



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (CSE, IT, ECE, EEE & ME)

Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada

L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

## DEPARTMENT OF MECHANICAL ENGINEERING

### ENGINEERING WORKSHOP

**Lab Introduction:** Mechanical Engineering Workshop is a place of where students acquire knowledge on the operation of various process involved in manufacturing and production. The workshop practice course makes students competent in handling practical work in engineering environment. Mechanical Engineering workshop is also involved in different maintenance/ repair works for college.

In LBRCE we have a modern workshop facility which supports the teaching and research activities of the engineering. The workshop covers an area of approx. 484.8 Sqm and has a dedicated staff of 2 workshop technicians. The primary function in this lab is to manufacture the engineering components from student/staff designs.

Equipment in this laboratory includes Drilling Machine, Wood Planer, Wood Turning Machine, A.C Welding sets, D.C Welding set, Spot Welding, Tig-Welding, Hydraulic Press, Power Hacksaw and general fabrication facilities.

The workshop supports teaching activities in the engineering by providing demonstrations of trades and other manufacturing processes and by manufacturing equipment used in teaching and research laboratories. Workshop facility plays an important role in the design phase of nearly all work related to manufacturing. Workshop staff assist both undergraduate and postgraduate students with all aspects of their designs, including material selection, design optimisation etc.

The workshop manufactures fixtures and apparatus for the following groups/areas:

- Undergraduate laboratory activities and development.
- 4th year undergraduate projects.
- Postgraduate research projects.
- Staff research projects.

Along with work from the above areas our workshop is occasionally requested to manufacture components for staff researchers of other schools and research centres.

### R17 Regulations

### CEO & COs:

**PRE-REQUISITES:** Knowledge in dimensions and units, Usage of geometrical instruments and analytic salability.

### **COURSE EDUCATIONAL OBJECTIVE:**

The objective of this course is to get familiarized with various trades used in Engineering Workshop and learn the safety pre-cautions to be followed in the workshops, while working with the different tools.

**COURSE OUTCOMES:** After completion of the course students are the able to:

**CO1 :** Design and model different prototypes in the carpentry trade such as Cross lap joint, Dove tail joint.

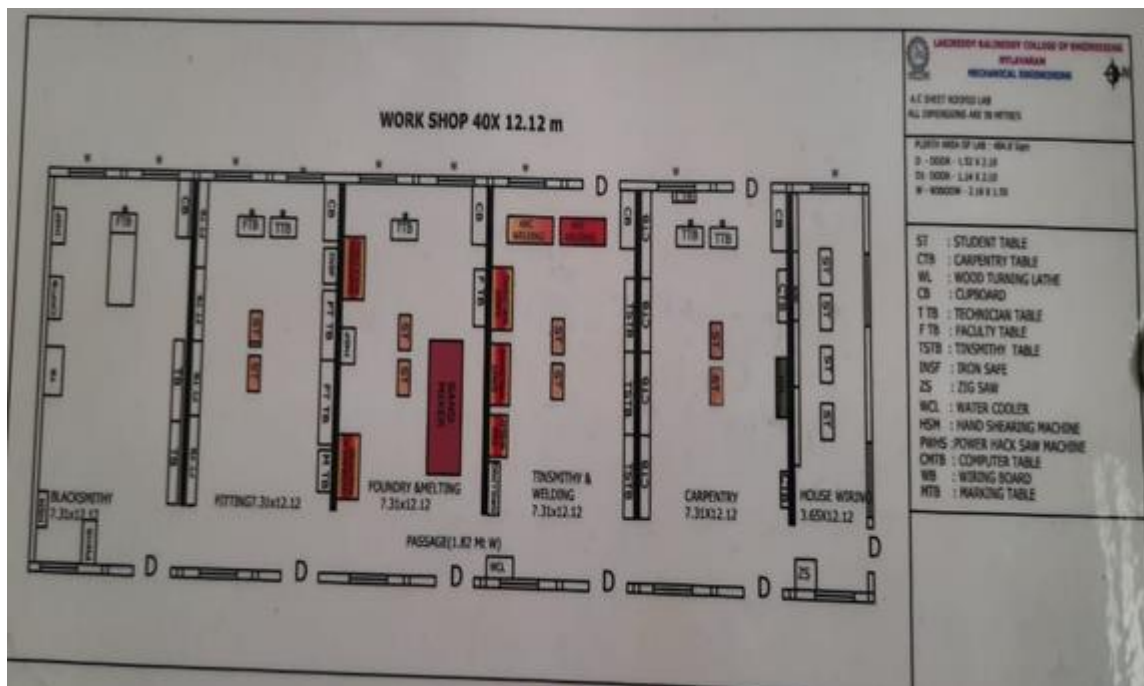
**CO2 :** Fabricate and model various basic proto types in the trade of fitting such as Straight fit, V- fit.

