

CAM230 : Basic Mastercam Mill

General Information

Author:	<ul style="list-style-type: none">Jorge Palma
Course Code (CB01) :	CAM230
Course Title (CB02) :	Basic Mastercam Mill
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) :	CCC000628523
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:	CAM 230 is a Mastercam mill course that introduces the Mastercam mill interface and uses milling toolpaths to machine 2-Axis Mill parts. Machining processes include a combination of face Milling, profile Milling, pocket Milling, drilling, reaming, tapping, and high speed milling toolpaths. This course also explores stock model operations.
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

Prerequisite

CAM210 - Computer Aided Manufacturing Basic Milling (in-development)

Objectives

- Perform basic interpretation of geometric shapes and translate them into the proper numeric format.
 - Demonstrate a basic knowledge of the principles required to successfully complete a simple project.
 - Explain the safety measures employed during the operation of a Computer Numerical Control (CNC) mill.
 - Perform basic cutting procedures using a CNC mill.
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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

Discussion

Methods of Instruction

Multimedia

Methods of Instruction

Collaborative Learning

Methods of Instruction

Demonstrations

Methods of Instruction

Presentations

Out of Class Assignments

- Individual project (e.g. create a part from a blue print)
- Group project (e.g. create a part program from a solid model)
- Calculations (e.g. acceptable rotational tool speeds)

Methods of Evaluation

Rationale

Exam/Quiz/Test

Quizzes

Exam/Quiz/Test

Practical laboratory examinations

Exam/Quiz/Test

Evaluation of final project (e.g. bottle opener)

Textbook Rationale

No Value

Textbooks

Author	Title	Publisher	Date	ISBN
Mike Wearne, Duane Weidinger	MasterCam 2024 Mill 2D Training Guide	CamInstructor Incorporated	2022	978-1-77851-013-7

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

Description	Instructor handouts
Author	No value
Citation	No value
Online Resource(s)	No value

Materials Fee

No value

Learning Outcomes and Objectives

Course Objectives

Create geometry and toolpaths for Computer Numerical Control (CNC) mill.

Set up a Computer Numerical Control (CNC) mill.

Demonstrate roughing and finishing operations.

Evaluate the geometry of a part.

Perform a stock model operation.

SLOs

Demonstrate programming with Mastercam mill software.

Expected Outcome Performance: 70.0

CAM
A.S. Computer Numerical
Control Technician

Apply various software programs to write CNC code for the production of manufactured parts.

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.

Explain safe and appropriate part handling for CNC mill.

Expected Outcome Performance: 70.0

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

Verify accuracy of program keystrokes using back-plot.

Expected Outcome Performance: 70.0

CAM Apply various software programs to write CNC code for the production of manufactured parts.

A.S. Computer Numerical
Control Technician

Use manual machine and CNC machine tools to produce manufactured parts.

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

Additional SLO Information

Does this proposal include revisions that might improve student attainment of course learning outcomes?

No

Is this proposal submitted in response to learning outcomes assessment data?

No

If yes was selected in either of the above questions for learning outcomes, explain and attach evidence of discussions about learning outcomes.

No Value

SLO Evidence

No Value

Course Content

Lecture Content

General introduction (2 hours)

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

Mill Machining Setup in Mastercam (3 hours)

- Setting up Mastercam configuration
- Orientation of the part
- Part zero in Mastercam
- Stock setup in Mastercam

Creating Geometry (3 hours)

- Creating lines, arcs, and points
- Extract geometry from solid models
- Rectangle/polygon
- Use levels, groups and attributes

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.)

Mill toolpaths (3 hours)

- Face milling the part
- Roughing and finishing the profile
- Milling inside and outside the part
- Tapping cycle
- Use drilling cycle
- Threading cycles

Part Handling in Mastercam (2 hours)

- Set up stock and vise
- Using planes
- Stock model
- High speed milling
- Mill tool manager
- Toolpath transform

Set up a CNC Milling Machine (2 hours)

- Load a desired work holding fixture on the machine
- Indicate the part
- Load proper tool holders
- Find part zero
- Set up tools
- Verify and run part

Total hours: 18

Laboratory/Studio Content**Mill Machining Setup in Mastercam (18 hours)**

- Setting up Mastercam configuration
- Orientation of the part
- Part zero in Mastercam
- Stock setup in Mastercam

Creating Geometry (18 hours)

- Creating lines, arcs, and points
- Extract geometry from solid models
- Rectangle/polygon
- Use levels, groups and attributes

Modifying Current Geometry (16 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.)

Mill toolpaths (18 hours)

- Face milling the part
- Roughing and finishing the profile
- Milling inside and outside the part
- Tapping cycle
- Use drilling cycle
- Threading cycles

Part Handling in Mastercam (18 hours)

- Set up stock and vise
- Using planes
- Stock model
- High speed milling
- Mill tool manager
- Toolpath transform

Set up a CNC Milling Machine (20 hours)

- Load a desired work holding fixture on the machine
- Indicate the part
- Load proper tool holders
- Find part zero

- Set up tools
- Verify and run 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