

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bangalore

Prerequisites: Theoretical concepts Work shop technology

	Course Title: MECHANICAL WORK SHOP PRACTICE		
	Scheme (L:T:P) : 0:2:4	Total Contact Hours: 78	Course Code: 15ME06P
	Type of Course: Tutorial and practice	Credit : 03	Core/ Elective: Core(practice)
CIE- 25 Marks		SEE- 50 marks	

Course Objectives:

1. To understand basic Metal fabrication processes
2. To understand various Metal removal operations and Procedure protocols.

On successful completion of the course, the students will be able to attain CO:

Course Outcome		CL	Linked practices	Linked PO	Teaching Hrs
CO1	Acquire Metal fabrication skill by Welding for a given Automobile job and various sheet metals joint for required applications /Utility items	<i>U/A</i>	ALL welding and sheet metal excises	1,2,3,4,5,6,8,9,10	40
CO2	Demonstrate and prepare various Foundry operations for required applications	<i>U/A</i>	ALL foundry shop excisess	1,2,3,4,5,6,8,9,10	12
CO3	Acquire metal shaping process skill by Forging for a given job	<i>U/A</i>	ALL forging shop excisess	1,2,3,4,5,6,8,9,10	26
			Total sessions		78

COURSE-PO ATTAINMENT MATRIX

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
MECHANICAL WORK SHOP PRACTICE	3	3	3	3	3	3	-	3	3	3



Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If $\geq 40\%$ of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If $< 5\%$ of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

COURSE CONTENT

Unit No	Unit Name	Hour
1	WELDING AND SHEET METAL PRACTICE	40
2	FOUNDRY PRACTICE	12
3	FORGING PRACTICES	26
	Total	78

UNITI: WELDING AND SHEET METAL PRACTICE

40Hrs

Demonstration and detailed explanation of tools and equipment used-Description and specification of welding transformer, gas welding machine-various types of welding machine like TIG/MIG equipments-Welding joints-Bending operation, upsetting operation,-Safety measures to be observed in the smithy shop

HANDS-ON-EXERCISE

Job I: Simple job on butt joint.

Job II: Simple job on Lap joint

Job III: Simple job on T joint and Lap joint

Introduction and demonstration of hand tools used in sheet metal shop.- different types of hammers, hard and soft mallet, sheet and wire gauge,- demonstration of various raw materials used in sheet metal shop e.g. M.S. sheet, galvanized-iron plain sheet, galvanized corrugated sheet, aluminum sheets etc.

HANDS-ON-EXERCISE

Job I: Practice on making single riveted lap joint/double riveted lap Joint.

Job II: Practice on making single cover plate chain type, seam joint and Preparation of any one utility articles

UNITII: FOUNDRY SHOP

12Hrs

Study of Foundry Tools and Equipment-Sand Mixing, Study of cope and drag-Practice in a single box-Cutting Practice by double box

Hands on Experience

Preparation of moulds-

Job I: Hexagon, Square and Circular Mould

JobII: Combination of Hexagon with Square or Circular Mould

JobIII: Flange coupling, V – Pulley/ Gear pulley by using pattern



Demonstration and detailed explanation of tools and equipment used-Description and specification of anvils, swage blocks, hammers, tongs, fullers, swages -Forging operations in smithy shop-Bending operation, upsetting operation,-Safety measures to be observed in the smithy shop

Hands on Experience

Job I: To forge a L-hook.

Job II: To prepare a job involving upsetting process

Job III: To forge a chisel

Resource:**Text books;**

Elements of Workshop Technology (Vols.I and II) by Hajrachaudhary

SUGGESTED LIST OF STUDENT ACTIVITIES

1	Take the students for local body building works observe the sheet metal practices followed in body building works and discuss different operations being carried out there.
2	Ask the students to observe the Welding operations carried out in local garages
3	Ask the students to observe the forging operations carried out in local vicinity
4	Ask the students to observe the foundry operations carried out in local vicinity

Course Delivery:

1. The course will be delivered through Demonstration and Shop practices.
2. Show video/animation films of different Welding/sheet metal/Machine tool operations to explain proper procedures and to make concepts more clear.



