



<b>COURSE: Industrial Automation I</b>		
<b>DEGREE: Mechanical Engineering, Electronics and Automation Engineering and Electrical Power Engineering</b>	<b>YEAR: 2018/2019</b>	<b>TERM: 1</b>

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	<b>Presentation:</b> The detailed content of the subject, the detailed chronogram, and the evaluation system will be explained.		X		NO		1,66	
1	2	<b>Introduction and Logic systems:</b> 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	<b>System modelling:</b>	X			NO	Previous reading of the lesson.	1,66	3

		Logic system representation. State diagrams. System representation using functional diagrams.					To study the solved exercises about State Diagram. To study the concepts related to 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	<b>Technologies:</b> 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	<b>Programming I:</b> 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	<b>Ladder (contact language) programming:</b> 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	<b>Midterm Exam 1:</b> Contents: State and functional diagrams.	X			NO	To prepare the evaluation test.	1,66	

7	12	Simulation Software UnityPro:  PLC programming introduction: hardware configuration, variables, execution modes, programming) PLC programming introduction: LD programming.		X	PC Lab	NO	Previous reading of the proposed guiding notes. The student will program a simple script using LD so he will learn to use the simulation software in a practical way.	1,66	6
7	13	<b>SFC Programming:</b> 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	7
8	15	<b>Programming III:</b> 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	
8		<b>Lab Session 1:</b> 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	<b>Exercises Solutions:</b> 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	
10	19	<b>Sensors I:</b> Classification. Features, presence/proximity sensors.	X			NO	Previous reading of the lesson. To study of the concepts related to sensors.	1,66	7
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	
11	21	<b>Sensors II:</b> 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	6
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	
12	23	<b>Actuators:</b> 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	7
12		Laboratory session 3: PLC programming		X	1.1L01/02	NO	PLC programming to solve proposed exercises.	2	
13	24	<b>Midterm Exam 2:</b> 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	<b>Industrial Communications:</b> Introduction to Fieldbuses	X			NO	Previous reading of the lesson.	1,66	

							To study of the concepts related to actuators.		
14	26	<b>Midterm Exam 2:</b> 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
			X	1.1L01/02	YES				
<b>Subtotal 1</b>								<b>49,16</b>	<b>81</b>
<b>Total 1</b> ( <i>Hours of class plus student homework hours between weeks 1-14</i> )								130,16	
15		Tutorials, handing in, etc							
16		Assessment						3	15
17									
18									
<b>Subtotal 2</b>								<b>3</b>	<b>15</b>
<b>Total 2</b> ( <i>Hours of class plus student homework hours between weeks 15-18</i> )								18	
<b>TOTAL</b> ( <i>Total 1 + Total 2. <u>Maximum 180 hours</u></i> )								<b>148,16</b>	