

Washtenaw Community College Comprehensive Report

NCT 123 2D CAD CAM CNC Programming for Mills and Lathes 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: 123

Org Number: 14400

Full Course Title: 2D CAD CAM CNC Programming for Mills and Lathes

Transcript Title: 2D CAD CAM CNC Programming

Is Consultation with other department(s) required: No

Publish in the Following: College Catalog , Time Schedule , Web Page

Reason for Submission: Course Change

Change Information:

Pre-requisite, co-requisite, or enrollment restrictions

Rationale: This course does utilize our CNC lab. Requiring knowledge of machines obtained in NCT 101. Adding only prereq at this time.

Proposed Start Semester: Fall 2022

Course Description: In this course, students will use geometry creation skills to create tool paths for drilling operations, arc hole patterns, hole patterns, slotting, facing, contouring, and pocket milling. The computer-aided manufacturing (CAM) files will be posted to the vertical computer numerical control (CNC) machine tools to create milled parts. Lathe cycles such as facing, internal and external roughing, grooving, and threading will be used with the CAM software to produce parts on the CNC horizontal lathes.

Course Credit Hours

Variable hours: No

Credits: 2

Lecture Hours: Instructor: 30 **Student:** 30

Lab: Instructor: 30 **Student:** 30

Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 60 **Student:** 60

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 101 minimum grade "C"

and

Prerequisite

NCT 120 minimum grade "C"

General Education

Request Course Transfer

Proposed For:

Eastern Michigan University

Student Learning Outcomes

1. Create 2D tool paths for milling operations.

Assessment 1

Assessment Tool: Outcome-related capstone projects

Assessment Date: Fall 2022

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 the students will score 75% or greater.

Who will score and analyze the data: Departmental faculty

2. Create 2D tool paths for lathe operations.

Assessment 1

Assessment Tool: Outcome-related capstone projects

Assessment Date: Fall 2022

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 the students will score 75% or greater.

Who will score and analyze the data: Departmental faculty

3. Write and modify post files to run the CNC machine tools.

Assessment 1

Assessment Tool: Outcome-related capstone projects

Assessment Date: Fall 2022

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 the students will score 75% or greater.

Who will score and analyze the data: Departmental faculty

Course Objectives

1. Utilize all software functions that control drilling holes.
2. Apply tool path geometry to drilling and other hole-producing operations using cut control options within the tool path pallets.
3. Apply tool path geometry to face cutting using cut control options within the tool path pallets.
4. Apply tool path geometry to contour cutting operations using cut control options within the tool path pallets.

5. Apply tool path geometry to produce slots of varying depth using geometry and cut control options within the tool path pallets.
6. Apply tool path geometry to circular pockets using cut control options within the tool path pallets.
7. Apply tool path geometry to irregular shaped pockets using cut control options within the tool path pallets.
8. Apply tool path geometry to irregular shaped pockets with islands using cut control options within the tool path pallets.
9. Generate geometry for lathe parts.
10. Apply tool path geometry to face parts at the lathe using cut control options within the tool path pallets.
11. Apply tool path geometry to rough and finish turn part external features at the lathe using cut control options within the tool path pallets.
12. Apply tool path geometry to rough and finish turn part internal features at the lathe using cut control options within the tool path pallets.
13. Apply tool path geometry to cut shaped features (grooves, knurls) at the lathe using cut control options within the tool path pallets.
14. Set up and cut parts at the CNC vertical mills using tool paths generated with the CAD/CAM software.
15. Set up and cut parts at the CNC turning centers using tool paths generated with the CAD/CAM software.