MODEL OF RUBRICS FOR ASSESSING STUDENT ACTIVITY

Dimension	Scale					Students Score				
	Unsatisfactory	Developing	satisfactory	Good	Exemplary	1	2	3	4	5
1. Research and gather information	Does not collect information relate to topic	Collects very limited information, some relate to topic	Collects basic information, most refer to the topic	Collects more information, most refer to the topic	Collects a great deals of information, all refer to the topic	1				
2.Full fills teams roles and duties	Does not perform any duties assigned to the team role	Performs very little duties	Performs nearly all duties	Performs almost all duties	Performs all duties of assigned team roles	2				
3.Shares work equally	Always relies on others to do the work	Rarely does the assigned work, often needs reminding	Usually does the assigned work, rarely needs reminding	Always does the assigned work, rarely needs reminding.	Always does the assigned work, without needing reminding	3				
4. listen to other team mates	Is always talking, never allows any one to else to speak	Usually does most of the talking, rarely allows others to speak	Listens, but some times talk too much,	Listens and talks a little more than needed.	Listens and talks a fare amount	4				
Grand Average/Total=1+2+3+4/4=10/4=2.5=3						3				

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment meth	CIE	IA	Students	Student activities	10	Report	1,2,3,
				Record (Average marks rounded off to the next higher digit)	15	Graded exercises	1,2,3,
	SEE	End Exam		End of the course	50	Answer scripts at BTE	1,2,3,
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1,2,3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3, Effectiveness of Delivery of instructions & Assessment Methods

*CIE – Continuous Internal Evaluation

*SEE – Semester End Examination

Note:

- Rubrics to be devised appropriately by the concerned faculty to assess Mini project/Student activities.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	% Weightage
1	Understanding	40
2	Applying the knowledge acquired from	45
3	Analysis	10
4	Evaluation & Creating new knowledge	05

Note to IA verifier: The following documents to be verified by CIE verifier at the end of semester

- Student suggested activities report for 10 marks
- Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.



Scheme of Valuation for End Examination

Note: Any one model from Welding and sheet metal or Foundry or Forging practice

Serial no	Description	Marks
1	Listing of tools & operations required for performing job	05
2	Marking of job	05
3	Operation performed	10
4	Dimensional accuracy of job	10
5	Finishing of job	10
6	Viva	10
	TOTAL	50

EQUIPMENT LIST:

A: WELDING

Sl. No	Name of equipment(Welding shop)	Number
1.	Arc welding transformer upto 300Amps	03
2.	Welding shield	20
3.	Ball peen Hammer 11/2 Lbs	10
4.	Chipping Hammer	10
5.	Wire brush	10
6.	Anvil	01
7.	Hand Gloves	05
8.	Flat tongs	10



9.	Steel scale	10
10.	Flat file 14" rough bastard file	10
11.	Oxygen cylinder	01
12.	Acetylene cylinder	01
13.	Gas welding torch	05
14.	Spark lighter	05
15.	Gas welding goggles	10
16.	Gas cutting torch	02

FOR SHEET METAL PRACTICE

SL.NO	NAME OF THE EQUIPMENT	NO. OF STUDENTS/BATCH	NO.OF EQUIPMENT REQUIRED
01	Steel Rule	20	20
02	Try square	20	20
03	Scriber	20	20
04	Shearing machine	20	04
05	Snip	20	20
06	Mallet	20	20
07	Bench vice	20	10
08	Stacks	20	04

FOR FORGING PRACTICE

SL.NO	NAME OF THE EQUIPMENT	NO. OF STUDENTS/BATCH	NO.OF EQUIPMENT REQUIRED
01	Open hearth furnace	20	04
02	Flat tongs	20	20
03	Round tongs	20	20
04	Anvil	20	05
05	Sledge hammer	20	20
06	Flatener	20	20
07	Swage block	20	05



