Marwadi University
Faculty of Diploma studies
Information and Communication Technology

Semester – I

Subject Name: Electronic Practice

Subject Code: 09CT0102

Diploma Branches in which this subject is offered: Information & Communication Technology

Objective:

This subject of 'Electronics Practice' is focused 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, disordering, 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 course is designed to develop these vital skills required by the electronic industry through various laboratory experiences and strategies like mini-projects.

Credits Earned: 2 Credits

Course Outcomes: After completion of this course, student will be able to

- Identify a particular component from the given group of active & passive electronic components
- Use of CRO and Function Generator for various wave generation and measurements.
- Will be able to analyze and interprets IC manual available in market
- Student will be able identify various hardware components and devices like diode, transformer, relay, Bread board ICs etc..
- Will able to do soldering and de-soldering of general purpose components.
- Will able to create small project and trouble shoot same project.

Pre-requisite of course: Elementary knowledge of physics.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term work	
0	0	4	2	00	30	20	25	25	100

Contents:

Unit	Topics	Contact hours	Weightage (%)
1	**Electronic Components:** **Passive components:** Various type of resistors, inductors, capacitors, potentiometers, Thermistor, Transformer **Active components:** Characteristics of Diode, Zener diode, Varactor diode, LED, Photo diode, BJT**,** Photo transistor, FET, LDR, Solar cell, Photocell, Optocoupler.	**4**	**6**
2	**Various Sources & Measuring Instruments:** AC & DC power supply, Various Voltage & Current source, Measuring Instrument CRO & DSO, Digital Multimeter (DMM), and Function Generator.	**10**	**16**
3	**Cables, Connectors & Relays:** General specifications of cables- characteristic impedance, current carrying capacity twin core cable twisted & shielded type, optical fiber cable General specifications of connectors- contact resistance, breakdown voltage, insulation resistance ,Constructional diagram, applications of BNC, D series, Audio, Video, printer, edge, FRC, RJ 45 connectors. Construction, working and application of general purpose relay, NO, NC contact, reed relays, solid state relays.	**6**	**15**
4	**Introduction to IC and SMD & Datasheet Interpretation :** Classification of IC's, monolithic IC, thick & thin film IC, hybrid IC, linear IC, digital IC Using data sheet understand the IC packages-SIP, TO 5 ,Flat , DIP, pin Identification, temperature ranges, device identification Compare various IC's and SMD	**6**	**13**

5	**Introduction to Electronic workshop tool :** Bread board, Copper clad laminate sheet, Solder iron, solder-stand, solder-wire, flux, flexible wire, hookup wire, cables, fuses, Cutter, plier, screw-driver set, wire stripper, de-solder pump, De-solder wick, drilling machine	**12**	**25**
6	**Sensor Interfacing :** Introduction of open sources boards IDE, basics of programming using IDE, IO Control using IDE, Interfacing of switch, LED, Various Sensors and Actuators.	**15**	**25**
TOTAL HOURS		**53**	**100**

Suggested List of Experiments:

Sr. No.	Unit No.	Name of Topics
1	2	Test AC/DC voltage sources with Digital Multimeter (DMM).
2	1	Identify, find value and test different types of resistors, capacitors.
3	1	Make use of resister, capacitor, inductor in series and parallel connection.
4	2	Measure amplitude & frequencies of different type of waveforms using CRO & Function Generator.
5	4	Find Specifications and package of following components from Datasheet. (as a guideline only): (a) Diodes IN4001 to 1N4007, IN4148, 2N5402, 2N5408, BY127 (b) Zener Diode - 5V6 (c) Photo diode - BPW10 (d) LED - LED 55 (e) Varactor diode (f) Seven segment LED (g) Transistors BC107, BC177, BC547/548, (h) Transistors SL100, SK100, AC127/128, BF194, TIP122 (i) IC 78XX, 79XX (j) LM317 (k) SMD components: Resistor, Capacitor, Inductor & Diode-LL4148, SM4007, Chip transistor, Chip Darlington transistor, Bridge rectifier.
6	4	Read and interpret data sheet of various IC and SMD components.
7	3	Perform relay operation on bread-board.

8	3	Identify different types of connectors, cable & discover their application.
9	5	Perform Soldering and de-soldering on general purpose PCB. (practice using 4 and 8 pin DIP IC)
10	6	Generate Traffic light pattern using LEDs (use open source board)
11	6	DC motor direction control using motor driver IC. (use open source board)
12	ALL	Implement various characters on general purpose board using LED. (soldering practice)
13	ALL	Implement 0 to 9 digits on seven segment display.
14	ALL	Prepare one project on general purpose board. (Project will be suggested by faculty)
15	6	Prepare one project using open source boards and IDE module. (Project will be suggested by faculty)

Student Activity:

1. Collect various types of components and prepare chart/model
2. Collect specifications of similar types of tools and instruments and prepare report comparing them.
3. Assemble one electronic system on PCB, test, and demonstrate in functioning (Mini – project given by faculty member)

Instructional Method:

a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

b. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

c. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

d. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory

Reference Books:

1. Madhuri Joshi , "Electronic Components and Materials", Shroff Publishers & Distributors Private Ltd.
2. Thomas H. Jones, "Electronic Components Handbook", Reston Publishing Co.
3. Charles A. Harper, "Handbook of components for electronics", Laxmi Enterprise

Suggested Resources

1. https://electronicsforu.com/
2. http://www.learnabout-electronics.org/
3. https://en.wikipedia.org/wiki/Electronic_component