

Computer Numerical Control Programming

Curriculum Map						
Course	Course Description	Learning Objectives	Assessment Methods	Prerequisites	Standards	Notes
	Create a steam or stiring engine that involves parts using both the mill and the lathe.	Create a portfolio which may include printouts of Mastercam or other Computer Aided Manufacturing program part file drawings, numerical code files and operation sheets on an advanced level.	Compose written assignments on occupation safety in general industry.	Solve formulas by using unknowns and apply this knowledge to solve problems encountered in technological areas and various fields of engineering.	Establish a systematic approach to recognizing the essential information given on a blueprint.	Create, manipulate, and indentify multibody solids and use them in a meaningful part and assembly design.
ENE-52 Geometric Dimensioning and Tolerancing					I	I, D
	Read and interpret the ANSI Y14.5M standard for Geometric Dimensioning and Tolerancing (GD&T)					
	Read blueprints using GD&T standards				J	I, D
	Locate, identify and correct errors in GD&T on standard blueprints					
ENE-60 Math for Engineering Technology	I			I, D, M		I
	Solve arithmetic problems dealing with addition, subtraction, multiplication and division that are typical to the industrial setting.			D, M		
	Solve formulas by using unknowns and apply this knowledge to solve problems encountered in technological areas and various fields of engineering.			D, M		
	Solve problems by use of a scientific calculator.					
MAN-56 CNC Machine Set-up and operation	I, D, M	I, D, M		I	I	I
	Analyze engineering drawings for content necessary for the set-up and operation of CNC machine tools.	I, D, M			I	I
	Select, set, and install tooling as indicated by the engineering drawings and the CNC program while assessing the program for accuracy and editing when necessary.	I, D				
	Recognize CNC machine codes and terminology for computerized machining and manufacturing.					
	Demonstrate appropriate precision measurement instrument use.	I, D				
	Convert to and from Metric and U.S. customary, fractional and decimal fractional units.	I, D		I		
MAN-53 Adv Computer-Aided Manufacturing	D, M	D, M				D, M
	Create advanced multi-dimensional computer aided machining programs and tool paths for turning centers using various CAM software packages.	D, M	D, M			D, M
	Create advanced multi-dimensional computer aided machining programs and tool paths for milling machines using various CAM software packages.	D, M	D, M			D, M
	Demonstrate set-up and operation of advanced machining programs on CNC controlled machining centers.					
	Demonstrate satisfactory proficiency in part design and tool path creation using CAM software.					
	Produce multi-dimensional parts for assemblies using both turning centers and milling machines.					
MAN-57 CNC Program Writing		I, D, M				
	Perform calculations necessary to develop coordinate charts for part geometry.					
	Use canned cycles correctly in programs for CNC machine tools.					
	Use subroutine techniques correctly in programs for CNC machine tools.	I, D, M				
	Analyze CNC programs written by others to determine machining sequences.	I, D, M				
MAN-55 OSHA Standards for General Industry			I, D, M			

Locate and apply OSHA Safety and Health standards, policies and procedures for general industry.			I, D, M			
Utilize OSHA standards and regulations to supplement an ongoing safety and health program.						
Identify common violations of OSHA standards and propose abatement actions.						
Analyze the common causes of accidents and fatalities in hazardous areas of general industry.			I, D, M			
ENE-42 Solidworks I						I, D, M

Use all menus and options of the CAD system needed to build basic and advanced solid models.						
Apply materials such as metals and plastics to solid models then load each model and analyze the resulting deformations and stresses.						I, D, M
Build solid model assemblies and animate all moving parts with special attention to collision detection.						
Analyze and solve three-dimensional parametric solid modeling problems typically found in most solid models.						I, D, M

ENE-30 Computer Aided Drafting		I				I, D
Demonstrate the technique of mechanical and architectural drawing using computer assistance.						
Set up drawing parameters in order to create, store and retrieve drawings.						I, D
Synthesize information and apply critical thinking skills to solve instructional problems typical of industry.						
Apply the principles of two-dimensional CAD in the solution of various design problems.						I, D
Demonstrate CAD skills and work habits that will lead to transfer and future employment.		I				

ENE-51 Blueprint Reading				I		I, D, M
Develop basic blueprint reading ability along with a better understanding of prints, specifications, etc., used in the general field of all industry.						
Establish a systematic approach to recognizing the essential information given on a blueprint.				I		I, D, M
Create in the individual a confidence in the ability to approach and analyze even a complex print.						

MAN-52 Computer Aided Manufacturing-Mastercam	I		I, D, M				I, D
Program turning centers using MasterCam Computer Aided Machining software.		I		I, D, M			I, D
Program milling machine operators using MasterCam Computer Aided Machining (CAM) software.		I		I, D, M			I, D

Set up and operate machining programs on CNC controlled machining centers.							
Create simple parts using software and machining equipment.							

I=Introduced
D=Developed and Practiced with feedback
M=Demonstrated at the Mastery Level Appropriate for Graduation