STUDY & EVALUATION SCHEME FOR CERTIFICATE PROGRAMME IN LATHE OPERATOR

Code	Units	Study Scheme Total Hrs		Credits	Marks Evaluation Scheme								Total Marks
					Internal Assessment			External Assessment					
		Th	Pr		Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
CMEE4-101	Communication Skills	8	-	1	25	-	25	25	1	-	-	25	50
CMEE4-101P	Communication Skills Lab.	-	24	1	-	25	25	-	-	50	3	50	75
CMEE4-102	Introduction	20	-	1	25	-	25	50	2	-	-	50	75
CMEE4-102P	Introduction Lab.	-	60	2	-	50	50	-	-	100	4	100	150
CMEE4-103	Lathe Machine & its Operations	30	-	1	25	-	25	50	2	-	-	50	75
CMEE4-103P	Lathe Machine & its Operations Lab.	-	92	3	-	50	50	-	-	100	4	100	150
CMEE4-104	Tool Geometry	32	-	1	25	-	25	50	2	-	-	50	75
CMEE4-104P	Tool Geometry Lab.	-	90	3	-	75	75	-	-	100	4	100	175
CMEE4-105	**S**afety	16	-	1	25	-	25	50	2	-	-	50	75
CMEE4-105P	**S**afety Lab.	-	92	5	-	75	75	-	-	100	4	100	175
CMEE4-106P	#Student Centre Activity	-	48	2	-	25	25	-	-	-	-	-	25
CMEE4-107P	+ 4 – week industrial training at the end of semester	-	-	4	-	-	-	-	-	100	3	100	100
	TOTAL	**106**	**406**	**25**	**125**	**300**	**425**	**225**	**-**	**550**	**-**	**775**	**1200**

SCA will comprise of co-curricular activities like extension lectures on entrepreneurship, Industrial tour, environment, sports, hobby club, such as, photography, etc., seminars, declamation contest, educational field visits, NCC, NSS, cultural activities, etc.

+ **Industrial Training**

Before completion of the semester, the students will go for training in a relevant industry/ field organisation for a minimum period of 4 weeks and prepare a diary. The student will prepare a report at the end of training. This report will be evaluated by the concerned instructor in the presence of one industry representative from the relevant trade/ field.

Total weeks per semester: 16, Total working days per week: 5, Total hours per day: 7, Total hours in a semester: 16x5x7 = 560

One credit is defined as one hour of lecture per week or two hours of practical per week in the programme.

GUIDELINES FOR ASSESSMENT OF STUDENT CENTRED ACTIVITIES (SCA)

The maximum marks for SCA should be 25. The marks may be distributed as follows: -

i) 5 marks for general behaviour and discipline
(by Principal or HOD in consultation with the instructor(s)/trainers)

ii) 5 marks for attendance as per following
(by the instructors/ trainers of the department)

a) Up to 75% Nil
b) 75% to 80% 02 marks
c) 80% to 85% 03 marks
d) Above 85% 05 marks

iii) 15 marks maximum for sports/ NCC/ NSS/ Cultural/ Co-curricular activities as per following:
(by In-charge of Sports/ Cultural/ NCC/ NSS/ Co-curricular activities)
15 marks - for National level participation or inter-university competition
10 marks - participation any two of the activities
05 marks - participation at the internal sports of the institute/college/university
Note: There should be no marks for attendance in the internal sessional of different subjects.

SALIENT FEATURES OF THE PROGRAMME

1	Sector	Mechanical Industry
2	Name of the certificate programme	Lathe operator
3	Entry qualification	Matriculation or equivalent NSQF level as prescribed by MRSPTU, Bathinda.
4	Duration of programme	Six (6) months
5	Intake	30
6	Pattern of programme	Semester pattern
7	NSQF level	Level III
8	Ratio of theory & practice	20:80

JOB ROLE AND JOB OPPORTUNITIES OF A LATHE OPERATOR

JOB ROLE

A Lathe operator is expected to perform following job roles in industry

- Should be familiar with Lathe Machine Operation.
- Attaches specified chuck or chuck jaws to headstock.
- Selects correct cutting tool, grinds it if necessary and holds it tight in tool post at correct height.
- Sets feed and speed and starts machine. Manipulates hand wheels or starts automatic controls to guide cutting tool into or along metal.
- Controls flow of coolant (cutting lubricant) on edge of tool.
- knowledge of machine drawings, fits and tolerances.
- Familiar with Boring, drilling, reaming, threading and tapping (both CGS & SI systems)
- knowledge of Material.
- Cleans and oils machine
- Preparation of tools for machining.
- Should have worked in reputed Machine Shop / Work Shop.
- Should meet all safety requirements while performing the work.

