Annexure I: Course Curriculum				
MODULE-WISE COURSE CONTENT AND OUTCOME				
SL. NO	**MODULE NAME**	**MODULE CONTENT**	**MODULE LEARNING OUTCOME**	**DURATION (HRS)**
1	CNC technology and CNC programming	CNC programming Introduction and demonstration of line programs - CNC programming on lathe &milling machine - CNC programming for lathe and milling 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.	• Create the programming's for industrial components produced by CNC machines.	9
2	Programming generation and application in CNC Simulator	Functions and Identification of different parts of CNC lathe including data input – Functions and Identification of different parts of CNC mill including data input -Tool compensations Exposure for programming and simulation in Fanuc control - CNC programming on lathe & milling machine for different operations in simulator - Practice on CNC	• Create the programming's for industrial components produced by CNC machines. • Do the Cutting process parameter selection, tools and path planning.	9

		controller using on-screen simulation for generating different profile.		
3	Programming and Operations in CNC Turning	Plan and optimize programs for CNC turning operations - Calculate parameters like speed, feed etc - set a reference for the various operations - 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 - Use of various PPEs on CNC lathe machine.	● Create the programming's for industrial components produced by CNC machines. ● Do the Cutting process parameter selection, tools and path planning.	9
4	Programming and Operations in CNC Milling	Plan and optimize programs for CNC Milling operations - Calculate 9parameters like speed feed, depth of cut etc. - Set a reference for the various operations. - Various methods of work process like edge finding, block center etc. - Prepare operation and operation sequence for the milling operations like face milling, End milling, Drilling, etc. - Prepare & set CNC Milling operations	● Create the programming's for industrial components produced by CNC machines. ● Do the Cutting process parameter selection, tools and path planning.	9

		and test run programmed - Execute program and inspect simple geometrical forms / standard parts - Use of various PPEs on CNC milling machine.		
5	Quality Control	Principles of measurement - Limits, fits and Tolerances - Direct measurement such as Vernier Caliper, Vernier Height gauge, Vernier Depth gauge, Outside Micrometer, Inside Micrometer, Depth Micrometer – Introduction to Co-ordinate Measuring Machine.	• Do the industrial measuring practice and examine functionality and comparison of final product as per specification.	9

Annexure II: Use Cases and Test Projects

<table>
<tr><th colspan="4">OVERALL COURSE LEARNING OUTCOME ASSESSMENT CRITERIA AND USECASES</th></tr>
<tr><th>LEARNING OUTCOME</th><th>ASSESSMENT CRITERIA</th><th>PERFORMANCE CRITERIA</th><th>USECASES</th></tr>
<tr><td rowspan="4">● Create the programming's for industrial components produced by CNC machines.
● Do the Cutting process parameter selection, tools and path planning.
● Relate and analyze to get industrial skills in the field of automotive manufacturing.
● Do the industrial measuring practice and examine functionality and comparison of final product as per specification.</td><td>Drawing reading and simulation</td><td>i) Drawing reading. ii) Usage of simulators. iii) Simulation Output.</td><td rowspan="4">1. Create CNC Programming for below model components in multiple sectors like automobile, aerospace, medical, railway industries. Etc.,
2. Create and analyze lead time requirements.
3. Plan to achieve production resilience.
4. Stepping into evolution of CNC technology and Automation.
5. Derive the plan for reduce downtime and increase turnaround times, increasing productivity infactories.
6. Visit multiple domain factories and identify the demand of 5 axis and special purpose machines.
7. Find the more complex manufacturing setup and provide solution with IioT (Industrial Internet of Things).
8. Pick elevations of CNC Career growth and act accordingly.
9. Find the different departments support that should needed for the industrial process completion.
10. Create an interactive and future based project.
11. Create an automation process with SAP tool.
12. Derive and establish</td></tr>
<tr><td>Work place safety</td><td>i) Clean up machines after use
ii)Respectful and do not cause disruption to others
iii)Ensure actions of self-do not compromise the safety of others</td></tr>
<tr><td>Selection of tool and Work piece fixture</td><td>i) For following proper safety aspects
ii) For the selection of appropriate tool from tool magazine
iii) For the calling the tool in the proper sequence based on the operations
iv) Proper selection of fixture based on shape of work piece</td></tr>
<tr><td>Setting of tool offset</td><td>i) Using of appropriate</td></tr>
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		control mode ii) Positioning the machine reference iii) Selection of tool designation in machine control Completion of tool offset in minimum time duration	man power and work study. 13. Find the various ways to short the lead time. 14. Find and analyze to improve Zero Defects and Greater Accuracy. 15. Using Least cost method to recycle the waste material and make that to be reused. 16. Set and implement Kaizen activities in manufacturing. 17. Using the SOP guidelines monitor and regularize the process. 18. Create and standardize the action plan for machine maintenance. 19. Analyze and make use of precision cutting systems for better accuracy. 20. Using the 8D concept identify the root cause of a problem, providing corrective solutions, and preventive solutions to eliminate the recurring problems.
	Setting of work offset	i) Proper work holding techniques ii) Conformity of shape of the component by verifying the tool path iii) Completion of work offset in minimum time duration	
	Clamping &De-clamping of Work piece	i) Improper clamping of work piece ii) Proper clamping of work piece	
	Program writing and component production	i) Writing and execution of program in time. ii) Product completion.	
	Machined component inspection	i) Handling of instruments. iii)Measured reading match with drawing	

