Washtenaw Community College Comprehensive Report

NCT 259 MasterCam 2D and 3D CAM CNC Programming for Mills
Effective Term: Fall 2022

Course Cover
College: Advanced Technologies and Public Service Careers
Division: Advanced Technologies and Public Service Careers
Department: Advanced Manufacturing
Discipline: Numerical Control
Course Number: 259
Org Number: 14400
Full Course Title: MasterCam 2D and 3D CAM CNC Programming for Mills
Transcript Title: MasterCam 2D & 3D CAM CNC Prog
Is Consultation with other department(s) required: No
Publish in the Following:
Reason for Submission: Inactivation
Change Information:
   Other:
Rationale: Not able to run course.
Proposed Start Semester: Fall 2021
Course Description: In this course, students develop skills required to operate MasterCam software used to create 2D and 3D tool paths for milling operations. Basic understanding of file and menu structures for CAD and/or CAD CAM systems will be required for this class. Many of the menu selections, icons and tool pallet choices will be similar to those studied in the manual programming classes.

Course Credit Hours
Variable hours: No
Credits: 4
Lecture Hours: Instructor: 45 **Student:** 45
Lab: Instructor: 45 **Student:** 45
Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 90 **Student:** 90
Repeatable for Credit: NO
Grading Methods: Letter Grades
Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing
College-level Reading & Writing

College-Level Math
No Level Required

Requisites
Prerequisite
NCT 221 minimum grade "c"

General Education

Request Course Transfer
Proposed For:
Eastern Michigan University

Student Learning Outcomes

1. Apply CAD CAM software to create 2D & 3D geometry.
   Assessment 1
   Assessment Tool: Capstone project art to program
   Assessment Date: Fall 2019
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: departmentally-developed rubric
   Standard of success to be used for this assessment: 75% of students will score 75% or higher.
   Who will score and analyze the data: Department faculty

2. Apply proper methods for creating 2D tool paths for milling operations.
   Assessment 1
   Assessment Tool: Capstone project art to program
   Assessment Date: Fall 2019
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: departmentally-developed rubric
   Standard of success to be used for this assessment: 75% of students will score 75% or higher.
   Who will score and analyze the data: Department faculty

3. Apply proper methods for creating 3D tool paths for milling operations.
   Assessment 1
   Assessment Tool: Capstone project art to program
   Assessment Date: Fall 2019
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: departmentally-developed rubric
   Standard of success to be used for this assessment: 75% of students will score 75% or higher.
   Who will score and analyze the data: Department Faculty

Course Objectives
1. Know how to open and save files.
2. Know how navigate the menu structures.
3. Use view control and layers to organize geometry in the part models.
4. Use the display functions (zoom, pan, rotate, fit, refresh).
5. Manipulate geometry (delete, edit color, move to layers).
6. Create point or points using all options in the "point" and "points" menu structure.
7. Create lines using all options in the menu structure.
8. Create circles using all options in the menu structure.
9. Create and control contour tool path geometry using tool pallet menu structure.
10. Apply view control rules to create geometry in 3D space.
11. Learn how to use all functions involving drill control.
12. Apply tool path geometry to drilling and other hole producing operations using cut control options within the tool path pallets.
13. Apply tool path geometry to face cutting using cut control options within the tool path pallets.

14. Apply tool path geometry to contour cutting operations using cut control options within the tool path pallets.
15. Apply tool path geometry to produce slots of varying depth using geometry and cut control options within the tool path pallets.
16. Apply tool path geometry to circular pockets using cut control options within the tool path pallets.
17. Apply tool path geometry to irregular shaped pockets using cut control options within the tool path pallets.
18. Apply tool path geometry to irregular shaped pockets with islands using cut control options within the tool path pallets.
19. Apply proper methods for machining single surface features (ruled, section, extruded and more).
20. Apply proper methods for machining multiple surface features (extruded, drive curves, swept surfaces and more).
21. Edit the surfaces to create smooth transitions (blending, fillet, corner rounding, and more).
22. Generate tool paths using a range of methods (Roughing, Finishing, Dynamic Opti-rough, Rough Plunge, Rough Pocket, Finish Contour and more).
23. Apply concepts within tool pallets to control surface finish and optimize time.

New Resources for Course

Course Textbooks/Resources
Textbooks
Manton,Matthew & Weldinger,Duane. *Mastercam X9 Training Guide - Mill 2D&3D*, X9 ed. Kitchner Ontario: Cam Instructor Inc., 2015, ISBN: 978-1-927359-.
Manuals
Periodicals
Software

Equipment/Facilities
Level III classroom
Computer workstations/lab

Reviewer	Action	Date
Faculty Preparer:		
Allan Coleman	*Faculty Preparer*	*Nov 24, 2021*
Department Chair/Area Director:		
Allan Coleman	*Recommend Approval*	*Dec 02, 2021*
Dean:		
Jimmie Baber	*Recommend Approval*	*Dec 05, 2021*
Curriculum Committee Chair:		
Randy Van Wagnen	*Reviewed*	*Feb 22, 2022*
Assessment Committee Chair:		
Vice President for Instruction:		
Kimberly Hurns	*Approve*	*Feb 23, 2022*

