MACHINE TOOL TECHNOLOGY (MTT)

MTT-111 Manual Machining I
5 credits, Fall/Winter
This course is an introduction to machine tool operation and precision measurement. It covers elementary operation of drill presses, bandsaws, lathes, and milling machines. The course includes external threading.
Recommended Prerequisite Or Corequisite: MFG-104 and MTH-050

MTT-112 Manual Machining II
5 credits, Winter/Spring
This course is a continuation of machine tool operations. It covers set-up and operation of the vertical milling machine, lathe boring techniques, surface grinding and screw thread nomenclature.
Prerequisites: MTT-111

MTT-113 Manual Machining III
5 credits, Spring/Summer
This course is a continuation of machine tool operations. Topic covered include offset boring heads, rotary tables, indexing devices, taper attachments and cylindrical grinding. Additional emphasis is also placed on inspections technique, technical math and optical comparators.
Prerequisites: MTT-112

MTT-121 CNC I: Set-Up and Operation
3 credits, Fall
This is the first course in the CNC sequence. Students will learn basic skills including how to properly set-up and operate both CNC milling and turning centers. Students will also learn G & M codes related to basic machine set-up and operation. Designed for persons with little or no previous CNC experience.

MTT-122 CNC II: Programming and Operation
4 credits, Winter
This is the second course in the CNC sequence. Students will learn G&M-code programming for milling and turning while they build their set-up and operation skills. There will also be an introduction to set-up probing, 4-axis mill programming and machining, sub-programming and process documentation.
Prerequisites: MTT-111, MTT-121, MTH-050

MTT-123 CNC III: Applied Programming and Operation
4 credits, Spring
This is the third course in the CNC sequence. Students will build their CNC programming, set-up, and operation skills. They will work individually or in small groups to design, program, manufacture, and test advanced projects using CNC mills, CNC lathes, multi-axis/process machine tools, and various software applications.
Prerequisites: MTT-122 and MTH-080

MTT-141 CAD/CAM I
4 credits, Spring
This course is the first in the CAM series and will introduce students to computer-aided part creation and programming. Students will use CAD/CAM software to generate Numerical Control (NC) code to produce machined products. Model creation, process verification, code generation, and CAD/CAM integration will be covered.
Recommended: MTT-121

MTT-241 CAD/CAM II
4 credits, Fall
This course is the second in the Computer-Aided Machining (CAM) series and will greatly expand the student's existing CAD/CAM skills by exploring more advanced software features and programming techniques. There will be a strong emphasis placed on the entire CAD/CAM/CNC part machining process. An introduction to 4-axis mill programming will be included.
Prerequisites: MTT-122 and MTT-141

MTT-242 CAD/CAM III
4 credits, Winter
This course is the third in the Computer-Aided Machining (CAM) series and will build on the previous course. Students will use CAD/CAM software to produce CNC parts. There will be an emphasis on multiple operations on both CNC milling and turning machines. An introduction to five-axis and mill/turn machining will be included.
Prerequisites: MTT-241

MTT-252 Macro Programming and Machine Probing
3 credits, Fall
This course is an introduction to Fanuc-based, custom macro programming for individuals with some previous G&M-code programming experience. Students will learn to define and apply macro variables, program branching, macro functions and operators and implement repetitive looping. Additional topics will include custom alarms and assignment of G & M codes to macros. Students will write and prove out programs on HAAS CNC controls utilizing all basic functions of the language using Renishaw touch probes.
Recommended: Competence with basic G&M-code mill programming (FANUC/Haas-style) or MTT-123

MTT-253 5-Axis Machining
3 credits, Winter
This class will introduce students to 5-axis CNC milling machines, their programming, and setup procedures. The course will explore limitations, advantages, and configurations of typical 5-axis machines including rotation style and set-up orientation. Post processing and virtual machine simulation will also be discussed.
Prerequisites: MTT-123

MTT-254 Mill/Turn Machining
3 credits, Spring
This class will introduce students to CNC mill-turn machines, their programming, and setup procedures. The course will explore limitations, advantages, and configurations of typical mill/turn machines including rotation style and set-up orientation. Post processing and virtual machine simulation will also be discussed.
Prerequisites: MTT-123

MTT-268 Capstone Machining I
3 credits, Winter
This is the first of the capstone project series and will allow students to demonstrate mastery of core skills that are learned in the machining program including: CNC setup and operation, manual machining, CAM programming, and surface grinding. This class will focus on importing models, process development, and programming components to be run on a CNC machine tool.
Prerequisites: MTT-113, MTT-123, MTT-141
Recommended Corequisite: MTT-242

MTT-269 Capstone Machining II
3 credits, Spring
This final course in the capstone project series will continue to allow students to demonstrate mastery of core skills that are learned in the machining program while manufacturing a complex product. Special emphasis will be given to 4 and 5-axis CNC machining and programming, material preparation for CNC machining, and precision surface grinding.
Prerequisites: MTT-268