Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2022-23

Course Information	
Programme	B.Tech. (Electrical Engineering)
Class, Semester	Final Year B. Tech., Sem VII
Course Code	4OE443
Course Name	Open Elective-5: Industrial Automation NPTEL
Desired Requisites:	Nil

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	-	30	20	50	100
		Credits: 3			

Course Objectives	
1	This course intends to develop basics of ladder logic programming for PLC.
2	It provides the foundation level knowledge of SCADA System.
3	It gives overview of various types of controller for closed loop control.
4	It provides the applications of variable speed drives in industries.

Course Outcomes (CO) with Bloom's Taxonomy Level		
CO1	**Compare** the various types of controllers for Industrial Automation.	Understand
CO2	**Apply** the knowledge of PLC and SCADA for Industrial Automation.	Apply
CO3	**Explain** the use of variable speed drives for Industrial Automation.	Understand

Module	**Module Contents**	**Hours**
I	**Measurement of Various Process Parameters** Measurement of quantities such as temperature, pressure, force, displacement, speed, flow, level, humidity, pH etc., signal conditioning, estimation of errors and calibration.	6
II	**Process Control and Various Controllers** Introduction to process control, PID controller and tuning, various control configurations such as cascade control, feed forward control, split range control, ratio control, override control and selective control.	6
III	**Actuators** Introduction to various actuators such as flow control valves, Hydraulic and pneumatic, servo motors, symbols and characteristics.	6
IV	**PLC** Introduction to sequence control and relay ladder logic, basic PLC system, I/O modules, scan cycle, programming of timers, counters and I/O programming.	6
V	**SCADA for Industrial Automaton** Components of SCADA systems, functions, classification of SCADA, networking and communication protocols.	6

VI	**Variable Speed Drives** Role of variable speed drives in automation, DC drives, AC drives and synchronous motor drives applications of variable speed drives.	6
Text Books		
1	John W. Webb, Ronald A. Reis "*Programmable logic controllers, principles & applications*" by PHI publication, Eastern Economic Edition.	
2	C. D. Johnson, "*Process control & instrumentation techniques*".Pearson Education	
References		
1	George Stephanopoulos, "*Chemical Process Control - An introduction to Theory and Practice*", Prentice-Hall of India, 1st Edition 1984.	
2	"*Fundamentals of Electrical Drives*", G. K. Dubey, Narosa publication, 2nd edition.	
Useful Links		
1	https://onlinecourses.nptel.ac.in/noc21_me67/preview	

CO-PO Mapping

	Programme Outcomes (PO)												**PSO**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1		2												
CO2		2			2									
CO3						2								2

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High

Each CO of the course must map to at least one PO.

Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)