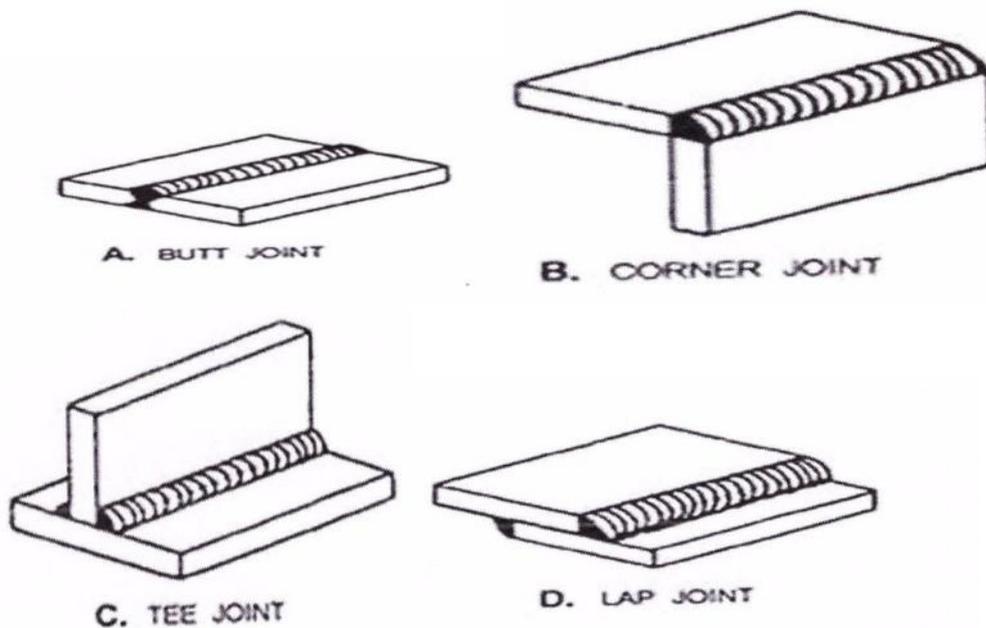
FOR FOUNDRY PRACTICE

SL.NO	NAME OF THE EQUIPMENT	NO. OF STUDENTS/BATCH	NO.OF EQUIPMENT REQUIRED
01	Moulding boxes	20	20
02	Rammer	20	20
03	Flatners	20	20
04	Steel rule	20	20
05	Try square	20	20
06	Trowel	20	20
07	Strike off bar	20	20
08	Showel	20	05

MODEL FOR PRACTICE

WELDING SHOP

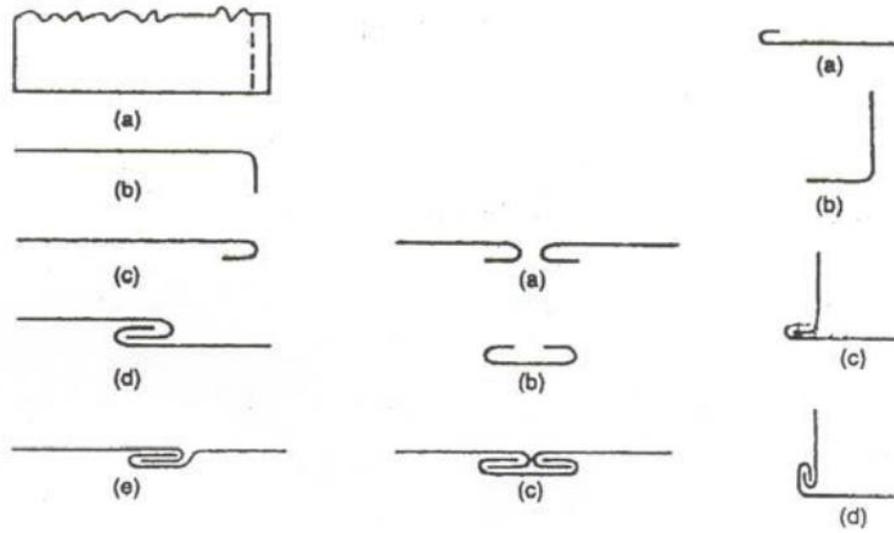
Copy the given sketch of the joint, and then make the joint using the given MS flat piece.



