

CAM241 : Advanced Mastercam Lathe

General Information

Author:	<ul style="list-style-type: none">Jorge Palma
Course Code (CB01) :	CAM241
Course Title (CB02) :	Advanced Mastercam Lathe
Department:	CAM
Proposal Start:	Spring 2025
TOP Code (CB03) :	(0956.30) Machining and Machine Tools
CIP Code:	(48.0501) Machine Tool Technology/Machinist.
SAM Code (CB09) :	Clearly Occupational
Distance Education Approved:	No
Will this course be taught asynchronously?:	No
Course Control Number (CB00) :	CCC000651640
Curriculum Committee Approval Date:	05/22/2024
Board of Trustees Approval Date:	07/16/2024
Last Cyclical Review Date:	05/22/2024
Course Description and Course Note:	<p>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. Note: This is an advanced CNC lathe course using Mastercam software, please make sure to review the recommended preparation for this class.</p>
Justification:	Mandatory Revision
Academic Career:	<ul style="list-style-type: none">Credit
Mode of Delivery:	
Author:	
Course Family:	

Academic Senate Discipline

Primary Discipline:	<ul style="list-style-type: none">Machine Tool Technology (Tool and die making)
Alternate Discipline:	No value
Alternate Discipline:	No value

Course Development

Basic Skill Status (CB08)

Course is not a basic skills course.

Allow Students to Gain Credit by Exam/Challenge

Course Special Class Status (CB13)

Course is not a special class.

Pre-Collegiate Level (CB21)

Not applicable.

Grading Basis

- Grade with Pass / No-Pass Option

Course Support Course Status (CB26)

Course is not a support course

General Education and C-ID

General Education Status (CB25)

Not Applicable

Transferability

Transferable to CSU only

Transferability Status

Approved

Units and Hours

Summary

Minimum Credit Units (CB07) 3

Maximum Credit Units (CB06) 3

Total Course In-Class (Contact) Hours 126

Total Course Out-of-Class Hours 36

Total Student Learning Hours 162

Credit / Non-Credit Options

Course Type (CB04)

Credit - Degree Applicable

Noncredit Course Category (CB22)

Credit Course.

Noncredit Special Characteristics

No Value

Course Classification Code (CB11)

Credit Course.

Variable Credit Course

Funding Agency Category (CB23)

Not Applicable.

Cooperative Work Experience

Education Status (CB10)

Weekly Student Hours

	In Class	Out of Class
Lecture Hours	1	2
Laboratory Hours	6	0
Studio Hours	0	0

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	54
Course In-Class (Contact) Hours	
Lecture	18
Laboratory	108
Studio	0

Total 126

Course Out-of-Class Hours

Lecture	36
Laboratory	0
Studio	0
Total	36

Time Commitment Notes for Students

No value

Units and Hours - Weekly Specialty Hours

Activity Name	Type	In Class	Out of Class
No Value	No Value	No Value	No Value

Pre-requisites, Co-requisites, Anti-requisites and Advisories

Advisory

CAM220 - Computer Aided Manufacturing, Basic Lathe (in-development)

Objectives

- Perform basic interpretation of geometric shapes and translate them into the proper numeric format.
- Explain the safety measures employed during the operation of a Computer Numerical Control (CNC) lathe.
- Perform basic cutting procedures using a CNC lathe.
- Identify the basic principles required to successfully complete a simple project.
- Differentiate between absolute and incremental positioning.
- Explain and identify the work offset (part zero).

OR

Advisory

CAM240 - Basic Mastercam Lathe (in-development)

Objectives

- Set up a Computer Numerical Control (CNC) lathe.
- Demonstrate roughing and finishing.
- Demonstrate drilling and boring.
- Evaluate the geometry of a part.
- Perform stock flip toolpath for second operation.

Entry Standards

Entry Standards

Course Limitations

Cross Listed or Equivalent Course

Specifications

Methods of Instruction

Methods of Instruction Lecture

Methods of Instruction Laboratory

Methods of Instruction Multimedia

Methods of Instruction Collaborative Learning

Methods of Instruction Demonstrations

Out of Class Assignments

- Individual project (e.g. create advanced part program from a blueprint drawing)
- Group project (e.g. create advanced part program from a solid model or models)
- Calculations (e.g. material properties and dimensions of a work piece)

Methods of Evaluation

Rationale

Exam/Quiz/Test

Quizzes

Exam/Quiz/Test

Practical laboratory examinations

Exam/Quiz/Test

Evaluation of a final project (e.g. worm gear)

Textbook Rationale

No Value

Textbooks

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

Other Instructional Materials (i.e. OER, handouts)

No Value

Materials Fee

No value

Learning Outcomes and Objectives

Course Objectives

Create complex 3D geometry and toolpaths for Mastercam lathe.

