



B.Tech	1	Semester	1/2	Teaching Scheme				Evaluation Scheme	
Subject Name	Electrical and Electronics Workshop			L	T	P	Credits	CCE	SEE
Subject Code	BTGN22102			-	-	2	1	25	25
Type of course	Engineering Science			CCE : Continuous and Comprehensive Evaluation SEE : Semester End Evaluation					
Prerequisite	No Prerequisite								
Rationale	<p>Specifically workshop practices for Electrical, Electronics, Computer and IT are addressed here. This course will help to learn skills related to utilization of measuring instruments, soldering methods to basic circuits at introductory level, computational and evaluating skills for electric wiring, programming microcontrollers Arduino, and interfacing peripherals. In addition, getting familiar with Open source Operating system and office tool usage.</p> <p>Workshop practice is the backbone of the real industrial environment which helps to develop and enhance relevant technical hand skills required to work in the various engineering industries. Irrespective of branch, the use of workshop practices in day to day industrial as well domestic life helps to resolve the problems.</p>								

Course Outcomes (COs): At the end of the course, students will be able to	Marks % Weightage
CO - 1 Apply appropriate electronic instruments such as digital storage oscilloscopes (DSOs), multimeters, function generators, and power supplies to measure, test, and troubleshoot basic electronic circuits.	20%
CO - 2 Write, upload and execute basic Arduino programs using open source platforms and demonstrate hands-on experience in testing and integrating sensors for practical applications.	20%
CO - 3 Describe the working principles and functionality of electrical appliances, protective gears and electronic ports.	20%
CO - 4 Gain proficiency in using a soldering iron for assembling circuits on a general purpose PCB and develop skills in assembling, testing, and debugging electronic circuits.	15%
CO - 5 Explain different types of electrical wiring and structured cabling components, and estimate their cost for new building.	15%
CO - 6 Verify and explain different electricity tariffs and bill.	10%





List of Laboratory Practical	
1	(A) To identify and measure the parameters values, rating and state of Electronic devices and Components. (B) To utilize functionality of electronics instruments like Digital multimeter, and trainers.
2	(A) To utilize functionality of electronics instruments like DSO, Function generator, power supply. (B) To measure voltage, current, frequency, amplitude using simple example case study (AC and DC), and compare with theoretical calculations
3	(A) Design a circuit using different components, batteries to glow an LED (B) Design a circuit using different components, batteries to glow and change intensity of LED using 1 K potentiometer LED .
4	(A) To perform soldering and de-soldering technique for given circuit on PCB. (B) To Identify and rectify open circuit and short circuit faults in using case study circuits.
5	(A) To describe functionality of electrical appliances and wiring scheme for electrical items. (B) To recognize various types of Ports and Connectors for Laboratory instrument, Audio and Video Application, computer networking usage purpose.
6	(A) To describe and compare various types of wires and cables used for electrical installation. (B) To prepare the drawing for electrical wiring of a room with specification and calculation of material cost. (C) To compute the energy consumption based on the case study for various electricity bills.
7	(A) To study types of lamps and their polar curves and measure their lumens using a Lux meter. (B) Demonstrate various types fixtures & reflectors, (C) Learn about various illumination schemes for domestic, industrial & Commercial premises.
8	(A) To study different types of pumps used for residential building and basic calculations of the size and rating of the pump (B) Calculate the rating of Air conditioner for a given room.
9	To learn the basics of the Linux operating system, including directory structures and essential commands for system navigation and file management.
10	To explore the Open Office suite, learning its key features and functionalities for document processing, spread sheets, and presentations.
11	To study various protection devices like MCB, MCCB and ELCB, and understand their usage in electrical installations.
12	(A) To identify various voltage regulator ICs ((LM78XX and LM79XX ICs, LM 317). (B) To design, develop and test a regulated power supply using transformer, rectifier and voltage regulator ICs (7805, 7812, 7815, 7912, 7915). (C) To design, develop and test Half wave & Full wave Rectifier circuits.
13	(A) Introduction to electrical earthing and study of various systems like TT, TN and IT . (B) Study of electrical bonding for protection against electrical shocks
14	To study various types of batteries, specifications, and their applications.



15	To use Tinkercad and Arduino developer board for LED blinking, <ul style="list-style-type: none"> i. One second on-off blinking. ii. TWO LED / Three LED blinking systems.
16	To program Arduino for following tasks: <ul style="list-style-type: none"> i. Play buzzer tone for duration (ms) of 100* last two digits of your roll number. ii. When a push button switch is pressed, an LED should light up for 5 seconds.
17	To program and interface Arduino with PIR sensor for motion detection.
18	To identify the key components, and observe the assembling process of computer motherboards, cellular phone motherboards, and PDA (Personal Digital Assistant) motherboards. <ul style="list-style-type: none"> i. To identify and analyse the block diagram computer, cellular phone and PDA motherboard. ii. Hands-on experience with assembling and disassembling the computer. iii. To compare the design and architecture of different motherboard types.
19	To identify various analog sensors LM 35 / RTD 100 based on their working principles and application-specific purposes. Additionally, to learn the interfacing techniques and testing methods for different sensors to evaluate their performance and functionality in real-world applications.
20	Study structured cabling system for wired connections (horizontal cabling, vertical cabling, consolidation point etc.) in a computer lab and Wi-Fi setup (Access Point, Routers, OU Rack, etc.) for Internet connectivity. Draw its diagram and explain the functionality of various components.
21	Presentation and Mini projects <ul style="list-style-type: none"> i. Students will form a team of two students and register themselves for presentation and mini project tasks OR ii. Industrial visit of Electrical product/design based manufacture company

Recommended Reference Books

- 1 Electrical Wiring, Estimating and Costing, S. L. Upal, Khanna Publisher, 1996
ISBN 978-81-7409-240-3
- 2 User Manual 3 MHz Function Generator / Counter SM5070 / SM5071, Scientific
- 3 User Manual Digital Storage Oscilloscope, Tektronix
- 4 Arduino Project Handbook, Mark Geddes



CO-PO-Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO-1	3	3	1	3	3	-	-	-	1	1	-	1
CO-2	3	2	3	3	3	1	1	1	2	2	1	3
CO-3	3	3	2	2	2	2	2	2	1	3	3	3
CO-4	3	3	2	3	2	3	2	2	2	3	3	3
CO-5	3	2	2	3	3	2	2	1	2	3	3	3
CO-6	3	3	3	2	2	2	1	1	2	3	1	1

List of Open Source/learning website/Other Details if any:

- <https://www.tinkercad.com/Tinker cad>
- <https://eleceng.dit.ie/dsp/elab/CRO and function generator simulation:>
- <https://www.virtualbox.org/wiki/Downloads>
- <https://www.slax.org/>
Resources for installing virtual machines and Linux on it:
- <https://www.webminal.org/>
Resource to practice Linux commands online

