



SYLLABUS

SOUTHERN POLYTECHNIC COLLEGE OF ENGINEERING AND ENGINEERING TECHNOLOGY
DEPARTMENT OF ENGINEERING TECHNOLOGY
MET 2800: CNC PROGRAMMING
FALL 2021

Course Information

Class meeting time: Lecture Tues./Thurs. 12:30pm-1:20pm
Lab Tues. or Thurs. 2:00pm-4:45pm
Modality and Location: Lecture F2F Q222
Lab F2F Q120

Instructor Information

Name: Randy Emert
Email: remert@kennesaw.edu
Office Location: Q226
Office phone: 470-578-7406
Office Hours: M-Th 11am-12pm
Preferred method of communication: email listed above

Course Description

This course is an introduction to CNC programming, process identification, process optimization, and automation. Tooling and workholding selection will be incorporated into the manufacturing design process. Laboratory projects will emphasize safety, CNC programming techniques, engineering documentation, design considerations, and in process inspection.

Course Materials

Required Texts: ToolingU.com. Instructions and code are on D2L along with the schedule of lessons.
Recommended Texts: Introduction to Computer Numerical Control Manufacturing, Fifth Edition. ISBN: 978-0-13-217603-3
Technology requirements: Access to internet; Solidworks; HSM Works; flash drive
Machine Shop: Safety glasses, closed toe shoes

Learning Outcomes

Students completing MET 2800 will have the ability to:

1. Select tooling and workholding to machine a part.
2. Perform CNC programming using a CAD/CAM system.
3. Provide set up instructions for various CNC machining tools to manufacture parts.
4. Develop camaraderie in an engineering team environment.
5. Communicate work completely, neatly and with grammatical correctness in report and procedure formats.

Course Requirements and Assignments

Assignments: In class assignments will be given each class period and/or each week.

ToolingU: Three to five ToolingU lessons will be assigned and due each week. Each test may be taken up to three times in order to get the best grade possible. Due dates for ToolingU are provided in the Course Schedule below.

Tests/Project: There will be a midterm and a final project. The midterm is based on hand coding and the final is based on CAD/CAM programming. A final project will be a culmination of what was learned throughout the course.

Labs: There will be seven Lab grades. Labs will consist of CAD/CAM programming, CNC setup and machining, lab reports, and field trips.

Evaluation and Grading Policies

Assignments	25%
ToolingU	25%
Tests/Project	25%
Labs	25%

ToolingU provides immediate feedback on each lesson with a test score. The assignment grades will be posted in D2L one week after their due date. The tests will likewise be posted in D2L one week after their due date. Any discrepancies on assignments, tests, or labs must be identified through email, remert@kennesaw.edu, within one week of being posted in D2L.

GRADING SCALE:

90% - 100% A
80% - 89% B
70% - 79% C
60% - 69% D
0% - 59% F

Grades will be rounded up if they are $>$ or $= .5$ or above, for example, an 89.6 is an A, but 79.2 is a C.

Course Policies

Students are expected to attend each lab. If you are unable to attend, send an email to remert@kennesaw.edu to document that you will not be in attendance. Communication is key. If you are aware of conflicts email early to notify me that you will be missing class. There are seven labs assigned during the semester and each lab builds upon the previous lab.

All due dates are listed in the Course Schedule below. If you are unable to meet the due dates due to extenuating circumstances, prior arrangements are required and must be documented through email at remert@kennesaw.edu.

Institutional Policies

[Federal, BOR, & KSU Course Syllabus Policies](#)

KSU Student Resources

This link contains information on help and resources available to students: [KSU Student Resources for Course Syllabus](#)

Course Delivery

KSU may shift the method of course delivery at any time during the semester in compliance with University System of Georgia health and safety guidelines. In this case, alternate teaching modalities that may be adopted include hyflex, hybrid, synchronous online, or asynchronous online instruction.

COVID-19 illness

If you are feeling ill, please stay home and contact your health professional. In addition, please email your instructor to say you are missing class due to illness. Signs of COVID-19 illness include, but are not limited to, the following:

- Cough
- Fever of 100.4 or higher
- Runny nose or new sinus congestion
- Shortness of breath or difficulty breathing
- Chills
- Sore Throat
- New loss of taste and/or smell

COVID-19 vaccines are a critical tool in “Protecting the Nest.” If you have not already, you are strongly encouraged to get vaccinated immediately to advance the health and safety of our campus community. As an enrolled KSU student, you are eligible to receive the vaccine on campus. Please call (470) 578-6644 to schedule your vaccination appointment or you may walk into one of our student health clinics.