JOB OPPORTUNITIES

Lathe operator can get jobs in following industries

- Automobile Industries
- Aerospace Industries
- Manufacturing industries
- Textile Industries
- Mining Industry

RESOURCE REQUIREMENTS
LIST OF TOOLS AND EQUIPMENT
Lab. Equipment and Tools

Sr. No.	Name of Item	Quantity
1.	Hammer brass 500 gm with handle	10
2.	Screw Driver set	20
3.	Spanner double ended -6mm to 32mm.	10
4.	Spanner adjustable 200mm.	10
5.	Pliers long nose- 150mm side cutting.	10
6.	Pliers combination- size 8”	10
7.	Fire Extinguisher	10
8.	Safety goggles clear glass (Good Quality)	30
9.	Oil can ½ pint (pressure feed system)	20
10.	Lathe Mandrels (Different Types)	5
11.	Revolving Centre	05
12.	Universal surface gauge- 250mm.	20
13.	Universal Vernier Caliper-200mm.	30
14.	Hacksaw fixed 200mm (Pistol grip)	20
15.	Drill Chuck with key- Cap. – 12mm	5
16.	Twist Drill Taper shank- 1 to 12 mm step range 0.5mm	15
17.	Tap Wrench (Adjustable)	20
18.	Knurling tool revolving head	10
19.	Tool Holder RH & straight for 3/8” square tool bit	5
20.	Parting Tool Holder	5
21.	SS and SC centre lathe (all geared) with having minimum specification as: centre height 150 mm and centre distance 1000 mm along with 4 jaw and 3 jaw chucks, auto feed system, safety guard, motorized coolant system and lighting arrangement.	1
22.	Lathe Tool Room SS and SC centre lathe (all geared) with having minimum specification as: centre height 150 mm and centre distance 1000 mm along with 4 jaw and 3 jaw chucks, auto feed system, safety guard, motorized coolant system and lighting arrangement.	1
23.	Scriber cutting tools for various operations,	5
24.	Dial gauges	10
25.	Micrometre	5
26.	Bevel Protector	15
27.	Allen Key set	10
28.	Safety goggles	10
29.	Files	10
30.	Steel rule	10
31.	Chisel cold flat	10
32.	Centre Punch	10
33.	Charts of dos and Don’ts in work area	30

CLASS ROOM FURNITURE

Sr. No.	Name of Item	Quantity
1.	Instructor Table & chair	1 set
2.	Students' chairs with writing pads	30 nos.
3	White Board of size 120cm x 90cm	1 no.
4.	LCD Projector with Screen	1 set
5.	Lap top for instructor with latest (Vista & above) configuration pre- loaded with operating system and MS Office package	1 no.

UNIT – I
SUBJECT CODE: CMEE4-101
COMMUNICATION SKILLS

LEARNING OUTCOMES:

After undergoing this unit, the students will be able to:

- Speak confidently.
- Overcome communication barriers.
- Write legibly and effectively.
- Listen in proper prospective.
- Read various genres adopting different reading techniques.
- Respond to telephone calls effectively.

