1L01/02	NO	PLC programming to solve proposed exercises.	2	
13	24	Midterm Exam 2: A practical programming exercise will be done individually. This exercise is the second valuable test of the continuous evaluation.		X	1.1L01/02	YES	In this test each student will solve a problem using the PLC. The teacher in charge of the small group will evaluate the solution.	1,66	7
13	25	Industrial Communications: Introduction to Fieldbuses	X			NO	Previous reading of the lesson. To study of the concepts related to actuators.	1,66	

14	26	Midterm Exam 2: A practical programming exercise will be done individually. This exercise is the second valuable test of the continuous evaluation.						In this test each student will solve a problem using the PLC. The teacher in charge of the small group will evaluate the solution.	1,66	4
Subtotal 1									49,16	81
Total 1 (Hours of class plus student homework hours between weeks 1-14)									130,16	
15		Tutorials, handing in, etc								
16		Assessment							3	15
17										
18										
Subtotal 2									3	15
Total 2 (Hours of class plus student homework hours between weeks 15-18)									18	
TOTAL (Total 1 + Total 2. Maximum 180 hours)									148,16	