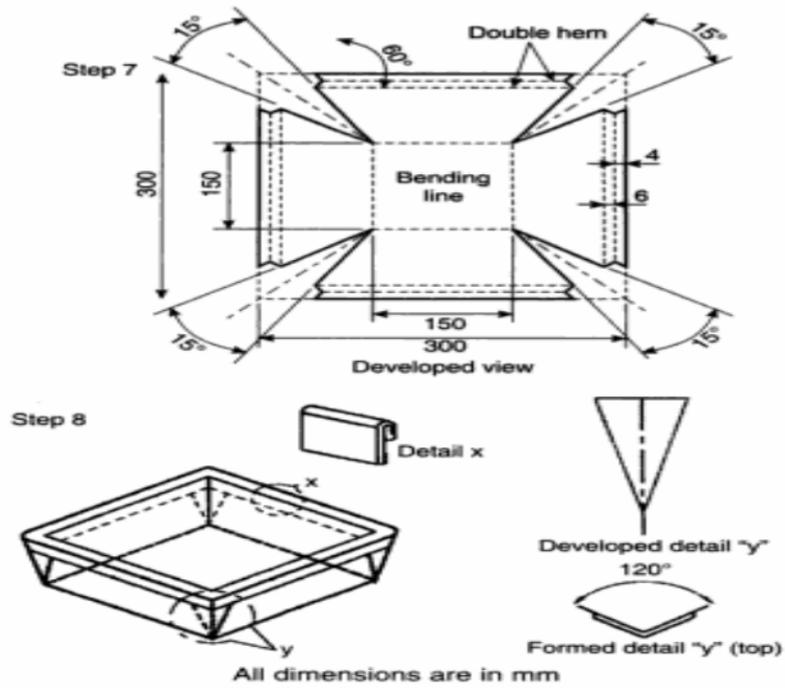
SHEET METAL SHOP

1. Make the joints as per the given sketch shown below

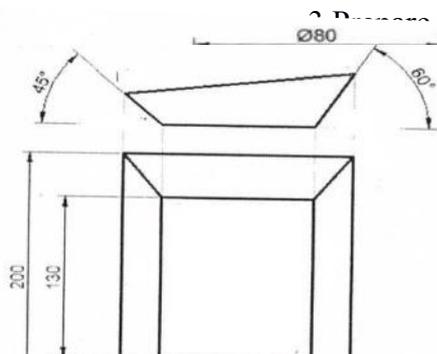




2. Prepare square container



2. Prepare the model as per the given sketch

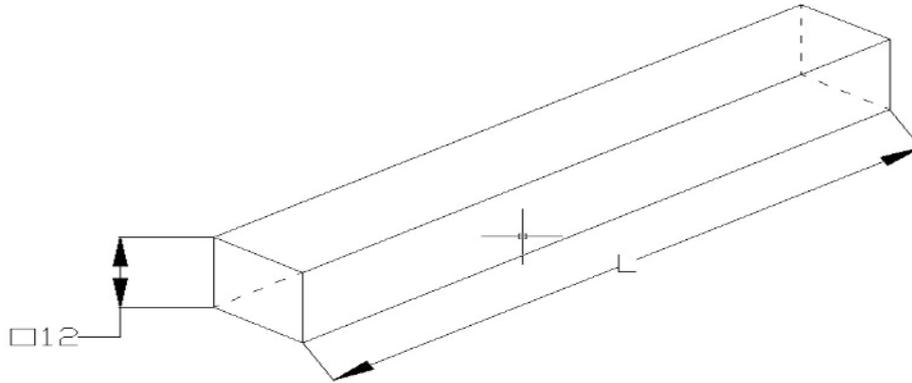


2. Prepare the model as per the given sketch

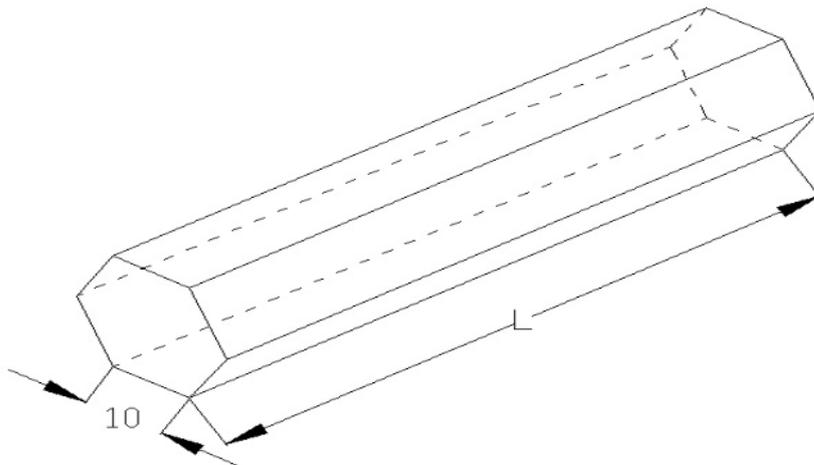


UNIT III: FORGING PRACTICE

