

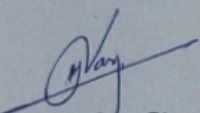
Value Added Course

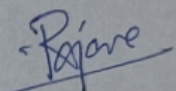
• Name of add on/Certificate course: CNC Lathe-Programming & Operation	
• Name of the Teacher/Supervisor: Prof. Nitin Jalindar Varpe	
• Date- 28/3/22 to 16/4/22	
• Time- 4.00pm to 6pm 2hrs per day; Total 15 days.	
• Duration: 30 hrs.	
• Tool/ICT Used: CNC machine, Digital height gauge, OHP etc.	
• Fee: 1000/- (Exempted due to covid 19)	
• No. of Beneficiary: 15 Nos.	Geo-tag photo attached: 2 Nos.
Objectives: • Evaluate manufacturing assignment based on critical thinking and problem solving skills. • Practice writing complex programs for CNC turning centers that meet the part specification. • Prepare programs to perform secondary operations including tapping, countersinking, counter boring, and threading. • Describe and illustrate common problems with tooling and fixtures in CNC programming and machining	
Outcome: After completing this programme, participants will be master in: • Health & safety Practices at workplace • Basic Fitting and use of measuring tools & instruments • Understanding of Engineering Drawings/ sketches and Geometric tolerances • Knowledge of metal cutting, cutting tools and tool material • Knowledge of Work and tool holding devices on CNC lathe machine • Job setting and simple programming on CNC lathe machine • Perform machining operations on CNC Lathe machine • Checking the quality of machined components • Daily Maintenance of CNC Lathe machine	



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Teacher Sign


HOD Sign

Date: 15/03/2022

To,
Dr. R. S. Tajane
Workshop Superintendent
AVCOE, Sangamner.

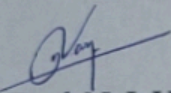
Subject: Regarding permission to conduct CNC Course in workshop.

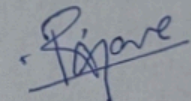
Respected Sir,

As per the advancement of curriculum, we are going to arrange value addition course on "CNC Programming and Operation" for students of Production Engineering.

Herewith, I am requesting you to please permit for the same.

Thanking You.


Prof. N. J. Varpe
Co-ordinator


Dr. R. S. Tajane
Workshop Suptd.

ANRUTVAHINI COLLEGE OF ENGINEERING, SANGAMNER
WORKSHOP DEPARTMENT



CURRICULUM / SYLLABUS FOR ADD ON/CERTIFICATE/DIPLOMA COURSE

Value Added Course Name : CNC Lathe - Programming and Operations		
Design and Development Date: 6 Sept 2021		
Teaching Scheme : Total 30 Hr.	Credits : 04	Examination : 100 Marks
Theory : 01 Hr./Day	Theory : 02	Theory : 40 Marks
Practical : 01 Hr./Day	Practical : 02	Practical : 60 Marks
Prerequisites Minimum qualification: T.E. and B.E. Students of Mechanical and Automation & Robotics Engineering. Diploma in Mechanical / Automobile Engineering. ITI Students.		
Course Outline Students will learn the safety procedures, coordinate system, tool setup and codes for programming and operating the CNC turning center.		
Methodology Any and/or all of the following activities may be utilized by the instructor during the term to achieve the learning objectives for the course. • Lecture • Discussions (large and small groups) • Audio/Visual Instruction • Individual and Group Projects/Presentations • Reading/Writing Assignments • Laboratory Exercises • Quizzes and Examinations		
Course Objectives • Evaluate manufacturing assignment based on critical thinking and problem solving skills. • Practice writing complex programs for CNC turning centers that meet the part specification. • Prepare programs to perform secondary operations including tapping, countersinking, counter boring, and threading. • Describe and illustrate common problems with tooling and fixtures in CNC programming and machining		



Course Outcomes

After completing this programme, participants will be master in:

