Gujarat Council of Vocational Training
Gandhinagar

कौशलम बलम

1. Name of Course: Industrial Automation - Electrical

N.C.O. No. for Skills Covered:
(Please refer National Classification of Occupants -2004 available on www.dget.nic.in

2. Engineering OR Non-Engineering: **Engineering**

3. No. of Students per Batch: **20**

4. Duration in Hours: **440**

5. Duration in Month Theory : **2.75 Months@ 23 hours/week = 11 x 23 = 253 Hours**

   Duration in Month Practical: **2.75 Months@ 17 hours/week = 11 x 17 = 187 Hours**

6. Examination Scheme:

No.	Name of Subject	Teaching Hours During full course	Maximum Marks (Excluding Sessional)	Minimum Marks required for passing (Excluding Sessional)	Sessional Marks If any.
Subject-1	**Theory**	**253**	**100**	**40**	
Subject-2	**Practical**	**187**	**150**	**90**	

7. Educational Qualification for Trainee:

Minimum Entry Qualification (Essential):	**ITI/Diploma/BE (I & C, EE, E & C, Mechatronics), B.Sc. / M.Sc. Instrumentation & Electronics**
Desirable:	**Basic electrical, electronics & Computer Operations**

8. Minimum qualification of Trainer:

Minimum Qualification (Essential):	**Diploma/Degree in I&C, EE, E&C or M.Sc. Instrumentation**
Desirable:	**Min 2 years' Experience in field of Industrial Automation**

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9. Syllabus Committee Member:

No.	Name	Organization	Designation	Tech Qualification	Experience in Years	Signature
1.	MOHAMMAD TANVEER SAIYED	Apollo TYRES LTD.	GROUP MANAGER - HR	MASTERS IN HRM	10	
2.	MR. M. RAVIKUMAR	Apollo Tyres LTD.	Divisional Head	B.E. Electrical	33	
3.	MR. P. G. PARMAR	ITI Waghodia	Principal	Diploma in plastic Eng.	30	
4.	MR. B. R. VYAS	RDD Vadodara	Technical officer	Diploma in Tools Eng.	33	
5.	JATIN TRIVEDI	Apollo Technical Edu Fou.	Regional Manager	B.Sc, MBA	17	
6.	MR. H. G. SINDHA	ITI Waghodia	Supervisor Instructor	B.E. Electrical	02	
7.	MR. J. S. BERDIYA	ITI Waghodia	Supervisor, Instructor	B.E. Electrical	01	

10. **Terminal Skills of Trainee:** (Should be well defined and having reference to NCO):

The Trainee, after successful completion of training, will have following skills:

1. Will be able to understand the control system architecture
2. Will become confident in industrial wiring aspects of control system
3. Will be able to design the Control panel with automation components
4. Will be able to apply different communication schemes
5. Have a specific development methodology
6. Expertise at PLC/HMI/SCADA software configuration management
7. Good command over Program understanding & troubleshooting
8. Upgraded Interfacing skill between field & System

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11 . Approximate cost of Tools /Equipment/Machinery for starting one batch of the course:	8 lacs (Approx)	2015
12 . Area required for practical/ workshop for one batch:	12000mm x 5000mm	
13 . Minimum Power Connection required:	5 KVA	
14 . No. of Items in Standard List of Machinery: 14.1. Page No from **04** to **04**	3 Items	
15 . No. of Items in Standard List of Shop Outfit: 15.1. Page No from **04** to **04**	2 Items	
16 . No. of Items in Standard List of Trainee Toolkit: 16.1. Page No from **04** to **04**	7 Items	

********* FOR OFFICE USE *********

Approved by GCVT in Governing Body meeting on : 21-9-2015

Syllabus implemented w.e.f. admission session : Next session

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Revision History : 1. Revision No..... Revision Date.
2. Revision No..... Revision Date.
3. Revision No..... Revision Date.