**CO3 :** Produce various basic proto types in the trade of Tin smithy such as rectangular tray and open Cylinder

**CO4 :** Perform various basic House Wiring techniques.

(Conduct at least 4 Trades with 2 exercises from each Trade and demonstrate about 2 Trades)

### Lab Layout:



### LIST OF EXPERIMENTS:

1. CARPENTRY TRADE : 1. Middle lap joint  
: 2. Dovetail joint  
: 3. T – Bridle joint
2. FITTING TRADE : 1. Square and L Fitting  
: 2. Square and T Fitting  
: 3. Square and V Fitting
3. House Wiring trade : 1. Two lights controlled by one switch  
In series and parallel circuits  
: 2. Calling circuit  
: 3. Florescent lamp circuit
4. Plumbing : 1. Pipe thread cutting  
: 2. Pipe joint making  
: 3. Pipeline layout
5. Tinsmithy : 1. Tray making  
: 2. Part of cone

6. Blacksmithy

: 1. S- hook

: 2. Chisel

**Equipment details in WORKSHOP Laboratory:**

S. No.	Description of the Equipment	S.R. Page No.	Qty.	Purchase date	Amount
1	Carpentry Vices 6"	05	06	22-09-98	3,202/-
2	Carpentry Vices 6"	05	04	22-09-98	1,501/-
3	Carpentry Vices 6"	05	04	02-01-05	2,900/-
4	Carpentry Vices 6"	05	06	26-08-06	4,516/-
5	Carpentry Vices 8"	05	08	08-10-09	8,985/-
6	Carpentry Vices 8"	05	12	31-01-12	23,814/-
7	Carpentry vices 9"	69	5	26-11-15	8,562/-
8	Jackplanes	06	07	22-09-98	1,257/-
9	Marking gauges	07	06	22-09-98	217/-
10	Steel rules	08	30	22-09-98	1,632/-
11	Tri squares	09	35	13-10-10	1,950/-
12	Hand saws	10	10	22-09-98	708/-
13	Hand saws	10	8	08-10-09	541/-
14	Hand saws	10	15	13-10-10	1,014/-
15	Ballpeen hammers 1.5"L.B.	11	10	22-09-98	816/-
16	900 gr Sledge hammers	11	3	25-11-16	795/-
17	1350gr.Slodge hammers	11	3	25-11-16	972/-
18	1800gr.Slodge hammers	11	3	25-11-16	1,440/-
19	450gr. Claw hammers	11	5	25-11-16	1,300/-
20	¼ Mortise chisels	12	10	22-09-98	217/-
21	12mm Mortise chisels	12	02	18-11-99	50/-
22	¼ Mortise chisels	12	08	08-10-09	240/-
23	12mm Mortise chisels	12	15	13-10-10	525/-
24	1" Firmer chisels	13	10	22-09-98	218/-
25	1" Firmer chisels	13	2	18-11-99	50/-
26	1" Firmer chisels	13	08	08-10-09	292/-
27	1.25" Firmer chisels	13	15	13-10-10	858/-
28	¼ Mortise chisels	12	30	28-11-15	1,350/-
29	1" Firmer chisels	13	30	28-11-15	1,350/-
30	6" Triangular files	14	20	22-09-98	1,111/-
31	6" Triangular files	14	6	20-08-03	324/-
32	6" Triangular files	14	10	20-01-05	300/-
33	6" Triangular files	29	12	16-07-07	576/-
34	6" Triangular files	19 R1	30	26-10-17	1,557/-
35	Oil stones	15	10	22-09-98	1,089/-
36	Oil stones	15	4	25-11-16	798
37	6" Dividers	16	30	22-09-98	653/-
38	12" Dividers	16	10	22-09-98	435/-

