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

Course Title: Machine Shop		Course Code: 15MC46P
Mode(L:T:P) : 0:2:4	Credits:3	Core/ Elective: Core
Type of course: Tutorials and Practical's		Total Contact Hours: 78
CIE- 25 Marks		SEE- 50 Marks

Pre-requisites: Knowledge of Manufacturing Science

Course objectives: Understand the Constructional features of Machine tools, perform simple Metal Cutting operations

Course outcomes: At the end of the semester, students should be able to

1. Develop a model by demonstrating various Turning operation
2. Develop a model by demonstrating various Drilling operation
3. Develop a model by demonstrating various Milling operation

Course Outcome		Cognitive Level	Linked with PO	Teaching Hours
CO1	Develop a model by demonstrating various turning operation	*A*	1,2,3	42
CO2	Develop a model by demonstrating various drilling operation	*A*	1,2,3	12
CO3	Develop a model by demonstrating various Milling operation	*A*	1,2,3	24
		Total sessions		**78**

Legend: R; Remember, U: Understand A: Application

Mapping Course Outcomes with Program Outcomes:

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Machine Shop	**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 ≥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.

Contents

Unit-I

Turning practice

Demonstration and detailed explanation of lathe, work holding devices, Description and specification of Cutting tools required, Various Turning operations performed in lathe(Prepare at least ONE model involving the following operations. Facing, Plain Turning, Step Turning, Taper Turning, Knurling, Thread cutting) and Safety practices to be observed.

42Hours

Unit-II

Drilling Practice

Demonstration and detailed explanation of Radial drilling Machine, work holding devices, Description and specification of Cutting tools required, Various Drilling operations performed in Drilling machine (Prepare ONE model with two or three different sizes holes at different locations)

12Hours

Unit-III

Milling Practice

Demonstration and detailed explanation of Milling Machine, work holding devices, Selection and specification of Cutting tools required, Various Milling operations performed in Milling Machine (Prepare ONE model with square/hexagonal cross section from round bars with indexing and without indexing and ONE model on milling a key ways.

24Hours

Contents linked with CO and PO

Sl No	Machine Shop Practices	CO	PO
1	Demonstration and detailed explanation of lathe, work holding devices, Description and specification of Cutting tools required, Various Turning operations performed in lathe(Prepare at least ONE model involving the following operations. Facing, Plain Turning, Step Turning, Taper Turning, Knurling, Thread cutting) and Safety practices to be observed.	1	1,2,3
2	Demonstration and detailed explanation of Radial drilling Machine, work holding devices ,Description and specification of Cutting tools required, Various Drilling operations performed in Drilling machine (Prepare ONE model with two or three different sizes holes at different locations	2	1,2,3
3	Demonstration and detailed explanation of Milling Machine, work holding devices, Selection and specification of Cutting tools required, Various Milling operations performed in Milling Machine (Prepare ONE model with square/hexagonal cross section from round bars with indexing and without indexing and ONE model on milling a key ways	3	1,2,3

Student Activity

Activity No	Description of the Student Activity
1	visit local Machine shop, observe the Machining practices followed and submit a handwritten report of 2 to 3 pages
2	Get a simple component, observe the Various machining operations carried out in a component, draw a sketch, list the operations, machines and cutting tool used and submit a handwritten report of 2 to 3 pages

Note:

1. Group of max four students should do any one of the above activity or any other similar activity related to the course COs and get it approved from concerned Teacher and HOD.
2. No group should have activity repeated or similar
3. Teacher should ensure activities by group must cover all Cos
4. Teacher should asses every student by using suitable **Rubrics** approved by HOD

Rubrics

Dimension	Exemplary	Accomplished	Developing	Beginning	Roll No. of the Student				
	5/4	3	2	1	1	2	3	4	5
Organization	Information presented in logical, interesting sequence	Information in logical sequence	Difficult to follow presentation--student jumps around	Cannot understand presentation--no sequence of information	2				
Subject Knowledge	Demonstrates full knowledge by answering all class questions with explanations and elaborations	At ease with expected answers to questions but does not elaborate	Uncomfortable with information and is able to answer only rudimentary questions	Does not have a grasp of the information. Cannot answer questions about subject	3				
Graphics	Explain and reinforce screen text and presentation	Relate to text and presentation	Occasionally uses graphics that rarely support text and presentation	Uses superfluous graphics or no graphics	4				
Oral Presentation	Maintains eye contact and pronounces all terms precisely. All audience members can hear	Maintains eye contact most of the time and pronounces most words correctly. Most audience members can hear presentation	Occasionally uses eye contact, mostly reading presentation, and incorrectly pronounces terms. Audience members have difficulty hearing	Reads with no eye contact and incorrectly pronounces terms. Speaks too quietly	5				
Total Score=(2+3+4+5)=14/4=3.5=4									

