GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

COURSE CURRICULUM

Course Title: Electrical Engineering Workshop Practice
(Code: 3320902)

Diploma Programmes in which this course is offered	Semester in which offered
Electrical Engineering	Second Semester

1. RATIONALE

The diploma electrical engineering students are required to perform tasks such as selection of different types of wires, cables, switches etc. relevant to the current, voltage ratings and applications. Such skills can be developed through the electrical workshop practices which will be useful in industries for using various electrical tools, measuring instruments, safety tools and devices. This course is designed in such a way that practicals performed in this course will develop these basic skills to perform well in the industry.

2. COMPETENCY

The course content should be implemented with the aim to develop different types of skills leading to the achievement of the following competency:

- **Connect basic electrical instruments and devices.**

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PA	ESE	PA	100
0	0	4	4	0	0	40	60	

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Student Activity; **P** - Practical; **C** – Credit;; **ESE** - End Semester Examination; **PA** - Progressive Assessment.

4. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit– I Electrical Tools	1a. Use various electrical tools and measuring instruments.	1.1 Pliers, nose plier, cutter, screw driver, tester, test lamp etc. Ammeter, voltmeter, wattmeter, clip on meter, Multimeter, Megger, etc.
Unit– II Cables and Switches	2a. Select different types of wires, cables, light sources and switches.	2.1 Single core cable, multicore cable, single strand wire, multi strand wire, shielded wire , different types of light sources etc.; Toggle switch, Rotary switch, Push button switch, micro switch, MCB, ELCB, etc.
Unit– III Resistors	3a. Select/identify different types of resistors.	3.1 Rheostat, wire wound resistor, Carbon film resistor, Carbon composition resistor, fixed and variable potentiometer etc.
Unit– IV Capacitors	4a. Select /identify different types of capacitors.	4.1 Paper capacitor, electrolytic capacitor, ceramic capacitor, polyester, gang capacitor
Unit–V Earthing and Electrical Safety	5a. Undertaking pipe earthing.	5.1 Earthing, pipe earthing, plate earthing, Electrical safety tools Electrical safety rules , I.E. rules for electrical hazards and accidents

5. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total
I	Electrical wiring tools, measuring instruments	**Not applicable**				
II	Electrical wires, cables and switches					
III	Resistors					
IV	Capacitors					
V	Earthing and electrical safety					

Legends: R = Remember; U = Understand; A = Application and above levels (Revised Bloom's taxonomy)

Note: This specification table shall be treated as only general guideline for students and teachers. The actual distribution of marks in the question paper may vary from above table.

6. SUGGESTED LIST OF EXERCISES/PRACTICALS

The experiments should be properly designed and implemented with an attempt to develop different types of skills leading to the achievement of the above mentioned expected competency.

S. No.	Unit No.	Practicals / Exercises	Hours
1	I	Identify various tools used for wiring.	04
2	I	Identify the symbols used in electrical circuit diagrams.	04
3	I	Identify and connect various electrical measuring instruments and measure various electrical parameters like current, voltage, power.	04
4	I	Use common testing instruments used in electrical workshops: 1: Test lamp. 2: line tester. 3: Multimeter. 4: Clamp-on meter. 5; Megger.	04
5	I	Connect different domestic appliances to power supply and measure current drawn by them using 1)Ammeter. 2)Tong tester. 3) Multimeter.	04
6	I	Identify different types of domestic wirings.	04
7	II	Identify and specify different types of wires, cables, cable joints used for different current and voltage ratings.	02
8	II	Identify different types of light sources, open circuit, closed circuit and short circuit.	04
9	III	Identify and specify different types of switches used for different applications as per current and voltage ratings.	02
10	III	Identify and specify different types of sockets and plugs used for different current and voltage ratings.	02
11	III	Know the working of various electrical circuit protective devices (fuse, MCB,)	04
12	I & III	Prepare a meter board for lighting and power installation using MCB, energy meter, fuse unit, DP switch, indicators and bus bars.	04
13	IV & IV	Identify and specify different types of conducting, insulating materials, resistors, capacitors and inductors as per standard color code practice.	04
14	III & IV	Solder various resistors, capacitors and electronic components on PCB.	04
15	V	Conduct mock artificial respiration and first aid exercises to learn about safety procedures of first aid in case of electrical hazards.	04
16	V	Undertake earthing practice (good demonstration)	02
		Total Hours	**56**

7. SUGGESTED LIST OF STUDENT ACTIVITIES

i. Draw various electrical symbols

ii. Collect and study of various catalogues for cables ,switches and instruments

iii. Study electrical safety I.S. codes

8. SUGGESTED LEARNING RESOURCES

A. List of Books

S.No.	Author	Title of Books	Publication
1	Mithal, G.K.	Electrical Engineering Materials	Khanna Publication ,2011
2	Gupta, J.B. , & Gupta, Renu	Electrical engineering materials & semiconductor devices	S.K. Kataria & sons, 2012
3	Singh, Surjit	Electrical engineering drawing i &ii	S.K. Kataria & sons, 2012
4	Bhatia, S.L.	Handbook of Electrical Engineering	Khanna Publication ,2012
5	Uppal, S.L. & Garg ,G.C.	Electrical Wiring, Estimating and Costing	Khanna Publication ,2012

B. List of Major Equipment/ Instrument

i. Various tools for wiring such as wire stripper, bearing puller, etc.
ii. Various electrical measuring instruments such as digital and analogue multimeters, ammeters, voltmeters, wattmeters, frequency meters, phase sequence meters, tong tester, etc.
iii. Various safety devices for protection of electrical installation, earthing rods, megger, insulation tester, etc..
iv. Various safety devices used for first aid and electric fire hazards.
v. Soldering kit.
vi. Different types of cables, wires, switches, light sources, resistors, capacitors, inductors, insulating and conducting materials, MCBs, ELCBs, etc.
vii. Various domestic appliances (e.g. fan, heater, electric iron, geyser etc.)
viii. Various electrical power supplying equipments (e.g. transformer, variac, d.c.power supply etc)

C. List of Software/Learning Websites

i. http://en.wikipedia.org/wiki/Electrical_wiring
ii. http://www.kpsec.freeuk.com/components/switch.htm
iii. http://home.howstuffworks.com/electrical-tools.htm

9. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnic

- **Prof. S.S.Mehta**. Lecturer, Electrical Engg. Dept. B&B Institute of Technology, Vallabhvidyanagar.
- **Prof. A. S. Pandya**. HOD. Electrical Engg. Dept. Govt. Polytechnic, Rajkot.
- **Prof. V. R. Kotdawala**. Lecturer, Electrical Engg. Dept. Govt. Polytechnic, Himmatnagar.

- **Prof. P.S. Chaudhary**. Lecturer, Electrical Engg. Dept. B&B Institute of Technology, Vallabhvidyanagar.

Coordinator and Faculty Members from NITTTR Bhopal

- **Dr. Joshua Earnest,** Professor and Head, Dept. of Electrical & Electronics Engg,
- **Prof. A.S.Walkey,** Associate Professor, Dept. of Electrical & Electronics Engg.