39	Centre punches	21	10	22-09-98	163/-
40	Centre punches	21	20	28-11-15	631/-
41	½ L.B. Ballpeen hammers	22	10	22-09-98	381/-
42	½ L.B. Ballpeen hammers	22	10	29-01-01	450/-
43	½ L.B. Ballpeen hammers	22	08	08-10-09	1,040/-
44	12'' Hacksaw frames	23	10	22-09-98	544/-
45	12'' Hacksaw frames	23	06	28-08-02	266/-
46	12'' Hacksaw frames	23	06	26-0806	390/-
47	12'' Hacksaw frames	23	06	22-10-08	312/-
48	12'' Hacksaw frames	23	12	08-10-09	936/-
49	12'' Hacksaw frames	23	15	13-10-10	1,638/-
50	12'' Hacksaw frames	23	10	28-11-15	2,310/-
51	6'' Half round files	24	10	22-09-98	1,296/-
52	6'' Half round files	24	06	20-08-03	600/-
53	6'' Half round files	24	15	13-10-10	2,535/-
54	6'' Half round files	24	25	28-11-15	5,827/-
55	8'' Square files	25	10	22-09-98	871/-
56	8'' Square files	25	06	20-08-03	450/-
57	8'' Square Files	25	15	25-11-16	4,567/-
58	6'' Round files	26	10	22-09-98	817/-
59	6'' Flat files (Smooth)	27	10	22-09-98	631/-
60	6'' Flat files (Smooth)	27	06	20-08-03	192/-
61	6'' Flat files (Smooth)	27	30	13-10-10	3,780/-/-
62	6'' Flat files (Smooth)	27	30	28-11-15	5,034/-
63	8'' Flat files (Smooth)	27	15	25-11-16	4,204/-
64	12'' Flat files (Rough)	28	10	22-09-98	1,002/-
65	12'' Flat files (Rough)	28	06	20-08-03	570/-
66	12'' Flat files (Rough)	28	15	13-10-10	1,980/-/-
67	12'' Flat files (Rough)	28	30	28-11-15	5,292/-
68	12'' Flat files (Rough)	28	15	25-11-16	4,095/-
69	12'' Flat files (Smooth)	29	10	22-09-98	1,764/-
70	12'' Flat files (Smooth)	29	06	20-08-03	960/-/-
71	12'' Flat files (Smooth)	29	09	16-07-07	2,142/-
72	12'' Flat files (Smooth)	29	15	13-10-10	3,405/-
73	6'' Scribers	30	10	22-09-98	163/-
74	1 L.B. Ballpeen hammers	31	20	22-09-98	1,415/-
75	Nylon mallets	32	10	22-09-98	762/-
76	Nylon mallets	32	10	18-10-09	832/-
77	Nylon mallets	32	15	13-10-10	3,795/-
78	Tin cutters	33	10	22-09-98	708/-
79	Tin cutters	33	03	29-01-01	180/-
80	Tin cutters	33	03	22-10-08	390/-
81	Tin cutters	33	15	25-11-16	4,961/-
82	Bench vices4''	34	07	22-09-98	4,345/-
83	Bench vices 4.5''	34	04	22-09-98	2,802/-
84	Bench vices 4''	34	09	22-09-98	5,855/-

85	Bench vices No.5	34	06	08-10-09	16,556/-
86	Bench vices 4"	34	03	25-11-16	11,812/-
87	Cutting Players	35	10	22-09-98	1,361/-
88	Cutting Players	35	06	23-11-15	1,071/-
89	Cutting Players	35	06	25-11-16	1,247/-
90	Side cutting players	37	10	22-09-98	762/-
91	Pokers	38	10	22-09-98	424/-
92	12" Screw drivers	39	10	22-09-98	544/-
93	12" Screw drivers	39	10	26-10-17	980/-
94	6" screw drivers	39	10	29-01-01	160/-
95	6" screw drivers	43 R1	08	26-10-17	304/-
96	2' Pipe wrench	42	01	22-09-98	550/-
97	18" pipe wrenches	42	01	22-09-98	560/-
98	Pipe vice	43	01	22-09-98	570/-
99	Pipe vice & Die collars	60	01	07-11-05	4,026/-
100	Pipe vice	44	01	13-10-10	2,740/-
101	Pipe die set	44	01	22-09-98	412/-
102	Ratchet die set	44	02	13-10-10	4,400/-
103	Hand drill	45	01	22-09-98	5,555/-
104	Hand Drill	47 R1	01	26-10-17	3,717/-
105	Sander polisher	46	01	22-09-98	11,388/-
106	Hand Grinding Machine	80 R1	01	26-10-17	2,832/-
107	Anvils	47	02	04-01-99	4,180/-
108	Molding boxes	48	20	04-01-99	8,000/-
109	Blower	49	01	04-01-99	1,000/-
110	Power blower	49	01	08-11-04	2,592/-
111	Basolas	50	02	18-11-99	150/-
112	Jig saw machine & motor	51&52	01	22-10-99	10,600/-
113	Jenny calipers	55	08	20-01-05	360/-
114	Wood planner	57	01	07-11-05	21,339/-
115	Plumbing set	59	01	07-11-05	1,429/-
116	Granite surface plate	63	01	16-12-08	9,360/-
117	Vernier height gauge	63	01	16-12-08	16,845/-
118	Cutoff machine	67	01	13-10-10	12,800/-
119	Pillar Drilling Machine	73	01	26-11-15	21,840/-
120	Vernier calipers	81R1	02	26-10-17	1,500/-
121	Nose players	82R1	10	26-10-17	1,581/-
122	Tile cutter	83	01	26-10-17	3,776/-
123	4" Machine vice	84R1	01	26-10-15	5,015/-
124	Cutting Players	92	5	16-08-18	950/-
125	Flat spanner set	93	2	16-08-18	572/-
126	Vernier Height gauge	55	01	16-08-18	9,850/-
127	12" Screw spanner	93	01	16-08-18	350/-
128	6" Screw drivers	43	10	16-08-18	570/-
129	2" pipe wrenches	46	2	16-08-18	1,050/-
130	Rachet die sets	86	2	16-08-18	3,800/-