Set up a Computer Numerical Control (CNC) lathe machine with live tooling.

Choose proper set-up tools for milling.

Demonstrate roughing and finishing.

Demonstrate drilling and boring on C-axis and Y-axis.

Explain sub spindle machining.

Identify automatic part handling toolpaths for second set-up.

SLOs

Demonstrate safe and appropriate part handling for sub spindle work.

Expected Outcome Performance: 70.0

<i>ILOs</i> Core ILOs	Demonstrate depth of knowledge in a course, discipline, or vocation by applying practical knowledge, skills, abilities, theories, or methodologies to solve unique problems.
--------------------------	--

<i>CAM</i> A.S. Computer Numerical Control Technician	Use manual machine and CNC machine tools to produce manufactured parts.
---	---

Utilize and demonstrate advanced programming with Mastercam lathe.

Expected Outcome Performance: 70.0

<i>ILOs</i> Core ILOs	Analyze and solve problems using critical, logical, and creative thinking; ask questions, pursue a line of inquiry, and derive conclusions; cultivate creativity that leads to innovative ideas.
--------------------------	--

	Demonstrate depth of knowledge in a course, discipline, or vocation by applying practical knowledge, skills, abilities, theories, or methodologies to solve unique problems.
--	--

<i>CAM</i> A.S. Computer Numerical Control Technician	Apply various software programs to write CNC code for the production of manufactured parts.
	Use manual machine and CNC machine tools to produce manufactured parts.

CAM A.S. Computer Numerical Control Technician	Apply various software programs to write CNC code for the production of manufactured parts.
<hr/>	
ILOs Core ILOs	Demonstrate depth of knowledge in a course, discipline, or vocation by applying practical knowledge, skills, abilities, theories, or methodologies to solve unique problems.

Course Content

Lecture Content

Introduction (3 hours)

- History of Computer Numerical Control (CNC) programming and machining
- Review of machining basics
- Preparation for CNC machining

Lathe Machining Set-up in Mastercam (2 hours)

- Setting up Mastercam configuration for MT_Lathe
- Orientation of the part
- Part zero in Mastercam
- Stock set-up in Mastercam Creating

Complex 3D Geometry (2 hours)

- Creating more complex lines, splines, arcs, and points
- Extract geometry from 3D solid models
- Use levels, groups, and attributes
- Creating mill and turn profile

Modifying Current Geometry (3 hours)

- 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.)

Lathe & Mill Toolpaths (3 hours)

- 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

Part Handling in Mastercam (2 hours)

- Set up stock and chuck
- Use of custom planes
- Stock flip
- Pickoff and Cutoff (POCO) toolpath
- Lathe tool manager
- Toolpath and stock transform

Set up a CNC Lathe Machine with Live Tooling (3 hours)

- 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

Total hours: 18

Laboratory/Studio Content

Lathe Machining Set-up in Mastercam (18 hours)

- Setting up Mastercam configuration for MT_Lathe
- Orientation of the part
- Part zero in Mastercam
- Stock set-up in Mastercam Creating

Complex 3D Geometry (18 hours)

- Creating more complex lines, splines, arcs, and points
- Extract geometry from 3D solid models
- Use levels, groups, and attributes
- Creating mill and turn profile

Modifying Current Geometry (18 hours)

- 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.)

Lathe & Mill Toolpaths (18 hours)

- 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

Part Handling in Mastercam (18 hours)

- Set up stock and chuck
- Use of custom planes
- Stock flip
- Pickoff and Cutoff (POCO) toolpath
- Lathe tool manager
- Toolpath and stock transform

Set up a CNC Lathe Machine with Live Tooling (18 hours)

- 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

Total hours: 108

Additional Information

Is this course proposed for GCC Major or General Education Graduation requirement? If yes, indicate which requirement in the two areas provided below.

No

GCC Major Requirements

No Value

GCC General Education Graduation Requirements

No Value

Repeatability

Not Repeatable

Justification (if repeatable was chosen above)

No Value

Resources

Did you contact your departmental library liaison?

No

If yes, who is your departmental library liaison?

No Value

Did you contact the DEIA liaison?

No

Were there any DEIA changes made to this outline?

No Value

If yes, in what areas were these changes made:

No Value

Will any additional resources be needed for this course? (Click all that apply)

No Value

If additional resources are needed, add a brief description and cost in the box provided.

No Value