Practical (24 Hours)	**Theory (08 Hours)**
	Basics of Communication • Process of communication • Types of communication - formal and informal, oral and written, verbal and non-verbal • Objectives of communication • Essentials of communication • Barriers to communication (1 hour)
• Looking up words in a dictionary (meaning and pronunciation) (2 hours)	Functional Grammar and Vocabulary • Parts of speech • Tenses • Correction of incorrect sentences (2 hours)
• Self and peer introduction • Greetings for different occasions (1 hour)	Listening • Meaning and process of listening • Importance of listening • Methods to improve listening skills Speaking • Importance • Methods to improve speaking • Manners and etiquettes (2 hours)
• Newspaper reading (1 hour)	Reading • Meaning • Techniques of reading: skimming, scanning, intensive and extensive reading (1 hour)
• Vocabulary enrichment and grammar exercises • Exercises on sentence framing accurately (6 hours)	Functional Vocabulary • One-word substitution • Commonly used words which are often misspelt • Punctuation • Idioms and phrases (2 hours)

• Reading aloud articles and essays on current and social issues • Comprehension of short paragraph (5 hours)	
• Write a short technical report • Letter writing (3 hours)	
• Participate in oral discussion • Respond to telephonic calls effectively • Mock interview (6 hours)	

Means of Assessment

- Assignments and quiz/class tests
- Mid-term and end-term written tests
- Laboratory and practical work
- Viva-voce

UNIT-II
SUBJECT CODE: CMEE4-102
INTRODUCTION

Learning Outcomes:

After undergoing study of this unit the students will be able to

- Different types of lathe and difference between them
- Understand Measurement standards
- Maintenance importance for lathe machine

Practicals **60 hrs**	**Theory** **20 hrs**
• Practice on Lathe dismantling & mounting of chuck. • Practice on Lathe on calibration of measuring instruments. • Checking geometrical accuracies of lathe • Practice on calibration of measuring instruments. • Measurement of components by Vernier calliper. • Practice of cleaning, preventive maintenance of machine. • Mount work piece between centres, in chuck, or to faceplate, manually or using hoist. • alignment of work piece on machine, using measuring instruments, such as rules, gauges, or callipers. • Periodical lubrication procedure on lathe, testing of accuracy of alignment. Procedure of checking accuracy of lathe, preventive maintenance of lathe. • Operate lathe machine and identify different parts	• Types of Lathe machine & its accessories • Turret & Capstan Lathe • Lathe specifications, Lathe cutting tools, speed, feed, depth of cut & machining time. • Precision measuring instruments. • Routine Maintenance on lathe machine. • Introduction to CNC and NC machines

Means of assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

UNIT-III
SUBJECT CODE: CMEE4-103
LATHE MACHINE & ITS OPERATIONS

Learning Outcomes:

After undergoing study of this unit the students will be able to

- Understated operations of lathe and its practical applications
- Identify different accessories used on lathe machine
- understand various parameters required for operation like cutting speed, feed rate and depth of cut
- To understand about numerical calculation about material removal rate

Practicals **92 hrs**	**Theory** **30 hrs**
• Plain turning between centre with follower rest (long bar job) • setting practice to check centre axis alignment between machine spindle axis and tail stock axis • Taper turning practice by swiveling compound slide. Taper turning practice by Tail. • Checking of taper angle by bevel protector and sine bar. • Practice on Lathe - Ball Turning. • Practice on Screw thread cutting B.S.W external R/H and L/H. • Checking of thread by using screw thread gauge.	**Various Operations on Lathe:** • turning operations • drilling • boring • shaping and planning • broaching • knurling • cutting operations • taper turning • chamfering • threading • counter boring
• Eccentric marking using Vernier height gauge, job holding & eccentric turning practice. • select and install pre-set tooling in tool posts, turrets or indexing heads, and automatic-tool-change magazine, in sequence specified on process sheet • Square thread- Construction and uses. Calculation involved- depth, core Dia, pitches, and module of Acme & Worm Thread. • Practice of boring, counter boring, grooving (external & internal) and radius (concave & convex) turning on lathe. Plain turning practice using solid mandrel. • Practice on Acme threading and tool grinding. • Practice of Crankshaft turning double throws. • Problems in metric and inch thread conversions.	• Tool holding devices • Detailed calculations and numerical related to material removal rate • Influence of tool height on tool angle for lathe operation • Definition and calculation of Cutting speed, feed, depth of cut, and turning time for lathe operation. • Principle of taper turning by compound slide swivelling method, its calculation, advantages & disadvantages. • Taper turning by form tool, its method of turning. Advantages & disadvantage of taper turning by form tool. • Principle of taper turning by tailstock set over method. • Calculation for tailstock set over method. Advantages & disadvantage of taper turning by tailstock.