131	Leg vise	86	1	16-08-18	3,900/-
132	Electronic Weighing machine	100	1	16-08-18	2,832/-
133	Cutting players	38	12	13-02-21	2,832/-
134	Flat and Ring spanner set	93	2	13-02-21	1,015/-
135	10" Sheet cutters	45	4	13-02-21	2,312/-
136	12" & 18" Pipe wrenches	87	2	13-02-21	1,180/-
137	½ LB ball peen Hammers	25	10	13-02-21	1,475/-
<b>Total</b>					<b>3,71,162/-</b>

### List of Experiments in Production Technology Lab:

1.	Preparation of desired object by using injection molding process
2.	Design and preparation of pattern
3.	Preparation of sand specimen using sand rammer
4.	Determination of sand strengths using universal sand strength machine
5.	Determination of permeability number using permeability tester
6.	Preparation of mould cavity using green sand
7.	Demonstration on core making process
8.	Casting of dumbbel shape
9.	Demonstration on gas welding process
10.	Preparation of V-butt & T-joints using arc welding
11.	Demonstration on tungsten inert gas (TIG) welding
12.	Preparation of chain joint using spot welding techniques
13.	Preparation of zig-zag joint using spot welding techniques

### Equipment details in Production Technology Laboratory:

S. No.	Description of the Equipment	S.R. Page No.	Qty.	Purchase date	Amount
1	Power Hacksaw	10	01	05-10-00	11,000/-
2	Spot welding Machines	5	02	03-01-01	34,070/-
3	Hand operated Hydraulic press	26	01	21-02-06	46,828/-
4	A.C. to D.C Welding rectifier	27	01	21-02-06	35,381/-
5	Hand shearing Machine	28	01	01-08-06	21,319/-
6	TIG Welding set	29	01	12-03-07	77,760/-
7	Universal Sand strength Equipment	30	01	16-03-07	82,449/-
8	Hand operated plastic injection machine	03	01	20-09-00	5,300/-
9	Wood Turning lathe	09	01	17-05-01	8,373/-
10	Arc welding machines	01	02	20-09-00	18,928/-
11	Inverted arc welding machines	64-R1	02	17-10-17	15,930/-
12	Gas welding machines	07	01	03-01-01	8,517/-
13	Oxygen and Argon cylinders	07	2	25-03-15	33285/-
14	Metal sheet cutter	11	01	14-10-04	200/-
15	Tin cutters	11	15	14-10-04	1,014/-
16	Injection moulding dies	13	02	18-02-02	2600/-
17	Hand grinding machine	15	01	13-11-03	3,200/-

18	Welding domes	17	02	06-07-05	8,101/-
19	Wooden moulding boxes	19	12	27-05-07	1660/-
20	Cutting pliers	21	02	14-10-04	280/-
21	Steel rules	23	30	14-10-04	1200/-
22	Flat wrench set	24	01	14-10-04	380/-
23	Tri square	25	15	14-10-04	450/-
24	Weighing machine (500 gms)	32	01	16-07-07	366/-
<b>Total</b>					<b>4,18,591/-</b>