Course Assessment Pattern

Particulars			Max Marks	Evidence	Course outcomes
Direct Assessment	**CIE**	Shop floor practice(Average marks of all models)	15	Models	1,2 &3
		Work shop dairy (Average marks of all models)	05	Work shop dairy	1,2 &3
		Student Activity	05	Student Activity Sheets	1,2 &3
	SEE	End of the course	50	Models and Answer scripts at BTE	1,2 &3
Indirect Assessment	**Student Feedback on course**	Middle of the course		Feedback forms	1 &2
		End of the course		Feedback forms	1,2 &3

***CIE** – Continuous Internal Evaluation ***SEE** – Semester End Examination

Note:

1. Rubrics to be devised appropriately by the concerned faculty to assess Student activities.

Scheme of valuation for SEE

Sl No	Description	Marks
1	Listing of tools & operations required for performing job	05
2	Marking of job	05
3	Operation performed	15
4	Dimensional accuracy of job	15
5	Finishing of job	10
	Total	**50**

Note: TWO Questions are to be set in following combination in the examination

Sl No	Description of Question pattern in SEE
1	Keyway milling with plain turning and thread cutting OR Hexagonal or square cross section milling on two sides showing indexing calculation along with plain and taper turning
2	Drilling a hole in a turning piece or separate work piece

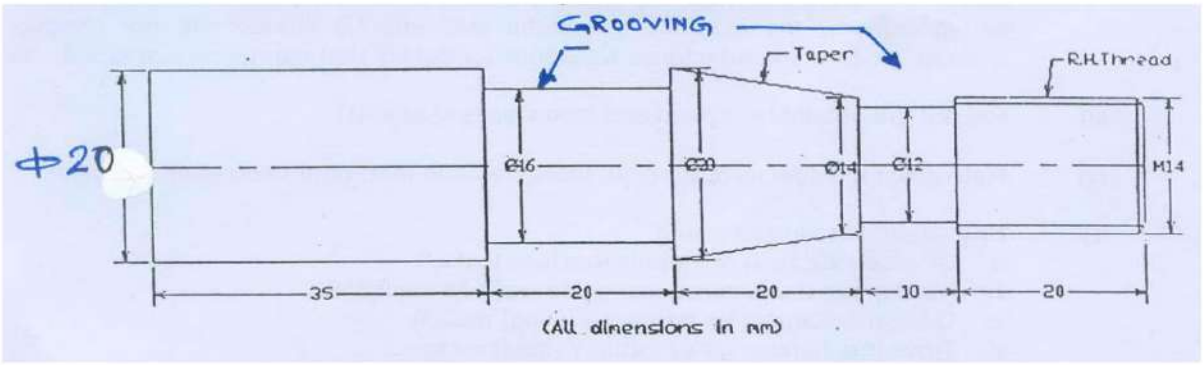
Machinery Requirement

1. Engine Lathe :10
2. Horizontal Milling Machine: 01
3. Vertical Milling Machine :01
4. Radial Drilling Machine :01

Models for Practice

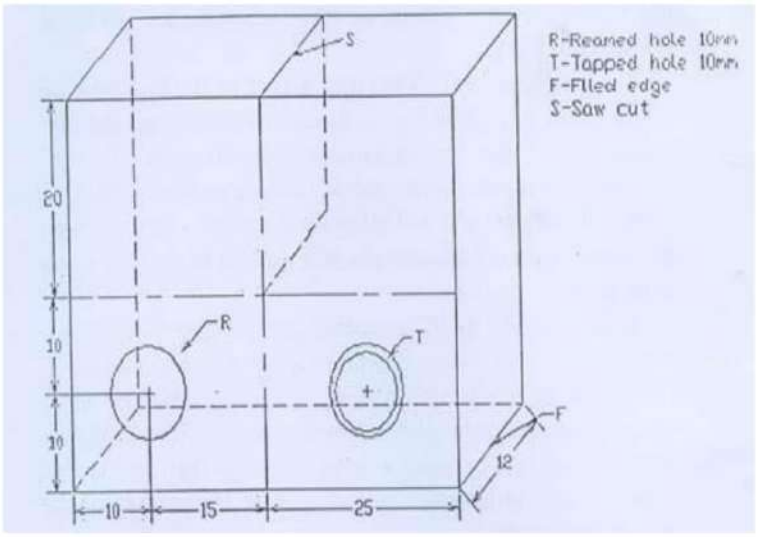
Unit - I
Turning Practice

1. Turn the part as shown in the sketch



Unit - II
Drilling Practice

1. Drill and Tap a hole as shown in the sketch



Unit –III
Milling Practice
(Note: One Model for Group of 05 Students)

1. Machine the hexagonal head and the slot as shown in the sketch