Lok Jagruti Kendra University
University with a Difference

Diploma in Electronics & Communication Engineering

LJ Polytechnic

Subject Code:025030106
Electronics Engineering Workshop

Course / Branch Name			Diploma in Electronics and Communication Engineering			
Subject	Electronics Engineering Workshop				**Code**	025030106
Subject Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses BSC: Basic Science Courses
ESC: Engineering Science Courses PCC: Program Core Courses
OEC: Open Elective Courses PEC: Program Elective Courses

1) Teaching and Evaluation Scheme

Teaching Hours / Week / Credits				Evaluation Scheme			
L	**T**	**P**	**Total Credit**	**CCE**	**SEE (Th)**	**SEE (Pr)**	**Total Marks**
0	0	6	3	50	-	50	50

Legends:
L: Lectures T: Tutorial P: Practical
CCE: Continuous & Comprehensive Evaluation
SEE (Th): Semester End Evaluation (Theory)
SEE (Pr): Semester End Evaluation (Practical)

2) Prerequisite

- ✓ Basic knowledge of Electronic Components.

3) Rationale

This course of 'Electronics Workshop' is aimed to provide the students with more hands-on experience and also enable them to develop and test simple PCB circuits. Selection of components, wiring, soldering, desoldering, testing and troubleshooting, are some of the basic skills required by industry from any electronics engineering diploma holder. Students also need to develop enough learning confidence to complete entire project work related to various courses in subsequent higher-level semesters.
Hence, this is designed to develop these vital skills required by the electronic industry through various laboratory experiences and strategies like mini-projects.

4) Objectives

- ✓ Demonstrate safety measures against electric shocks.
- ✓ Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols
- ✓ Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings
- ✓ Identify and test various electronic components
- ✓ Draw circuit schematics with EDA tools
- ✓ Assemble and test electronic circuits on boards

5) Contents

Unit No.	Topics	Sub-Topics	Learning Outcomes	% Weightage	Hours
1	Familiarization/Identification of electronic components with specification	1.1. Functionality, type, size, colour coding, package, symbol, cost etc. 1.2.Active, passive, electrical, electronic, electro-mechanical, wires, cables, connectors, fuses, switches, relays, crystals, displays, fasteners, heat sink etc.	• Component types and their colour coding • How to check the value of components • Its connection precautions	10	4
2	Familiarization/Application of testing instruments and commonly used tools	2.1.Multimeter, function generator, power supply, DSO etc. 2.2.Soldering iron, desoldering pump, Pliers, cutters, wire strippers, screwdrivers, tweezers, crimping tool, Hot air soldering and de-soldering station etc.	• The functioning of a different instrument used in a laboratory. • Using tools used for soldering and its techniques.	10	4
3	Inter-connection methods and soldering practice.	3.1.Breadboard, wrapping, crimping, 3.2.Soldering types - the selection of materials and safety precautions, soldering practice in connectors and general-purpose PCB	• How to test circuit on board. • Types of soldering used on PCB.	10	8
4	Printed circuit boards	4.1.Types and Processing methods. 4.2.Design and fabrication of a single-sided PCB for a simple circuit with manual etching (Ferric chloride) and drilling	• Types and layers of PCB. • How to make your PCB	10	8
5	Mini Projects	5.1.Assembling of electronic circuit/system on general-purpose PCB, test and show the functioning. (Any Five)	• Household or lab work usage projects use in daily work.	60	16
				Total Hours	40

6) List of Practicals / Exercises

The practical/exercises should be properly designed and implemented in an attempt to develop different types of skills that students can acquire the competencies/programme outcomes. Following is the list of practical exercises for guidance.

Sr. No	Practicals / Exercises	Key Competency	Hours
1	To understand and draw the symbols of various electronic devices.	Basic symbols of components	2
2	To identify the value of resistors, capacitors using different codes.	Colour coding techniques to identify the values of components	2
3	To study cathode ray oscilloscope and perform measurements.	Operation of CRO	2
4	To study digital multimeter and perform testing of various components.	Operation of Multimeter	2
5	To study function generator & power supply and perform measurements.	Operation of Function Generator	2
6	To study type of soldering and de-soldering techniques.	Soldering Techniques	2
7	To study a simple circuit using ORCAD and simulate it.	Simulation Tool	2
8	To make your PCB layout and printing process.	PCB Printing	2
9	To do an etching of your PCB with both front and backtrack print.	PCB Etching	2
10	Mini Project: Wireless Doorbell		2
11	Mini Project: Smart LED light		2
12	Mini Project: Decorative flashing LED		2
13	Mini Project: DC Power Supply of 5V, 12V, 15V, etc.,		2
14	Mini Project: Liquid Level Alarm		2
15	Mini Project: Fire Alarm		2
16	Mini Project: IR Music Transmitter		2
17	Mini Project: Electronic Combination Lock		2
18	Mini Project: Automatic parking light		2
19	Mini Project: Burglar Alarm		2
20	Mini Project: Electronic Dice		2
21	Mini Project: Quiz Buzzer		2
22	Mini Project: USB Li Battery Charger		2
23	Mini Project: CAR Horn or Reverse Horn		2
24	Mini Project: Electronic Counter		2
25	Mini Project: Mobile Fast Charger		2
26	Mini Project: Sound Operated Light		2

27	Mini Project: Square Wave Generator		2
28	Mini Project: Sine Wave Generator		2
29	Mini Project: Mini Drill for PCB		2

7) Reference Books

1) P-Cad 2002 Professional Tools for Board Layout Specialists, Altium Limited
2) Complete PCB design using OrCAD capture and layout by Kraig Mitzner, Newnes Publication, Oxford

8) Open Sources (Website, Video, Movie)

1) http://www.technologystudent.com/elec1/tranbrd1.htm
2) www.expresspcb.com/expresspcbhtm/download.htm
3) www.freepcb.com/
4) http://www.circuitstoday.com/simple-electronics-projects-and-circuits
5) http://www.buildcircuit.com/5-beginners-projects-that-work-in-the-first-attempt/