### **WORKSHOP PHOTOGRAPHS:**

#### **FITTING SECTION:**

Fitting is a place where fitting or assembling work is carried out. Some repair/ maintenance and die punch work is also carried out in fitting shop



#### **CARPENTRY SECTION:**

The wood is obtained from trees. In wood workshop students are trained to work on wooden jobs by using various hand tools and machines



### **TIN SMITHY SECTION:**

Many Engineering and household articals such as boxes, cans funnels, ducts etc. are made from flat sheet of metal: the process being known as a Tinsmithy



### **WELDING SECTION:**

It is the process of permanent fastening where two metals are fused at the temperature of 3200 Degrees (when metals are melted). The most common types of welding are 1. Electric arc welding, 2. Resistance welding, 3. Tigwelding, 4. Gas welding.





### **HOUSE WIRING SECTION:**

Electrical wiring is system of electric conductors, components and apparatus, for conveying electric power from the source to the point use. The wiring must be designed to provide constant voltage to the load.



### **PLUMBING & MOULDING SECTION:**

Plumbing deals with the laying of pipelines. Pipeline provides the means of transporting the fluid. It is obvious that laying – Out pipeline, requires a number of joints to be made and a number of valves incorporated, while connecting different lengths of pipes. Plumbing does not require many tools except pipe wrenches, hacksaw, pipe cutter, threading equipment and pipe vice.



Foundry is one of the manufacturing by which a desired shape of metal is obtained by heating up to its molten state (Liquid state and pouring in to mould cavity. After some time metal is allowed to cool and solidify. The solidified piece of metal is known as casting



## **ARC WELDING MACHINES:**



### **Technical specifications:**

Operating system	: A.C. Operating with oil cooled
Machine capacity	: 1Ph, 220v, 50Hz, 20Amps
Maximum applicable current	: 350Amps
Maximum applicable electrode	: 8Gauge
Maximum applicable current	: 50Amps
Make	: Universal machine tools crop, Bangalore

### **A.C. to D.C Welding Rectifier:**

Operating system	: A.C. Operating with air cooled
Machine capacity	: 1Ph, 220v, 50Hz, 20Amps
Maximum applicable current	: 350amps
Maximum applicable electrode	: 8 Gauge
Maximum applicable current	: 50 amps
Make	: Universal machine tools crop, Bangalore

## TIG WELDING MACHINE:



### Technical Specifications:

Operating system	: A.C Operating with air cooled
Machine capacity	: 1 Ph, 220v, 50Hz, 20Amps
Maximum Applicable current	: 350Amps
Maximum Applicable electrode	: 3mm
Minimum applicable current	: 50Amps
Make	: Universal machine tools corp, Bangalore

## **SPOT WELDING MACHINE:**



### **Technical Specifications:**

Operating system	: A.C. operating with air cooled
Machine capacity	: 1 phase, 220v, 50Hz, 16Amps
Maximum applicable current	: 18 amps
Maximum applicable thickness	: MS. 0.6 to 1.6mm, Br. 0.1 to .6mm, SS. 0.1 to 1.2mm
Minimum applicable thickness	: 0.1mm
Applicable materials	: MS and Brass, SS
Make	: Universal machine tools corp, Bangalore

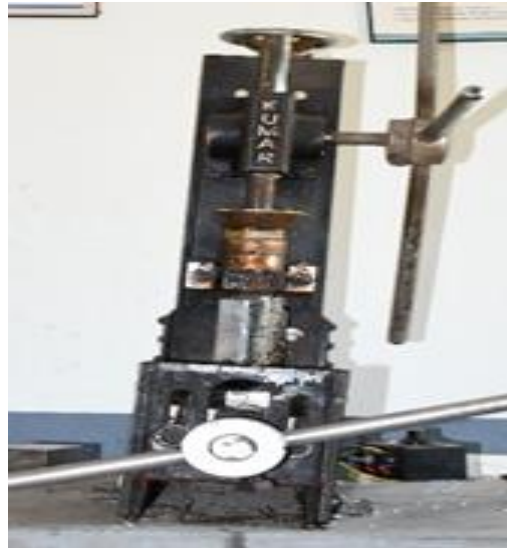
### **Pillar Drilling Machine:**



### **Technical Specifications:**

Specifications	: Size 25mm
Table working space	: 335 mm
Base working surface	: 318 x300mm
Number of spindle speeds	: 5
Range of spindle speed (RPM)	: 400-520-675-88-1142
Make	: KMT