For more information regarding COVID-19 (including testing, vaccines, extended illness procedures and accommodations), see KSU’s official Covid-19 website.

Face Coverings

Based on guidance from the University System of Georgia (USG), all vaccinated and unvaccinated individuals are encouraged to wear a face covering while inside campus facilities. Unvaccinated individuals are also strongly encouraged to continue to socially distance while inside campus facilities, when possible.

Course Schedule

Week	ToolingU Lesson	Due Date
1		
2		8/27 11:59pm
	Haas Mill: Classic Control Panel Overview 250	
	Haas Mill Classic Control: Entering Offsets 260	
	Haas Mill Classic Control: Locating Program Zero 270	
	Intro to Workholding 101	
3		9/3 11:59pm
	Haas Mill Classic Control: Program Execution 280	
	Haas Mill Classic Control: Program Storage 310	
	Haas Mill Classic Control: First Part Runs 320	

4		9/10 11:59pm
	Introduction to CNC Machines 201	
	History and Definition of CNC 202	
	Basics of the CNC Mill 212	
	Speed and Feed for the Mill 311	
5		9/17 11:59pm
	CNC Specs for the Mill 220	
	Coordinates for the CNC Mill 222	
	Control Panel Functions for the CNC Mill 252	
	Offsets on the CNC Mill 262	
6		9/24 11:59pm
	Basics of G Code Programming 231	
	Creating a Milling Program 290	
	Supporting and Locating Principles 111	
7		10/1 11:59pm
	Creating a CNC Milling Program 302	
	Locating Devices 121	
	Basic Cutting Theory 201	
8		10/8 11:59pm
	Calculations for Programming the Mill 312	
	Introduction to CAD and CAM for Machining 241	
	Clamping Basics 131	
	Cutting Tool Materials 321	
9		10/15 11:59pm
	Canned Cycles 310	
	Canned Cycles for the Mill 322	
	Chucks, Collets, and Vises 141	
	Introduction to Metal Cutting Fluids 221	
10		10/22 11:59pm
	Haas Lathe Classic Control Panel Overview 256	
	Haas Lathe Classic Control: Entering Offsets 265	
	Haas Lathe Classic Control: Locating Program Zero 275	
	Speed and Feed for the Lathe 301	
11		10/29 11:59pm
	Haas Lathe Classic Control: Program Execution 285	
	Haas Lathe Classic Control: Program Storage 315	
	Haas Lathe Classic Control: First Part Runs 325	
	Toolholders for Turning 260	
12		11/5 11:59pm
	Basics of the CNC Lathe 211	
	Coordinates for the CNC Lathe 221	
	CNC Specs for the Lathe 225	
	Control Panel Functions for the CNC Lathe 251	
	Offsets on the CNC Lathe 261	
13		11/12 11:59pm
	Calculations for Programming the Lathe 311	
	Creating a CNC Turning Program 301	
	Canned Cycles for the Lathe 321	
14		11/19 11:59pm
	Fixture Body Construction 200	
	Fixture Design Basics 201	
	Drill Bushing Selection 230	

Week	Lab Description	Due Date
1	Haas CNC Mill Setup	T 8/17; TH 8/19
	Indicate a Vise, Tool Offset, Work Offset, Change a Tool	
2	Introduction to HSM Works	T 8/24; TH 8/26
	Transfer G Code to CNC Machine	
3	SOFT JAW	
	CNC Programming & CNC Machining	
4	SOFT JAW	T 9/7; TH 9/9
	CNC Machining & Documentation	
5	TITAN	
	CNC Programming	
6	TITAN	
	Run TITAN on CNC Mill	
7	TITAN	T 9/28; TH 9/30
	Complete Documentation	
8	ROOK	
	CNC Programming & CNC Machining	
9	ROOK	T 10/12; TH 10/14
	CNC Machining & Documentation	
10	WISE HANDLE	
	Project Description and Reverse Engineering	
11	WISE HANDLE	
	Design Handle Base	
12	WISE HANDLE	
	CAD/CAM Programming with HSM Works	
13	WISE HANDLE	T 11/9; TH 11/11
	CNC Machining and Documentation	
14	Field Trip/CNC Mill Setup Test	T 11/16; TH 11/18
15	CNC Mill Setup Test/Field Trip	T 11/30; TH 12/2

This syllabus including scheduling and grading may be modified based on mutual agreement of instructor and student.