GUJARAT TECHNOLOGICAL UNIVERSITY
Bachelor of Engineering
Subject Code: 3110012

WORKSHOP/ MANUFACTURING PRACTICES

B.E. 1st YEAR

Type of course: Engineering Science

Prerequisite: Zeal to learn the subject

Rationale: Workshop practice is the backbone of the real industrial environment which helps to develop and enhance relevant technical hand skills required by the technician working in the various engineering industries and workshops. Irrespective of branch, the use of workshop practices in day to day industrial as well domestic life helps to dissolve the problems.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
0	0	4	2	0	0	80	20	100

Contents:
Introduction to various shops / sections and workshop layouts. Safety norms safety equipment's to be followed in a workshop.
Demonstration of hand tools, power tools, basic measuring instruments, marking and measurement. Overview of Carpentry, Fitting, Smithy shop, Welding, Tin smithy, Electrical and Electronic, Plumbing, Machine shop and machine tools.

Practice:
Students are required to prepare one job each in the following shops: Fitting, Carpentry, Smithy /Tin smithy, Electric Arc welding/ Resistance welding.
Demonstrations of Jobs in following machine shops: Lathe Machine, Drilling Machine, Hacksaw Machine

Course Outcome:

Sr. No.	CO statement
CO-1	Understand various manufacturing processes in machine shop and perform basic operations of welding, fitting, smithy and carpentry work a) perform basic operations of welding, fitting, smithy and carpentry work b) Explain various manufacturing processes in machine shop
CO-2	Discuss application of plumbing fitting, masonry items and about plastic molding and glass cutting for various engineering application
CO-3	Measure different electrical quantities and trouble shoot electrical and electronics appliances.
CO-4	Conduct experiments with various kits such as Raspberry and Arduino for embedded system development
CO-5	Use basic commands of computer operating systems

Workshop Practice:

1) Machine shop
2) Fitting shop
3) Carpentry
4) Welding shop
5) Electrical
6) Electronics
7) Casting
8) Smithy
9) Plastic moulding & Glass Cutting
10) Plumbing and its fitting
11) Masonry Work
12) IOT
13) **Software Tools & OS Commands**

List of Experiments

Machine shop

1. Demonstration of job on Lathe machine
2. Demonstration of job on Drilling machine
3. Study of different types of power tools

Fitting Shop

Hands on Practice and job making in Fitting shop

Carpentry

Hands on Practice and job making in Carpentry shop.

Welding shop

1. Hands on Practice and job making using Electric arc Welding / Resistance welding process
2. Hands on Practice and job making using Soldering process

Casting:

Demonstration of Pattern Making by sand moulding

Smithy

Hands on Practice and job making in Smithy/ Tin smithy shop.

Plumbing and its fitting

1) Types of Pipes and Fittings
2) Joints (PVC and Metal)
3) Plumbers tools and equipment's
4) Cutting and bending of different mental pipes

5) Pipe fitting
6) Plumbing symbols
7) Plumbing services
8) Sanitary Pipes and Fittings
9) Joints

Plastic moulding & Glass Cutting

Masonry Work

1) Different types of Bricks
2) Different size and part of Bricks
3) Different types of Bonds
4) Types of tools used for various masonry works

Electrical

1. Measure voltage, current, frequency, phase difference, power, power factor for single and three-phase supply
2. Wire fan, tube light, two-way control (staircase wiring).
3. Wire MCB, ELCB for a given load circuit
4. Preparing the drawing for wiring a newly built room, without any electrical wiring along with a bill of materials with specifications; the room may be a class-room, an office, a shop, a clinic, a small workshop etc.
5. Identify and rectify open circuit, and short circuit faults in PCB/System
6. Solder and de-solder electronic components on different types of PCB
7. Identify various types of ports and connectors

Electronics:

1) Introduction to basic electronics components and its testing: Resistors, Inductors, Capacitor, Diode, BJT
2) Introduction to testing and Measurement Instruments: Power Supply, Function Generator, Oscilloscope

IOT

Arduino starter kits or raspberry pi

i.e. Arduino Starter kit mostly includes following:, Similarly for Raspberry pi use whatever required

- An Arduino or Raspberry
- Jumper wires
- Resistors
- Breadboard
- LEDs
- Buttons

Case Studies/Demonstration

1. Arduino LED On/Off

2. Or Raspberry LED/On

It requires

- LED
- Resistor
- Connecting wires

3. Arduino alarm system which detects movement of an intruder with a high pitched alarm sounds and flashing lights.

It requires

- An ultrasonic "ping" sensor –HC-SR04 or PIR
- A piezo buzzer
- LED strip light

4. Arduino Trafiic Light Controller

5. raspberry pi on screen keyboard app.

It requires

- Red, yellow and green LEDs.
- A breadboard.
- 6 x 220 resistors.
- Connecting wires.
- 1 x pushbutton switch.
- 1 x 10k resistor

Software Tools & OS Commands

- **Dream weaver Web development Too**l

Student Has to build his own Web Site consisting of basic profile about his department,his own personnel profile and basic Institute Details

Student Has to learn any of Two OS (Windows,Linux,Unix,MacOS,Apple,Android)

Student has to learn basic Windows and Linux/Ubuntu shell commands and have to develop simple shell script.

Journal is to be prepared covering the topics of demonstration and report about process / methodology /

inspection for making jobs.

Major Equipment: Lathe machine, drilling machine, grinding machine, Resistance and Arc Welding machine, Hacksaw machine, Fitting, Carpentry and Plumbing vice, various types of files for fitting shop, hand hacksaw, monkey spanner, die, chisels, jack plane, furnace, anvil, different types of hammers for various shops, tongs, scissors, hand shear machine, sheet cutter, welding goggles, welding gloves, Soldering iron, Moulding box, different wooden/ metal patterns.

List of Open Source Software/learning website: http://nptel.iitm.ac.in/courses.php

Reference Books:

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2. Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGraw Hill House, 2017.
3. Workshop Technology Vol. 1 and 2 by Raghuvanshi B.S. Dhanpat Rai & Sons1998
4. Workshop Technology by Chapman W.A. J and Arnold E. Viva low priced student edition, 1998
5. Workshop Practices, H S Bawa, Tata McGraw-Hill,2009

P.S: Out of 13 activities, college has to opt for any 8 activities for a specific branch.

Each activity will be of 4 hours per semester.