### **Injection Moulding Machine:**



### **Technical Specifications:**

Operating System	: A.C Operating with Air cooled
Machine Capacity	: Single Phase, 220v, 50Hz, 10Amps
Capacity of tank	: 500 Gms
Applicable Material	: PVC
Maximum Travel of Rack	: 50mm
Make	: Kumar Machinery corporation

### **Hydraulic Press:**



### **Technical Specifications:**

Operating System:	: Hand operated Hydraulic loading
Maximum applicable load	: 25 Tonnes
Distance between columns	: 850 x 250mm
Distance between RAM to BED	: 175 x800mm
Travel of RAM:	: 125mm
Punch Dia	: 61mm
Applications	: Punching, Dyeing, compressing and Ejecting
Make	: Universal Machine tools corporation, Bangalore.

### **Wood Turning lathe:**



### **Technical Specifications:**

Operating system	: A.C. Power operating
Motor capacity	: 1 HP, 3Ph, 440v, 50Hz, 6A, 1500 RPM
Type of applications	: Revolving
Maximum Depth of cutting	: 12mm
Maximum length of turning	: 1200mm
Maximum speed of turning	: 4500 RPM
Maximum turning of Dia	: 150mm
Applications	: Circular, conical, cylindrical, grooving, and chamfering
Applicable material	: Wood, Wax, plastic
Make	: Jaya Machinery corporation, Rajkot

### **Zig Saw Machine:**



### **Technical specifications:**

Operating system	: AC, power operating
Motor capacity	: 1Hp, 1 Ph, 220V, 50Hz, 16 Amps, 1500 rpm.
Type of application	: To cut complicated patterns and shapes
Maximum Depth of cutting	: 50mm thickness
Maximum applications	: Different shapes in internal and external shapes
Applicable materials	: wood, PVC, Acrylic board, hylum sheets
Weight Approx	: 100 kgs
Make	: Jaya Machinery corporation, Rajkot

### **HAND SHEAR MACHINE:**



### **Technical specifications:**

Operating system	: Hand operating
Machine capacity	: Maximum 8mm thickness cutting.
Type of application	: To cut Anglers, Rounds, Square rods, Metal sheets
Maximum Depth of cutting	: 8mm thickness
Applicable materials	: MS, SS, Aluminium, Copper, Brass sheet Metals
Weight Approx	: 50 kgs
Model	: 10/ ch
Make	: Universal Machine tools corporation, Bangalore.

### **Power Hacksaw:**





**Technical specifications:**

Operating system : A.C, power operating  
Motor capacity : 1Hp, 3 Ph, 415V, 50Hz, 6 Amps, 1000 rpm.  
Type of application : To cut metals  
Maximum Depth of cutting : 50mm thickness  
Applicable materials : Wood and Metals  
Weight Approx : 100 kgs  
Make : Jaya Machinery corporation, Rajkot

**Universal Sand Strength machine:**



**Technical specifications:**

Operating system : Manual operating  
Motor capacity : 1Hp, 3 Ph, 415V, 50Hz, 6 Amps, 1000 rpm.  
Type of application : Conducting compression, shear, tensile, transverse tests  
Maximum Depth of cutting : 50mm thickness  
Applicable materials : Different types of sands  
Weight Approx : 50 kgs  
Model : FST-4  
Make : PSI sales pvt. Limited, New delhi

**Permeability Meter:**



**Sand Rammer:**



**Technical Specifications:**

**Model : FST-2**

**Laboratory Utilization:**

<b>S. No</b>	<b>Laboratory Name</b>	<b>Branch(s)</b>
1	Enineering Workshop Practice	B.Tech I Semester (ME)
2	Enineering Workshop Practice	B.Tech I Semester (EEE)
3	Enineering Workshop Practice	B.Tech I Semester (CIV)
4	Enineering Workshop Practice	B.Tech I Semester (ASE)
5	Enineering Workshop Practice	B.Tech II Semester (ECE)
6	Production Technology Laboratory	B.Tech IV Semester (ME)
7	Production Technology Laboratory	B.Tech III Semester (ASE)

**Lab In-charge:**

**Faculty in-charge:** SEELAM SRINIVASA REDDY *M.Tech*

**Sr.Technician:** G.RAVINDRA REDDY

**Lab Assistant:** P. MANIKYALA RAO