COURSE OUTLINE : CAM 241
C Credit – Not Degree Applicable
COURSE ID 010564
Created: APRIL 2021

COURSE DISCIPLINE : CAM

COURSE NUMBER : 241

COURSE TITLE (FULL) : Advanced Mastercam Lathe

COURSE TITLE (SHORT) : Adv Mastercam Lathe

ACADEMIC SENATE DISCIPLINE: Machine Tool Technology

CATALOG DESCRIPTION

CAM 241 is an advanced Mastercam lathe course. This course will cover the setup aspects of MT_Lathe. Students will learn how to configure the Mastercam workspace, properly orient part geometry, and complete Job Setup. Students will learn how to create more complex 3D geometry, advanced C-Axis toolpaths and toolpaths that support the Y-axis rotation and examples on how to use the Mill toolpaths on a Lathe with Live Tooling. Proper Tool Definition, Axis Combinations, Sub spindle machining, and Tool Plane setup will be covered.

CATALOG NOTES

Note: This is an advanced CNC lathe course using Mastercam software, please make sure to review the recommended preparation for this class.

Total Lecture Units:1.00

Total Laboratory Units: 2.00

Total Course Units: 3.00

Total Lecture Hours:18.00

Total Laboratory Hours: 108.00

Total Laboratory Hours To Be Arranged: 0.00

Total Contact Hours: 126.00

Total Out-of-Class Hours: 36.00

Recommended Preparation: CAM 220 or CAM 240, or equivalent.

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ENTRY STANDARDS

	Subject	Number	Title	Description	Include
1	CAM	220	Computer Aided Manufacturing, Basic Lathe	Compile a reference guide to be used in future training as well as later in the field;	Yes
2	CAM	220	Computer Aided Manufacturing, Basic Lathe	perform basic drawing of geometric shapes and translate them into the proper numerical format required by the equipment;	Yes
3	CAM	220	Computer Aided Manufacturing, Basic Lathe	demonstrate a basic knowledge of the principles required to successfully complete a simple project	Yes
4	CAM	220	Computer Aided Manufacturing, Basic Lathe	engage keystroke commands for each program.	Yes
5	CAM	240	Basic Mastercam Lathe	create geometry and toolpaths for Mastercam lathe;	Yes
6	CAM	240	Basic Mastercam Lathe	set up a Computer Numerical Control (CNC) lathe;	Yes
7	CAM	240	Basic Mastercam Lathe	demonstrate roughing and finishing;	Yes
8	CAM	240	Basic Mastercam Lathe	demonstrate drilling and boring;	Yes
9	CAM	240	Basic Mastercam Lathe	evaluate the geometry of a part;	Yes
10	CAM	240	Basic Mastercam Lathe	perform stock flip toolpath for second operation.	Yes

EXIT STANDARDS

1 create complex 3D geometry and toolpaths for Mastercam lathe;
2 set up a Computer Numerical Control (CNC) lathe machine with live tooling;
3 choose proper set-up tools for milling;
4 demonstrate roughing and finishing;
5 demonstrate drilling and boring on C-axis and Y-axis;
6 explain sub spindle machining;
7 identify automatic part handling toolpaths for second set-up.

STUDENT LEARNING OUTCOMES

1 demonstrate safe and appropriate part handling for sub spindle work;
2 utilize and demonstrate advanced programming with Mastercam lathe;
3 verify accuracy of program keystrokes using back-plot.

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COURSE CONTENT WITH INSTRUCTIONAL HOURS

	Description	Lecture	Lab	Total Hours
1	Introduction • History of Computer Numerical Control (CNC) programming and machining • Review of machining basics • Preparation for CNC machining	3	0	3
2	Lathe Machining Set-up in Mastercam • Setting up Mastercam configuration for MT_Lathe • Orientation of the part • Part zero in Mastercam • Stock set-up in Mastercam	2	18	20
3	Creating Complex 3D Geometry • Creating more complex lines, splines, arcs, and points • Extract geometry from 3D solid models • Use levels, groups, and attributes • Creating mill and turn profile	2	18	20
4	Modifying Current Geometry • Trim entities • Divide and join entities • Modify length • Break two pieces • Add fillet radius and chamfer • Offset geometry • Project geometry • Geometry transformation (scale, rotate, etc.)	3	18	21
5	Lathe & Mill Toolpaths • Facing the part • Roughing and finishing the profile • Grooving inside and outside of the part • Apply threading toolpath • Use C&Y axis machining • Face drilling, cross drilling • Sub spindle machining • Part off the part	3	18	21

6	Part Handling in Mastercam • Set up stock and chuck • Use of custom planes • Stock flip • Pickoff and Cutoff (POCO) toolpath • Lathe tool manager • Toolpath and stock transform	2	18	20
7	Set up a CNC Lathe Machine with Live Tooling • Load a desire work holding fixture on the machine • Indicate the live tooling holders • Load proper tool holders • Find part zero • Set up tools • Verify and run a complex lathe part	3	18	21
				126

OUT OF CLASS ASSIGNMENTS

1 individual project (e.g. create advanced part program from a blue print drawing);
2 group project (e.g. create advanced part program from a solid model or models);
3 calculations (e.g. material properties and dimensions of a work piece).

METHODS OF EVALUATION

1 quizzes;
2 practical laboratory examinations;
3 evaluation of a final project (e.g. worm gear).

METHODS OF INSTRUCTION

- [x] Lecture
- [x] Laboratory
- [ ] Studio
- [ ] Discussion
- [x] Multimedia
- [ ] Tutorial
- [ ] Independent Study
- [x] Collaboratory Learning
- [x] Demonstration

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- ☐ Field Activities (Trips)
- ☐ Guest Speakers
- ☐ Presentations

TEXTBOOKS

Title	Type	Publisher	Edition	Medium	Author	IBSN	Date
Mastercam 2021 Lathe C and Y Axis Toolpaths Tutorial	Required	In-House Solutions Inc.			Mastercam	978-1-77146-920-3	2021