- Health & safety Practices at workplace
- Basic Fitting and use of measuring tools & instruments
- Understanding of Engineering Drawings/ sketches and Geometric tolerances
- Knowledge of metal cutting, cutting tools and tool material
- Knowledge of Work and tool holding devices on CNC lathe machine
- Job setting and simple programming on CNC lathe machine
- Perform machining operations on CNC Lathe machine
- Checking the quality of machined components
- Daily Maintenance of CNC Lathe machine

Course Contents

Module I : Basic health-safety practices, environment regulation and housekeeping at the workplace

Understand importance of complying health safety and environmental regulation at work place. Understand hazards associated with use of CNC operations, revolving and moving parts, hot metal particles, sharp cutting tools, lifting and holding work holding devices, burrs and sharp edges on the component. Identify safety alarms accurately. Understand: Different types of fire; use of appropriate fire extinguishers risk and accidents; safe working practices and methods of accident prevention at work place. Identify basic first aid and use them under different circumstances. Importance of using protective clothing like leather or asbestos gloves, flame proof aprons, helmets/hard hats, ear defenders/plugs, safety boots, glasses/goggles/visors, hand shields, machine guards etc. Identify environmental pollution & contribute to avoidance of same. Take opportunities to use energy and materials in an environmentally friendly manner. Avoid waste and dispose waste as per procedure. Recognize different components of 5S and apply the same in the working environment.

Module II : Engineering drawing interpretation, Metal cutting and Cutting tools, Measuring instrument

Read and establish the importance of extracting information from engineering drawings and related specifications. Reading and interpreting first and third angle from drawings. Tool selection based on material, finish and tolerance; factors which determine selection and use of tungsten carbide and tips. Importance and effect of the depth of cut, RPM and feed on surface finish. Understand and effectively use the methods of checking quality of shaped components against required standards. Vernier caliper/height gauge (Conventional/Dial/Digital), Vernier bevel protractor, Micrometer- construction, graduation setting & reading. Care and maintenance of vernier caliper/height gauge and bevel protractor.

Module III: Introduction of Lathe machine and its operations

Classification and specification of lathe machine. Different parts of lathe machine such as lathe bed, head stock, tail stock, tool post, carriage, cross slide and compound slide, lead screw, feed rod etc. Different work and tool holding devices such as 3 jaw and 4 jaw chucks, lathe dogs, steady and follower rests, mandrels, tool holders, face plate, angle plate etc. Different operations performed on lathe such as plain turning, step turning, taper turning, form turning, drilling, reaming, boring, sawing, cutting or parting-off, Grooving, knurling, Eccentric Turning, Facing & Threading Operations. Different mechanisms of lathe machine such as half nut mechanism, back gear mechanism, all gear head stock etc.

Module IV : Introduction-history of CNC and parts of CNC

Introduction to CNC technology -CNC machines & controls. History & development of CNC technology. Conventional Vs. non-conventional machine tool. Numerical control on CNC machine tools. CNC Control and types of CNC control. Machine Axes, Absolute & incremental system. Applications, Advantages & Disadvantages of CNC Machine. Control switches, console buttons and machines specifications (spindle power, axes traverse, etc.). Demonstration of CNC lathe parts -bed, spindle motor and drive, chuck, tailstock, tool changer, axes motor and balls crews, guide ways, LM guides, console, electrical, coolant system, hydraulic system, chip conveyor. Working of Hand wheels, keys, locks, emergency stop etc.

Module V : CNC Programming

Introduction to CNC programming, Introduction and demonstration of line programs CNC programming for lathe machine. CNC programming for lathe machines using different machining cycles. Procedures Associated with part programming, Cutting process parameter selection, Process planning issues and path planning, G & M Codes, Interpolations, Canned Cycles and Subprograms, Tool compensations. Exposure for programming of FANUC Control through post processors. Plan and optimize programs for CNC turning operations. Calculate parameters like speed feed etc. and set references for the various operations. CNC part programming with simple exercises and various programming codes. Practice on CNC machine simulator.