Means of Assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

UNIT-IV
SUBJECT CODE: CMEE4-104
TOOL GEOMETRY

Learning Outcomes:
After undergoing study of this unit the students will be able to
- Correctly and safely handle different tools
- Tool wear and its prevention
- Understand about tool parts and its uses

Practicals **90 hrs**	**Theory** **32 hrs**
Tools grinding Practice Side Cutting tools Offset turning tools Parting tools select and install pre-set tooling in tool posts, turrets or indexing heads, and automatic-tool-change magazine, in sequence specified on process sheet how to replace worn tools, and sharpen dull cutting tools and dies using bench grinders or cutter-grinding machines. install, align & secure tools, attachments, fixtures & work pieces on machines, using hand tools & precision measuring instruments Position, and align cutting tools in tool holders on machines using hand tools and verify their position with measuring instruments. Turning practice by using index able inserts. Methods of measuring cutting forces. Practice of negative rake tool on non-ferrous metals. Produce job using various cutting tools involving different operations. Grinding of cutting tools used on a lathe machine	Importance of tool geometry geometry of single point cutting tool Drilling tools and broaching tools. Introduction to latest cutting tools, materials, their properties and applications types of tool wear tool life variables affecting the tool life Introduction about merchant theory. determination of tool life exponents machinability

Means of Assessment
- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

UNIT-V
SUBJECT CODE: CMEE4-105
SAFETY

Learning Outcomes:

- After undergoing study of this unit the students will be able to
- Recognize & comply safe working practices, environment regulation and housekeeping.
- Advantages of safety devices
- Important terms used for safety in industry
- safe work environment importance in industry

Practicals **92 hrs**	**Theory** **16 hrs**
• Health, Safety and Environment guidelines, legislations & regulations as applicable. • Disposal procedure of waste materials like cotton waste, metal chips/burrs etc. • Basic safety introduction, Personal protective Equipment (PPE):- Basic injury prevention, Basic first aid, Hazard identification and avoidance, safety signs for Danger, Warning, caution & personal safety message. • Preventive measures for electrical accidents & steps to be taken in such accidents. • Describe hazard, including the different types of health and safety hazards in the workplace • Use of Fire extinguishers. • Explain the importance of maintaining high standards of health, safety and security • Follow the Safety, Health and Environment related practices • Uses of Safety gloves, Safety shoes, les, Ear plugs • use the health, safety and accident reporting Procedures and the importance of these. • report any identified breaches in health, safety, and security policies and procedures to the designated person.	• Study of importance of complying health safety and environmental regulation at work place. • Study of hazards associated with lathe machines operations. • Safety equipment. • Precautions and remedies. • Response to emergencies eg; power failure, fire, and system failure. • Read and understand the safety signs and instructions on the lathe machine, Identify job-site hazards and apply good housekeeping practices, Organisation's emergency procedures for accident, fires or any other natural calamity.

Means of Assessment

- Assignment and quiz/ class tests
- Mid-term and end-term written tests
- Viva – voce
- Practical work

SUBJECT CODE: CMEE4-107P
INDUSTRIAL TRAINING – I (4 Weeks)

The purpose of industrial training is to:

- Develop understanding regarding the size and scale of operations and nature of industrial/field work in which students are going to play their role after completing the courses of study.
- Develop confidence amongst the students through first-hand experience to enable them to use and apply institute based knowledge and skills to perform field activities.
- Develop special skills and abilities like interpersonal skills, communication skills, attitudes and values.

It is needless to emphasize further the importance of Industrial Training of students during their one-year certificate programme. It is industrial training, which provides an opportunity to students to experience the environment and culture of world of work. It prepares students for their future role as skilled person in the world of work and enables them to integrate theory with practice.

An external assessment of 100 marks have been provided in the study and evaluation scheme of 1st Semester. Evaluation of professional industrial training report through viva-voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real life situations.

The instructor along with one industrial representative from the concerned trade will conduct performance assessment of students. The components of evaluation will include the following:

a) Punctuality and regularity 20%
b) Industrial training report 50%
c) Presentation and viva-voce 30%