



GOVERNMENT OF TAMILNADU
DIRECTORATE OF TECHNICAL EDUCATION, CHENNAI
STATE PROJECT COORDINATION UNIT
(Established under Canada India Institutional Cooperation Project)

CURRICULUM

Course Name	CNC LATHE
Course Code	ME/2020/007
Course Duration	70 Hours
Minimum Eligibility Criteria	ITI/10th/+2/Diploma/Graduates
Pre-requisites (if any)	-
Course Objectives	Training module has been designed to provide the participants to • Understand the concept and requirement of Design and Manufacturing. • Understand the working principle of CNC Lathe • Learn the programming methods for CNC Lathe
Course Outcomes	At the end of training, the participants will be able to • Operate all CNC Machine tools and equipment's efficiently • Identify all the components of CNC Machine tool • Prepare CNC programs for CNC Lathe • Make use of special programming features and execute on CNC Lathe
Expected Job Roles	CNC Operator and Service Technician

TEACHING AND SCHEME OF EXAMINATION

Course Code	Course Name	Hours		Assessment Marks		Duration of the Examination
				Min	Max	
ME/2020/007	CNC LATHE	Theory	36	10	20	3 Hours
		Practical	34	40	80	
		Total	70	50	100	

ME/2020/007-CNC LATHE
DETAILED SYLLABUS

Unit No.	Modules	No. of Hours	
		Theory	Practical
I	Introduction to Computer Numerical Control (CNC):	02 Hours	
1.1	General Safety & Maintenance – Typical applications of CNC – Advantages and limitations of CNC – Classification of CNC machine tools.	02	
II	Components of CNC machine tool:	03 Hours	
2.1	Drive systems-Machine spindle-Spindle drives-Slide drives, Slide moving elements, Feedback system-Incremental encoders-Absolute encoders, Tool change –Automatic Tool Changing System (ATC).	03	
III	Programming fundamentals:	06 Hours	
3.1	Procedure for manual NC Programming-Structure of a program-Programming Methods-Data input.	03	
3.2	Axes Designation for Various CNC machine tools-Zero and Reference points on CNC Machine tools.	03	
IV	Part Programming for CNC Turning Centre:	25 Hours	
4.1	G codes and M codes for CNC turning Centre-Introduction to Fanuc simulation software, Part programming practice-simple turning, facing, step turning, taper turning, circular interpolation	08	
4.2	Part programming practice - thread cutting, grooving cycle, multiple turning cycle and multiple facing cycle, Internal operations-drilling and peck drilling	07	
4.3	Practical: Program proving through FANUC simulation software and to provide training for CNC Lathe in Tool Offset and Part programming for typical components.		10
V	Training in CNC lathe:	34 Hours	
5.1	Tool and Work holding devices, Tool selection – Process planning – cutting tool specification and tool selection, Tool offset setting, Work piece datum setting and Cutting parameters calculation.	10	
5.2	Practical: Tool offset setting- Work piece datum setting-CNC Machine Control Unit- The console and Console key pad-Operators panel and Machining Practice(simple exercises).		24
Total Theory and Practical hours		36	34
Total hours		70	

HARDWARE REQUIREMENT

S. NO.	LIST OF TOOLS /EQUIPMENTS
1.	• CNC Lathe • Tool Holders (CNC Lathe) • Various types of tools (CNC Lathe) • CAM Software (CNC Lathe)

SOFTWARE REQUIREMENT

S. NO.	LIST OF SOFTWARE
1.	• CAM Software (CNC Lathe simulation)

REFERENCE BOOKS

S. NO.	NAME OF THE BOOK	AUTHOR	PUBLISHER
1.	Automation, Production Systems, and Computer-Integrated Manufacturing	Mikell P. Groover	McGraw Hill book company, USA, 1983
2.	CAD/CAM	P.Groover, Emory Zimmers Jr	Pearson Education, New Delhi. 2002
3.	Computer control of manufacturing systems	Yoram Koren	McGraw Hill book company, USA
4	CAD/CAM: Principles and Applications	J.Srinivas	Oxford Higher Education, Noida, Uttar Pradesh – 201 301.
5	Computer Aided Design and Manufacturing	K.Lalithnarayan K.Mallikarjuna Rao M.M.M.Sarcar	PHI Learning Private Limited, Edition 2008, New Delhi – 110 002.
6	CAD/CAM: Theory and Concepts	Kuldeep Sareen Chandandeep Grewal	S.Chand Publishing 2007, New Delhi – 110 002.

ASSESSMENT AND CERTIFICATION

S. No.	Criteria for Assessment
1.	A trainee will be assessed based on the performance in End Examination for Theory and Practical conducted internally in the Project Polytechnic College for a duration of 3 hours
2.	A trainee must have 75% of attendance to appear for End examination in Theory and Practical.
3.	The assessment for theory part will be based on the marks scored in the end examination on the knowledge bank of questions (1 word/objective type questions)
4.	The assessment for practical part will be based on the marks scored in the end examination conducted by the Project Polytechnic and assessed by the Examiners approved by Strategic Plan Implementation Committee (SPIC) of the project polytechnic.
5.	The passing criteria for successful completion of training is every trainee should score 50% of marks in theory and practical examination.
6.	On successful completion of training , Certificate will be issued to the participants by the Directorate of Technical Education through the Project Polytechnics.

END EXAMINATION

ALLOCATION OF MARKS

S.NO	Description	Max.Marks
1.	Theory Examination	20
2.	Practical Examination	
	a)Aim and Procedure	20
	b)Demonstration / Execution	25
	c) Result & Viva Voce	15
	d)Record	20
Total Marks		100

THEORY MODEL QUESTION PAPER

ME/2020/007 - CNC LATHE

(Maximum Marks: 20)

(N.B: Answer any **Twenty** questions)

20x1= 20 Marks

1. Name any two safety devices.
2. Write any two types of safety.
3. Draw first angle projection symbol.
4. Write down the least count of Vernier caliper.
5. Write any two parts of Centre Lathe.
6. What are the two types of chucks?
7. Write any two tools used in Lathe.
8. Write any two Operations in Lathe.
9. Name of the materials used to Manufacture Lathe bed.
10. What is CNC Machine?
11. What is MCU?
12. Write any two parts of CNC Turning Centre.
13. What is meant by Indexing?
14. Write down the two methods of Indexing.
15. Write down the types co-ordinate system.
16. What is G Code used for multiple turning?
17. Write any two operations performed in CNC Lathe.
18. Write any two disadvantages of CNC Lathe.
19. Write any two specifications of CNC Turning Centre.
20. Name the Code used to Constant surface speed.
21. Write down the syntax format for G72.
22. What is the M code used for coolant off?
23. List out the measuring instruments.
24. Name any two communication methods.
25. What is meant by Motivation?