



Benazir Bhutto Shaheed Youth Development Program

Occupational Skill Standards

INDUSTRIAL ELECTRONICS
(12 Month Course)

PROJECT MANAGEMENT UNIT

Directorate of Manpower & Training
Labour Department, Government of Sindh

FOREWORD

The people government recognizing the plight of jobless, semi-literate, and educated youth of Pakistan has decided to launch a program to employ 5 lakh youth (age 18-35 years) throughout the country, province wise and impart them employable skills through short and medium term (6 to 12 months courses) under Benazir Bhutto Shaheed Youth Development Program (BBSYDP).

The task before SINDH Government is to impart the training to one lakh youth in the province using its existing Technical Training Centres / Departments and where inevitable to outsource the courses.

Keeping these objectives in view, Sindh Government has opened the venues for such opportunities for youth to be trained in the employable skills under this project with following objectives.

- Enhance employability of un-employed youth belonging to lower income group providing training in employable skills.
- Relevant skills for industrial and Economic Development.
- Improving Access, Equity and Employability.
- Assuring quality for Skill Development.
- Meet the emerging demand of growing industries and Development projects.
- Development of employable skilled workers primarily for wage employment in industries.
- Provision of basic skills for the rural poor primarily for self-employment.

The project has very clearly defined objectives which shall address the unemployment menace in the province. It envisages that no additional workshop, labs, and classroom shall be constructed for training of the youth, where as the existing 34 Training Centres of the Directorate of Manpower & Training mandated / established for skill development shall impart employable skill training to youth targeted in this project.

The occupations / trades are selected in sectors where employment is available. In this regard the Employers Federation / Associations and group of industries have been consulted.

The curriculums consisting of skills and operations for imparting of the training for 06–12 months courses are available based on 80% practical and 20% theoretical knowledge. The training methodology and activities are predefined in the respective curriculum. Periodical progress of the trainees are made compulsory.

It has been a team effort of Training Management Board and Trade Testing Board who have supervised the trade specialists in the development of the Curriculum according to the need of the job market.

KARIM BAKHSH H. SIDDIQUI
Director,
Manpower & Training Sindh, Karachi

INDUSTRIAL ELECTRONICS

OVERALL OBJECTIVE

After completion of the course, trainees should be able to find suitable employment to understand and work in electronics-based workshop / Industry under the supervision of skilled worker / supervisor.

SPECIFIC OBJECTIVES:

After completion of the course, trainees should be able to:

- Observe general safety rules as well as Electricity safety rules.
- Understand and use of measuring tools and equipment.
- Understand about the laws
- Use and test electronics devices.

TRAINING PARAMETERS

Course Code	B-04
Entry level	Intermediate
Age group	20 – 38 years
Medium of Instructions	English / Urdu / Sindhi
Duration of course	12 Months
Contact Hours	1200
Daily Contact Hours	Four Hours per day
Per Class Trainees	Maximum 25
Timing of Training	Morning Shift (09:00 A.M. to 01:00 P.M.) Evening Shift (02:00 P.M. to 06:00 P.M.)

Knowledge requirement:

After completion of course the trainee should be able to:

- Observe general safety rules as well as Electricity safety rules.
- Understand about the electrical laws.
- Understand and read electronics symbols and diagrams.
- Calculate different quantities and units.

Skill requirement:

After completion of the course the trainee should be able to:

- Understand and use measuring tools and equipment.
- Use and test power supply, motors etc.
- Use and test Electronics devices.
- Test and troubleshoot electronics circuits.

SCHEME OF STUDIES:

S. No.	Topic	Time (Hours)		
		Theory	Practical	Total
1	Essentials of electric and electronics	78	160	238
2	Digital Electronics	46	90	136
3	Advanced Electronics Circuits	58	130	188
4	Power Electronics	90	170	260
5	Electrical Machines and Controllers	81	160	241
6	P.L.C.	22	50	72
7	Final Project	--	50	50
8	Basic <i>Arabic</i> Communication	20	--	20
Total		395	810	1205

DETAIL OF TOPICS:

S. No.	Topic	Time (Hours)		
		Theory	Practical	Total
1	ESSENTIAL OF ELECTRIC AND ELECTRONICS <ul style="list-style-type: none"> • 17-N/1/1 1 Safety Precautions • 17-N/1/1 2 The Electronics VOM • 17-N/1/1 3 Basic Electrical Quantities • 17-N/1/1 54 Electrical Circuits • 17-N/1/1 4 Magnetism & Electro-magnetism • 17-N/1/1 5 Electrical & Electronics Components • 17-N/1/1 6 Semi-Conductor Devices • 17-N/1/1 7 Electronics Circuits 	78	160	238
2	DIGITAL ELECTRONICS <ul style="list-style-type: none"> • 17-N/1/2/1 Numbers & Codes • 17-N/1/2/2 multi-vibrators • 17-N/1/2/3 Logic Gates • 17-N/1/2/4 Flip Flop Coder • 17-N/1/2/5 Counters 	46	90	136
3	ADVANCE ELECTRONICS CIRCUITS <ul style="list-style-type: none"> • 17-N/1/3/1 Special purpose diode • 17-N/1/3/2 Regulators • 17-N/1/3/3 Power amplifiers • 17-N/1/3/4 Oscillators • 17-N/1/3/5 Operational amplifier 	58	130	188
4	POWER ELECTRONICS <ul style="list-style-type: none"> • 17-N/1/4/1 JFET & MOSFET • 17-N/1/4/2 UJT • 17-N/1/4/3 SCR • 17-N/1/4/4 Triac and Diac 	90	170	260