Module VI : CNC Operation

Prepare operation and operation sequence for the lathe operations like turning, grooving etc. Prepare & set CNC lathe operations and test run programmed. Execute program and inspect simple geometrical forms / standard parts. CNC turning center operation in various modes: jog, single block, auto, MDI, edit, etc. Program entry. Setting of tool offsets, entry of tool nose radius and orientation. Machining parts on CNC lathe with parallel, taper, step, radius turning, grooving and threading of different pitches.

Text Books:

1. Programming of CNC machines, by Ken Evans
2. CNC Programming Handbook by Peter Smid
3. NC Control by Kundra Rao, Tewari

Reference Books:

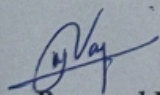
1. Zeid, I and Sivasubramania, R., (2009), "CAD/CAM : Theory and Practice", 2nd edition, McGraw Hill Education, ISBN-13: 978-0070151345
2. https://cache.industry.siemens.com/dl/files/554/74475554/att_56792/v1/PGsl_0313_en_US.pdf
3. G codes, M codes Handbook, by Mazak Corporation, sources:
 1. available at Mini Tool Room, Parlakhemundi campus, CUTM
 2. <https://gist.github.com/anonymous/f14c73a7174bf8a43f0c970817897454>

Assessment & Certification

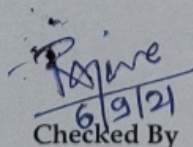
The trainee will be tested for his skill, knowledge and attitude during the period of course and based on that trainee will get course completion certificate.

Assessment will be evidence based comprising the following:

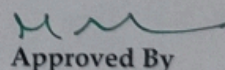
- Job carried out in labs/workshop
- Record book/ daily diary
- Answer sheet of assessment
- Viva-voce
- Progress chart
- Attendance and punctuality
- Assignment



Prepared By
Prof. N. J. Varpe
Faculty In-Charge


6/9/21

Checked By
Dr. R. S. Tajane
Workshop Superintendent



Approved By
Dr. M. A. Venkatesh
Principal

Workshop Superintendent
Amrutvahini College Of Engineering
Sangamner - 422608



Amrutvahini College of Engineering, Sangli
Department of Workshop
CNC Training Program Attendance Register

Class: SE / TE / BE - Mech / Prod

Batch: T3

Semester: I / II

Duration: 02 Hrs/Day

Year: 2021 / 2022

Teacher:

Roll No.	Name of student	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		28-3	29-3	30-3	31-3	1-4	4-4	5-4	6-4	7-4	8-4	9-4	11-4	12-4	13-4	16-4
31	Vaibhav Machhindra Walade	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
32	Bhagwant Aditya Rajendra	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
33	Badhe Rohit Subhash	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
34	Patil Bhushan Vasudev	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
35	Gurajal Mayur Bamesh	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
36	Varpe Suraj Raju	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
37	Bhoinai. Snehal Ait	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
38	Godakh kalpesh sanjay	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
39	Bagwan Jaiz Altaf	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
40	Bagwan Rehan Rajmohamad	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
41	Hase Rushikesh Bhaskar	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
42	Shaikh Nadim Raut	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
43	Shaikh Yashmin Kaddabhai	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
44	Binnar Rahul Balu	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
45	Kakad Shubham Dattatray	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB

Certificate

Amrutvahini Sheti & Shikshan Vikas Santha's
**Amrutvahini College of Engineering,
Sangamner**

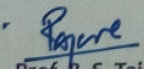


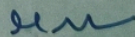
P.O. Sangamner S.K., Tal: Sangamner Dist: Ahmednagar, Maharashtra-422608
An ISO 9001:2015 Certified Institute

This is to certify that

Mr./ Ms. Gurjal Saurabh Sopan of Production Engg.

has undergone training at Workshop Department- Amrutvahini College of Engineering, Sangamner
in **CNC-Lathe** in the area of **Lathe-Programming & Operation** Model **Smarturn** with **Fanuc-Oi**
CNC System as a part of our Student Training Programme in association with Precision Auto
Industries Pvt. Ltd., Nashik


Prof. B. S. Tajane
Workshop Superintendent


Dr. M. A. Venkatesh
Principal