TABLE 4: LIST OF FINAL PROJECTS (20 PROJECTS THAT COMPREHENSIVELY COVER ALL THE LEARNING OUTCOME)	
SL.NO	**FINAL PROJECT**
1	PART NAME – AS MANIFOLD
2	PART NAME – HYLSA
3	PART NAME – SUPPORT819
4	PART NAME – AXLE HOUSING (I2PD)
5	FRONT ENGINE SUPPORT
6	AXLE HOUSING (I2DD)
7	CARRIER HUB 1201
8	SWIVEL HOUSING
9	CENTREL HOUSING 300
10	STEERING KNUCKLE HOUSING
11	PART NAME - BVI BODY
12	PART NAME - COCK BODY
13	PART NAME –BODY ADAPTER QUICK EXHAUST
14	PART NAME - DISTRIBUTOR BODY
15	PART NAME - BODY PIPE THD SERIES
16	PART NAME – GEAR VALVE
17	PART NAME – MANIFOLD
18	PART NAME - SOLENOID CAP
19	PART NAME - BODY BULL
20	PART NAME - CRANK CASE

Annexure III: Assessment Rubrics				
COURSE ASSESSMENT RUBRICS (TOTAL MARKS: 70)				
ASSESSMENT CRITERIA	DESCRIBE THE CRITERIA OF THE BELOW CATEGORY PERFORMANCE			TOTAL MARKS
	FAIR	GOOD	EXCELLENT	
1	50%-64%	65%-79%	80%-100%	70

Category	**Assessment Criteria**	**Performance Levels**	**Weightage (Marks)**
Practical Skills Proficiency	Demonstrates ability to perform job-specific tasks effectively, using relevant tools, techniques, or methodologies (e.g., Tally for accounting, consignment tracking).	Fair, Good, Excellent	20
Technical Knowledge Application	Applies theoretical concepts to practical scenarios with accuracy and relevance (e.g., compliance with GST laws, financial planning, or logistics protocols).	Fair, Good, Excellent	20
Project Execution	Completes assigned projects or use cases demonstrating innovation, thoroughness, and skill application relevant to industry standards.	Fair, Good, Excellent	20
Communication and Reporting	Clearly presents findings, solutions, or project outcomes using professional communication and documentation standards (e.g., reports,	Fair, Good, Excellent	10

	presentations).		