S. No.	Topic	Time (Hours)		
		Theory	Practical	Total
5	ELECTRICAL MACHINES AND CONTROLLERS <ul style="list-style-type: none"> 17-N/2/1/1 D.C Motors and Generators 17-N/2/1/2 D.C Motors Control 17-N/2/1/3 A.C Motors 17-N/2/1/4 Capacitor-run Motor Controller 17-N/2/1/5 Plugging and dynamic braking 17-N/2/1/8 Magnetic amplifier 17-N/2/1/10 Plugging and dynamic braking 	81	160	241
6	PLC (Programmable Logic Controller) <ul style="list-style-type: none"> 17-N/2/2/1 Introduction to PLC 17-N/2/2/2 Hardware summary 17-N/2/2/3 Introduction set summary 17-N/2/2/4 Programming Language 17-N/2/2/5 PLC system description 17-N/2/2/6 Programming basics 17-N/2/2/7 Relay-type instruction 17-N/2/2/8 Program editing 17-N/2/2/9 Timer Instruction 17-N/2/2/10 Counter Instruction 17-N/2/2/11 Additional program instruction 	22	50	72
7	FINAL PROJECTS <ul style="list-style-type: none"> Choosing project Preparation of working project Assembling of assigned project Testing of assigned project Preparation of thesis 	--	50	50
8	BASIC ARABIC COMMUNICATION <ul style="list-style-type: none"> Introduction of Arabic language Basic Arabic grammar Formation of sentences Speech practice 	20	--	20
Total		395	810	1205

TOOLS AND EQUIPMENT:

Following tools and equipment are prescribed for 20 trainees.

S. No.	Tool / Equipment	Quantity
1	Bread Board	12
2	D.C Power supply	25
3	Multi-meter (Analog)	25
4	Multi-meter (Digital)	25
5	Soldering Iron	12
6	Oscilloscope	06
7	Connection wires (Probs) set	12
8	Coils	12
9	Digital Board	12
10	Audio Generator	06
11	Frequency Counter	12
12	Logic prob	20
13	Logic Pulser	20
14	Volt Meter	10
15	Am Meter	10
16	Motor assembly	05
17	A.C power Supply	05
18	Bar Magnet	05
19	Compass Needle	05
20	P.L.C	02
21	A.C & D.C controller	02

TRAINING MATERIAL:

S. No.	Item	Specification	Quantity (Numbers)
1	Resistor	Assorted	100
2	Capacitor	0.1 μ f, 0.22 μ f, 0.02 μ f, 0.05 μ f, 10 μ f, 100 μ f, 470 μ f 50V.	05 each
3	Inductor	10mH, 2.5mH	05 each
4	Diode	1N4004, 1N4007	10 each
5	L. E. D.	3mm Red, Yellow, Green	20 each
6	Zener Diode	6.8Volt, 5.1Volt	10 each
7	Relay	12V D.C, 220V A.C	10 each
8	Transistor	2N2219, 2N295, 2N3055	20 each
9	Transformer	12-0-12V, 2Amp.	10
10	Bread Board	6" X 12"	10
11	S. C. R.	SC106B	10
12	U. J. T.	2N646	10
13	Diac	ST103	10
14	Triac	TIC226M	10
15	J-FET	N-channel	10
16	Lamp	6Volt, 12Volt	20 each
17	Battery	1.5Volt, AA size	24
18	Variable resistor	1K Ω , 10K Ω , 100K Ω , 500K Ω	20 each
19	Hook-up wire	09meter coil	01
20	Speaker	8 Ω , 0.5 Watt	10 each
21	Integrated circuit	555, 7402, 7404, 7420, 7451, 741, 7400, 7476, 7432, 7408	05 each
22	Bridge rectifier	5Amp.	20
23	Banana Jack (Male)	--	10
24	Crocodile clip	--	10
25	Oscilloscope Probe	--	03

QUALIFICATION OF INSTRUCTOR:

Three years of Diploma of Associate Engineer in Electrical/Electronic technology with three years working experience.

REFERENCE BOOKS:

1. Basic Electronics, By Grob;
2. Digital Electronics, By Tokhame.

Examination and certification:

The testing and certification shall be carried out by the Trade Testing Board, Government of Sindh.
