



SWARNANDHRA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

Narsapur, West Godavari District, A.P. 534280

DEPARTMENT OF ROBOTICS

TEACHING PLAN

Course Code	Course Title	Semester	Branch	Contact Periods /Week	Academic Year	Date of commencement of Semester
23RB5T02	PROGRAMMABLE LOGIC CONTROLLERS (R23)	V	ROBOTICS	5	2026-27	22-06-26

COURSE OUTCOMES

1	Apply PLC architecture knowledge to select PLC for specific problems.[K3]
2	Ability to apply Basics Instruction Sets used for ladder Logic and Function Block Programming. [K3]
3	Use PLC Ladder diagram for simple applications. [K3]
4	Apply real time application using PLC.[K3]
5	Explain the fundamentals of SCADA system. [K2]
6	Describe working of HMI. [K2]

UNIT	Out Comes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method
Unit-1 Introduction to PLC						
I	Apply PLC architecture knowledge to select PLC for specific problems.[K3]	1.1	Introduction to PLC	T1, R1	1	Videos,Chalk and talk /ppt
		1.2	Need and tools of automation	T1, R1	1	
		1.3	Evolution of PLC	T1, R1	1	
		1.4	Architecture PLC Block Diagram and working	T1, R1	1	
		1.5	selection of PLC, Types of PLCs,	T1, R1	1	
		1.6	Advantage, limitations and applications of PLCs	T1, R1	1	
		1.7	scan cycle of PLC	T1, R1	1	
		1.8	Types of I/O modules	T1, R1	1	
		1.9	power supplies and isolators,	T1, R1	1	
		1.10	configuring a PLC, PLC wiring.	T1, R1	1	
Content beyond Syllabus			Simulation of FMS system		1	
Total					11	

II	Ability to apply Basics Instruction Sets used for ladder Logic and Function Block Programming. [K3]	Unit-2. PLC Programming				
		2.1	PLC programming Instructions: Relay type instructions	T1	1	Seminar, Chalk and talk /ppt
		2.2	timer instructions: On delay, off delay, retentive	T1	1	
		2.3	Counter instructions, Up, Down	T1	1	
		2.4	High speed, Logical instructions	T1	1	
		2.5	Comparison Instructions, Data handling Instructions, Arithmetic instructions.	T1	2	
		2.6	PLC programming language Functional Block Diagram (FBD).Instruction List	T1	2	
		2.7	Structured text, Sequential Function Chart (SFC)	T1	2	
		2.8	Simple Programming examples using ladder logic	T1	2	
Content beyond Syllabus		basics of using plc simulator		1		
Total				13		
III	Use PLC Ladder diagram for simple applications. [K3]	Unit-3. PLC Intermediate Functions and Applications				
		3.1	Skip and Master control relay Functions	R1,T1	1	Chalk and talk /ppt/ /quiz
		3.2	with non-return; jump with return, bit functions, Sequencer Functions	T1, T2	2	
		3.3	basic two axis ROBOT with PLC sequencer control	T1, T2	1	
		3.4	industrial three axis ROBOT with PLC control.	T1, T2	1	
			PLC based applications: Motor sequence control, Traffic light control	T1, T2	2	
		3.4	elevator control, Tank level control, conveyor system, Stepper motor control	R1,T1	2	
Content beyond Syllabus		simulation of counter and timers in software		1		
Total				10		
IV	Explain the fundamentals of SCADA system. [K2]	Unit-4. Introduction to SCADA				
		4.1	Introduction, definition and history of SCADA and its System Architecture,	T3	1	TPS,Chalk and talk /ppt/ /quiz
		4.2	Communication Requirements, Desirable properties of SCADA system,	T3	1	
		4.3	Features, advantages, disadvantages and applications of SCADA	T3,R3	1	
		4.4	SCADA Architecture (First Generation-Monolithic, Second Generation-Distributed, Third Generation-Networked Architecture),	T3,R3	2	
		4.5	SCADA systems in operation and control of interconnected power system,	T3,R3	1	
		4.6	Power System Automation	T3,R3	1	
Content beyond Syllabus		Designing systems of plc		1		
Total				8		

V	Describe working of HMI. [K2]	Unit 5. HMI SYSTEMS				
		5.1	Need for HMI in Industrial Automation	T1, R1	2	Chalk and talk /ppt, Quiz
		5.2	Types of HMI – Configuration of HMI	T1, R1	2	
		5.3	Screen development and navigation	T1, R1	1	
		5.4	Configuration of HMI elements	T1, R1	1	
		5.5	Objects and Interfacing with PLC	T1, R1	1	
Content beyond Syllabus		Multiple man-machine interfaces		1		
Total				8		
CUMULATIVE PROPOSED PERIODS				50		
Text Books:						
S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION					
1	Frank D Petruzella, “Programmable Logic Controllers ", 5th Edition, McGraw-Hill Education, 2016.					
2	William Bolton, “Programmable Logic Controllers ", 6th Edition, McGraw-Hill Education, 2016.					
3	Ronald L Krutz, “Securing SCADA System”, Wiley Publication, 2005					
Reference Books:						
S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION					
1	Dag H. Hanssen, “Programmable Logic Controllers ", 1st Edition, Wiley Publisher, 2015.					
2	Khalid Kamel, Eman Kamel, “Programmable Logic Controllers”, McGraw-Hill Professional Publishing, 2013					
3	SCADA Supervisory Control and Data Acquisition, Stuart A Boyer, ISA, 4th Revised edition 1993					
Web Details						
1	https://plc-coep.vlabs.ac.in/exp/up-down-counter/simulation/index.html					
2	https://www.plcademy.com/					
3	https://www.youtube.com					

	Name	Signature with Date
i	Faculty	Dr. Francis Luther King M
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[Signature]
Principal