New Resources for Course

Course Textbooks/Resources

Textbooks
Manuals
Periodicals
Software

Equipment/Facilities

Level III classroom
Computer workstations/lab

<u>Reviewer</u>	<u>Action</u>	<u>Date</u>
Faculty Preparer: <i>Allan Coleman</i>	<i>Faculty Preparer</i>	<i>Jan 17, 2022</i>
Department Chair/Area Director: <i>Allan Coleman</i>	<i>Recommend Approval</i>	<i>Jan 17, 2022</i>
Dean: <i>Jimmie Baber</i>	<i>Recommend Approval</i>	<i>Jan 18, 2022</i>
Curriculum Committee Chair: <i>Randy Van Wagnen</i>	<i>Recommend Approval</i>	<i>Feb 16, 2022</i>
Assessment Committee Chair: <i>Shawn Deron</i>	<i>Recommend Approval</i>	<i>Feb 23, 2022</i>
Vice President for Instruction: <i>Kimberly Hurns</i>	<i>Approve</i>	<i>Feb 23, 2022</i>

Washtenaw Community College Comprehensive Report

NCT 123 2D CAD CAM CNC Programming for Mills and Lathes Effective Term: Fall 2016

Course Cover

Division: Advanced Technologies and Public Service Careers

Department: Industrial Technology

Discipline: Numerical Control

Course Number: 123

Org Number: 14400

Full Course Title: 2D CAD CAM CNC Programming for Mills and Lathes

Transcript Title: 2D CAD CAM CNC Programming

Is Consultation with other department(s) required: No

Publish in the Following: College Catalog , Time Schedule , Web Page

Reason for Submission: New Course

Change Information:

Rationale: This course, combined with NCT120 created, will replace what was NCT249. Upon approval of NCT120 and NCT123 the NCT249 (4 credit) will be deactivated and replaced with these two classes.

Proposed Start Semester: Fall 2016

Course Description: In this course, students will use geometry creation skills to create tool paths for drilling operations, arc hole patterns, hole patterns, slotting, facing, contouring, and pocket milling. The CAM files will be posted to the vertical CNC machine tools to create milled parts. Lathe cycles such as facing, internal and external roughing, grooving, and threading will be used with the CAM software to produce parts on the CNC horizontal lathes. This course contains material previously taught in NCT 249.

Course Credit Hours

Variable hours: No

Credits: 2

Lecture Hours: Instructor: 30 Student: 30

Lab: Instructor: 30 Student: 30

Clinical: Instructor: 0 Student: 0

Total Contact Hours: Instructor: 60 Student: 60

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 120 minimum grade "C"

General Education

Request Course Transfer

Proposed For:

Eastern Michigan University

Student Learning Outcomes

1. Create 2D tool paths for milling operations.

Assessment 1

Assessment Tool: Capstone project art to program

Assessment Date: Fall 2018

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 the students will score 75% or greater.

Who will score and analyze the data: Department Faculty

2. Create 2D tool paths for lathe 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 the students will score 75% or greater.

Who will score and analyze the data: Department Faculty

3. Write and modify post files to run the CNC machine tools.

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 the students will score 75% or greater.

Who will score and analyze the data: Department Faculty

Course Objectives

1. Learn how to use all functions involving drill control.
2. Apply tool path geometry to drilling and other hole producing operations using cut control options within the tool path pallets.
3. Apply tool path geometry to face cutting using cut control options within the tool path pallets.
4. Apply tool path geometry to contour cutting operations using cut control options within the tool path pallets.
5. Apply tool path geometry to produce slots of varying depth using geometry and cut control options within the tool path pallets.
6. Apply tool path geometry to circular pockets using cut control options within the tool path pallets.
7. Apply tool path geometry to irregular shaped pockets using cut control options within the tool path pallets.
8. Apply tool path geometry to irregular shaped pockets with islands using cut control options

within the tool path pallets.

9. Generate geometry for lathe parts.
10. Apply tool path geometry to face parts at the lathe using cut control options within the tool path pallets.
11. Apply tool path geometry to rough and finish turn part external features at the lathe using cut control options within the tool path pallets.
12. Apply tool path geometry to rough and finish turn part internal features at the lathe using cut control options within the tool path pallets.
13. Apply tool path geometry to cut shaped features (grooves, knurls) at the lathe using cut control options within the tool path pallets.
14. Setup and cut parts at the CNC vertical mills using tool paths generated with the CAD/CAM software.
15. Setup and cut parts at the CNC turning centers using tool paths generated with the CAD/CAM software.

New Resources for Course

Course Textbooks/Resources

Textbooks
Manuals
Periodicals
Software

Equipment/Facilities

Level III classroom
Computer workstations/lab

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