Standard List of Machinery – Equipment/ Shop outfits/ Trainee Toolkit

For Trade of **Industrial Automation – Electrical**

No.	Item with Specification	Item Type (Machinery, Equipment, Shop Outfit or Trainee Toolkit)	Quantity Required per One Batch of Students	Quantity Required per One batch of Students for Instructor	Total Quantity Required (Total of previous two columns)
1	PLC	Equipment	2		2
2	HMI	Equipment	2		2
3	Laptop/PC with Windows XP/7 with Corresponding programming software	Equipment	2		2
4	Communication Cables	Shop Outfits	5		5
5	Input/ Output Wiring cables of 0.75/1.5 sq. mm	Shop Outfits	1 Coil		1 Coil
6	Wire Stripper	Trainee Toolkit	1		1
7	Tester/ Screw Driver Kit	Trainee Toolkit	1		1
8	Contactor	Trainee Toolkit	5		5
9	Push buttons for Inputs	Trainee Toolkit	20		20
10	Lamps for Output Indications	Trainee Toolkit	20		20
11	Proximity Sensors	Trainee Toolkit	5		5
12	Potentiometers	Trainee Toolkit	4		4

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SYLLABUS FOR SPECIALISED MODULE

NAME OF MODULE : INDUSTRIAL AUTOMATION - Electrical
DURATION : 11 Weeks (440 HOURS)
ELIGIBILITY CRITERIA : ITI / Diploma / Degree (I&C, E&C, EE, Mechatronics), B.Sc. / M.Sc., Instrumentation & Electronics

Week	Theory	Practical
1	Basics of Electrical & Electronics related to Automation system Introduction to Industrial Automation • Definition of Industrial automation • Benefits & Drawbacks of Industrial automation • History of Control systems • Basic concepts of Relay system • Construction & working of Relay • Circuit diagram using relays Relay circuit exercises with SLD Architecture of PLC control system Components & Classifications Classification of I/O system Wiring terminologies & diagrams Fundamentals of Sensors Digital I/O wiring	Basics of Wiring & Electrical supply system Relay logic circuit diagram study & wiring Industrial drawing understanding Wiring of I/O System Digital Wiring
2	Wiring concept reviews Programming fundamental & Languages Overview of Industrial communication Basic Software Environment (Rockwell – Micrologix 1400) Bit level Instructions Timer Instructions	Communication components Identifications Program basic setup & communication configuration Addressing fundamentals(Rockwell) Bit Instructions Exercise Timer Exercises
3	Counter Instructions Basics of Analog Signals & Exercises Analog addressing Math Instructions Data handling instructions Concept of standalone controller (Discrete controller) Basic Software Environment (Rockwell – Compact Logix)	Counter Exercises Wiring Diagram of Analog System Scaling of Analog Signal Calculation Exercises Scaling programs Analog input in Discrete control Program basic setup & communication configuration Addressing fundamentals

4	Compact Logix Exercise Software Environment (Siemens S7-300) Siemens Instruction study & Exercises	Basic setup, configuration & addressing fundamentals S7-300 Siemens
5	Siemens S7-1200 Software Environment Introduction to Visualization Types of Graphic Interface Introduction to HMI (PVP700) Software Environment Display Preparation Introduction to Library Alarm, Trend Configuration Upload/download procedure Different HMI exercises with PLC Program	Basic setup, configuration & addressing fundamentals PVP Terminal Settings FT View Studio Configuration Environment Communication with PLC Display preparation Alarm, Trend Configuration Upload/download procedure HMI Projects
6	Siemens Touch panel environment & exercises Introduction to SCADA Difference between HMI & SCADA Device preparation Tag Preparation Display Configuration Display & Control screen Navigation SCADA Alarm & Trend configuration	Setup configuration SCADA Preparation Exercises Different configuration properties
7	SCADA configuration with third party controller Process of continuous controls PID configuration & Simulation in PLC HMI & SCADA	SCADA Third party communication PID configuration & Simulation in PLC HMI & SCADA
8	B&R System Programming- PLC & Visualization	B&R System Programming- PLC & Visualization
9	Mitsubishi Q Series PLC programming Different PLC feature comparison	Mitsubishi Q Series PLC programming

10	Basics of Magnetism DC Motors & Controls Basics of AC motors- single phase & three phase Contactor construction & working Different starter wiring diagrams Basics of Drives Variable Frequency Drives (Power flex 4M- Rockwell) Drive Networking concept Difference between VFD & Servo system	Basics of Motors & AC Drives Programming
11	Servo system basics & architecture Basic Tests & Programming instructions Control panel components identification, Design aspects, Safety & maintenance Combined Industrial project Evaluation	Servo System Configuration & Test

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