1. Prepare the model as per the given sketch

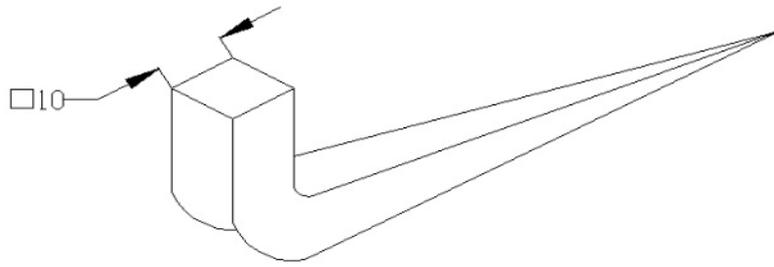


3. Prepare the model as per the given sketch



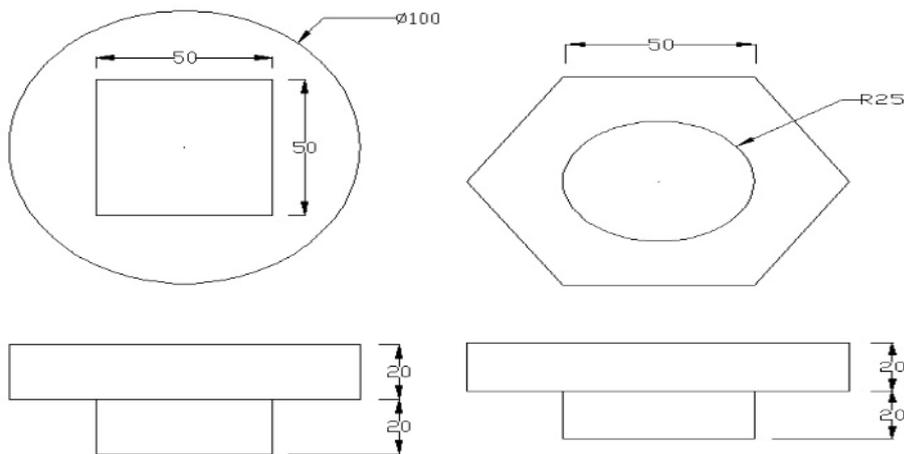
3. Prepare the model as per the given sketch





FOR FOUNDRYPRACTICE

- 1.Prepare the model as per the given sketch 2..Prepare the model as per the given sketch



- 3..Prepare the model as per the given sketch

