

CAM210 : Computer Aided Manufacturing Basic Milling

General Information

Author:	• Jorge Palma
Course Code (CB01) :	CAM210
Course Title (CB02) :	Computer Aided Manufacturing Basic Milling
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) :	CCC000246608
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 210 introduces the use of computers in programming numerical control milling machines. Students write and edit programming code for computer numerical control (CNC) milling machines and learn the fundamentals of the milling process through hands-on machining practice.
Justification:	Mandatory Revision
Academic Career:	• Credit
Mode of Delivery:	
Author:	
Course Family:	

Academic Senate Discipline

Primary Discipline:	• 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. <input type="checkbox"/> 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) No value
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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
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No Value	No Value	No Value	No Value
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Pre-requisites, Co-requisites, Anti-requisites and Advisories

Advisory

ENGL101 - Introduction to College Reading and Composition

Objectives

- Read, analyze, and evaluate a variety of primarily non-fiction readings for content, context, and rhetorical merit with consideration of tone, audience, and purpose.

OR

Advisory

ESL141 - Grammar And Writing IV

Objectives

- Compose a 400 to 450-word thesis-based essay which: (a) summarizes and cites appropriately a reading passage provided as a prompt, (b) includes a clear thesis statement, (c) uses evidence to support the thesis, (d) shows clear organization into an introduction, body, and conclusion, and (e) uses appropriate rhetorical modes such as comparison/contrast, cause/effect, and persuasion in order to support a thesis.

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

- Homework (e.g. calculation of lathe speed)
- Written assignments (e.g. programming part code)

Methods of Evaluation

Rationale

Exam/Quiz/Test

Quizzes

Exam/Quiz/Test

Final examination

Exam/Quiz/Test

Project evaluation (e.g. mill rectangular block project)

Textbook Rationale

No Value

Textbooks

Author	Title	Publisher	Date	ISBN
No Value	No Value	No Value	No Value	No Value

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

Description VF/HS Haas Automation Programming Workbook
Author Haas Automation Inc.
Citation June 2006
Online Resource(s)

Materials Fee

No value

Learning Outcomes and Objectives

Course 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) mill.

Perform basic cutting procedures using a CNC mill.

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).

SLOs

Demonstrate the design process from drawing to execution of a project.

Expected Outcome Performance: 70.0

ILOs
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.

CAM
A.S. Computer Numerical
Control Technician

Discuss the techniques used to read and evaluate an engineering drawings.

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

Perform CNC mill machining programs with precision and accuracy using a range of techniques.

Expected Outcome Performance: 70.0

ILOs
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.

CAM
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.

Describe the proper applications, methods, and procedures for each program.

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.

Use manual machine and CNC machine tools to produce 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.

Demonstrate machine control panel keystroke commands for each program.

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.

Additional SLO Information

Course Content

Lecture Content

General Introduction (2 Hours)

- Scope of curriculum
- Course requirements
- Grading standards
- Methods of preparation

Familiarization (2 Hours)

- Overview of workbook requirements
- Introduction to program
- Introduction to computer
- Demonstration of computer operation
- Demonstration of Mastercam program

Introduction to Computer Numerical Control (CNC) Programming (2 Hours)

- History of CNC programming and machining
- Review of machine basics
- Basic overview of cutting tool
- CNC mill safety

CNC Mill Basic Programming System (2 Hours)

- Coordinate system
- Absolute and incremental positioning
- Program format
- Machine defaults
- Programming with codes

Overview of Program Structure (2 Hours)

- Coding structure
- G-codes, M-codes (Geometric code, Miscellaneous code)
- Machine CNC mill cycles
- Machine commands

G-code Programming (2 Hours)

- Computer code entry
- Program name format
- Code structure
- Order of operations

Haas Simulator Operation (3 Hours)

- Initializing the simulator
- Manually inputting data
- Loading a program
- Saving a program
- Verifying tool path

Haas CNC Mill Operation (3 Hours)

- Set up work holding for mill
- CNC mill controller panel
- Indicate the part
- Load tool holders & tools
- Find part zero
- Set up tools
- Verify and run CNC mill

Total hours: 18

Laboratory/Studio Content**Familiarization (2 Hours)**

- Overview of workbook requirements
- Introduction to program
- Introduction to computer
- Demonstration of computer operation
- Demonstration of Mastercam program

Introduction to Computer Numerical Control (CNC) Programming (8 Hours)

- History of CNC programming and machining
- Review of machine basics
- Basic overview of cutting tool
- CNC mill safety

CNC Mill Basic Programming System (18 Hours)

- Coordinate system
- Absolute and incremental positioning
- Program format
- Machine defaults
- Programming with codes

Overview of Program Structure (18 Hours)

- Coding structure
- G-codes, M-codes (Geometric code, Miscellaneous code)
- Machine CNC mill cycles
- Machine commands

G-code Programming (18 Hours)

- Computer code entry
- Program name format
- Code structure
- Order of operations

Haas Simulator Operation (20 Hours)

- Initializing the simulator
- Manually inputting data
- Loading a program
- Saving a program
- Verifying tool path

Haas CNC Mill Operation (24 Hours)

- Set up work holding for mill
- CNC mill controller panel
- Indicate the part
- Load tool holders & tools
- Find part zero
- Set up tools
- Verify and run CNC mill

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