Washtenaw Community College Comprehensive Report

NCT 259 MasterCam 2D and 3D CAM CNC Programming for Mills
Effective Term: Fall 2016

Course Cover
Division: Advanced Technologies and Public Service Careers
Department: Industrial Technology
Discipline: Numerical Control
Course Number: 259
Org Number: 14400
Full Course Title: MasterCam 2D and 3D CAM CNC Programming for Mills
Transcript Title: MasterCam 2D & 3D CAM CNC Prog
Is Consultation with other department(s) required: No
Publish in the Following:
Reason for Submission: New Course
Change Information:
Rationale: This class is being created for an advanced certificate in the advanced manufacturing program. This course is needed to get students skills to operate new equipment being purchased for our program.
Proposed Start Semester: Fall 2016
Course Description: In this course, students develop skills required to operate MasterCam software used to create 2D and 3D tool paths for milling operations. Basic understanding of file and menu structures for CAD and/or CAD CAM systems will be required for this class. Many of the menu selections, icons and tool pallet choices will be similar to those studied in the manual programming classes.

Course Credit Hours
Variable hours: No
Credits: 4
Lecture Hours: Instructor: 45 **Student:** 45
Lab: Instructor: 45 **Student:** 45
Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 90 **Student:** 90
Repeatable for Credit: NO
Grading Methods: Letter Grades
Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing
College-level Reading & Writing

College-Level Math
No Level Required

Requisites
Prerequisite
NCT 221 minimum grade "c"

General Education

Request Course Transfer

Proposed For:
Eastern Michigan University

Student Learning Outcomes

1. Apply CAD CAM software to create 2D & 3D geometry.
   Assessment 1
   Assessment Tool: Capstone project art to program
   Assessment Date: Fall 2019
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: departmentally-developed rubric
   Standard of success to be used for this assessment: 75% of students will score 75% or higher.
   Who will score and analyze the data: Department faculty

2. Apply proper methods for creating 2D tool paths for milling operations.
   Assessment 1
   Assessment Tool: Capstone project art to program
   Assessment Date: Fall 2019
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: departmentally-developed rubric
   Standard of success to be used for this assessment: 75% of students will score 75% or higher.
   Who will score and analyze the data: Department faculty

3. Apply proper methods for creating 3D tool paths for milling operations.
   Assessment 1
   Assessment Tool: Capstone project art to program
   Assessment Date: Fall 2019
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: departmentally-developed rubric
   Standard of success to be used for this assessment: 75% of students will score 75% or higher.
   Who will score and analyze the data: Department Faculty

Course Objectives
1. Know how to open and save files.
2. Know how navigate the menu structures.
3. Use view control and layers to organize geometry in the part models.
4. Use the display functions (zoom, pan, rotate, fit, refresh).
5. Manipulate geometry (delete, edit color, move to layers).
6. Create point or points using all options in the "point" and "points" menu structure.
7. Create lines using all options in the menu structure.
8. Create circles using all options in the menu structure.
9. Create and control contour tool path geometry using tool pallet menu structure.
10. Apply view control rules to create geometry in 3D space.
11. Learn how to use all functions involving drill control.
12. Apply tool path geometry to drilling and other hole producing operations using cut control options within the tool path pallets.
13. Apply tool path geometry to face cutting using cut control options within the tool path pallets.

14. Apply tool path geometry to contour cutting operations using cut control options within the tool path pallets.
15. Apply tool path geometry to produce slots of varying depth using geometry and cut control options within the tool path pallets.
16. Apply tool path geometry to circular pockets using cut control options within the tool path pallets.
17. Apply tool path geometry to irregular shaped pockets using cut control options within the tool path pallets.
18. Apply tool path geometry to irregular shaped pockets with islands using cut control options within the tool path pallets.
19. Apply proper methods for machining single surface features (ruled, section, extruded and more).
20. Apply proper methods for machining multiple surface features (extruded, drive curves, swept surfaces and more).
21. Edit the surfaces to create smooth transitions (blending, fillet, corner rounding, and more).
22. Generate tool paths using a range of methods (Roughing, Finishing, Dynamic Opti-rough, Rough Plunge, Rough Pocket, Finish Contour and more).
23. Apply concepts within tool pallets to control surface finish and optimize time.

New Resources for Course

Course Textbooks/Resources
Textbooks
Manton,Matthew & Weldinger,Duane. *Mastercam X9 Training Guide - Mill 2D&3D*, X9 ed. Kitchner Ontario: Cam Instructor Inc., 2015, ISBN: 978-1-927359-.
Manuals
Periodicals
Software

Equipment/Facilities
Level III classroom
Computer workstations/lab

Reviewer	Action	Date
Faculty Preparer:		
Thomas Penird	*Faculty Preparer*	*Aug 29, 2015*
Department Chair/Area Director:		
Thomas Penird	*Recommend Approval*	*Aug 29, 2015*
Dean:		
Brandon Tucker	*Recommend Approval*	*Oct 06, 2015*
Curriculum Committee Chair:		
Kelley Gottschang	*Recommend Approval*	*Nov 30, 2015*
Assessment Committee Chair:		
Michelle Garey	*Recommend Approval*	*Dec 01, 2015*
Vice President for Instruction:		
Michael Nealon	*Approve*	*Dec 14, 2015*