

SLO Presentation

MTT

Date: 09-15-2022

ISLO

Civic Engagement

- Students will develop values and beliefs in their role as a member of local, national and global societies to promote truth, fairness and goodwill to others. They will use the democratic process to further their values and beliefs and recognize and accept differing perspectives based on cultural diversity. They will engage in actions which provide service to others and have a positive impact on their local community.

Communication and Expression

- Students will demonstrate the ability to effectively and appropriately communicate their thoughts and ideas both in written and oral forms. They will develop verbal and non-verbal delivery skills, in an appropriate manner, to communicate their ideas as well as evaluate the ideas of others in a wide variety of contexts.

Critical Thinking and Quantitative Reasoning

- Students will demonstrate the ability to recognize assumptions within an argument and actively and skillfully analyze underlying reasoning to develop a conclusion. They will apply qualitative and/or quantitative analysis to solve problems, predict outcomes, test hypotheses, and explore alternatives in an ethical manner.

Information Literacy

- Students will demonstrate the ability to determine when gathering additional information is necessary. They will use appropriate resources and technologies to locate, evaluate and incorporate the information when developing supporting arguments and drawing conclusions. Students will also develop the ability to understand any legal, ethical or social issues regarding the use of information.

Personal Knowledge and Responsibility

- Students will develop the necessary skills to define, maintain and complete their personal educational goals. They will learn to work independently to accomplish personal goals toward realizing their full potential academically, physically and emotionally whether for personal enrichment, further education or career advancement.

Technology
MTT
Industrial Arts Education <ul style="list-style-type: none">• Student know how to repair basic automotive systems• Students understands blueprint reading up to the industry standard• Students design and troubleshoot basic electrical and electronic circuits• Students fabricates parts using manually operated machine tools• Student design parametric 3d parts and assemblies• Student fabricate wooden structures using the manually operated woodworking machineries• Students troubleshoot and optimize basic four plastics manufacturing processes.
Machine Tool Technology--AA <ul style="list-style-type: none">• Students apply industry standard safety practices and specific safety requirements for different machining operations.• Students calculate necessary tolerances to plan for his machine sequences.• Students create the digital geometry necessary for machine programming.• Students inspect the produced part to ensure completion per blueprint requirement.• Students interpret blueprint information and translate it into actionable items.• Students perform basic setup and operation of a CNC lathe & mill.• Students perform setup and operation of manual machines, such as band saw, lathe, mill, and drill press.
Machinist--Cert <ul style="list-style-type: none">• Students apply industry standard safety practices and specific safety requirements for different machining operations.• Students calculate adjust speed, feed and other parameters to properly produce the part.• Students calculate necessary tolerances to plan for his machine sequences.

- Students inspect the produced part to ensure completion per blueprint requirement.
- Students interpret blueprint information and translate into actionable items.
- Students perform setup and operation of manual machine, such as band saw, lathe, mill, and drill press.

Numerical Control Machine Operator--Cert

- Students apply industry standard safety practices and specific safety requirement for different machining operations.
- Students complete industry standard inspection report.
- Students inspect the produced part to ensure completion per blueprint requirement.
- Students interpret blueprint information and translate it into actionable items.
- Students perform basic setup and operation of CNC lathe & mill.
- Students perform setup and operation of manual machines, such as band saw, lathe, mill, and drill press.

Numerical Control Tool Programmer--Cert

- Students apply industry standard safety practices and specific safety requirement for different machining operations.
- Students create the digital geometry necessary for machine programming.
- Students generate a tool path and verify its execution.
- Students inspect the produced part to ensure completion per blueprint requirement.
- Students interpret blueprint information and translate into actionable items.
- Students perform basic setup and operation of CNC lathe & mill.

Tool and Die Maker--Cert

- Students apply industry standard safety practices and specific safety requirement for different machining.
- Students calculate adjust speed, feed and other parameters to properly produce the part.
- Students complete industry standard inspection report.
- Students inspect the produced part to ensure completion per blueprint requirement.
- Students interpret blueprint information and translate into actionable items.
- Students perform the set up and operation of manual machines, such as band saw, lathe, mill, and drill press.

CSLO

MTT51 - MasterCAM Milling

- Students can create basic geometry needed for machining on a CNC milling machine.
- Students can access the proper toolpath to machine the part according to the blueprint.
- Students can modify instructor's tool paths after verify simulation on a virtual CNC milling machine.
- Students backplot their part to see how long it will take to machine it on a CNC milling machine
- Students modify the tool parameters they used if they see a need for it
- Students modify their toolpaths after they simulate the machining on a virtual CNC milling machine
- Students modify the tool parameters they used if they see a need for it.
- Students select the proper stock for simulation on a virtual CNC milling machine.
- Students simulate their machining operations to check that the part is being machined correctly on the CNC milling machine
- Students post process the information for a specific CNC milling machine to generate G&M codes

MTT52 - Setup and Operation of CNC Milling Machines

- Students know how to turn on the CNC milling machine safely.
- The students will be able to produce a workpiece within tolerances of the blueprint using a CNC milling machine and a CNC program of moderate complexity.
- Students setup the X and Y axis for their part on the CNC milling machine.
- Students setup several tool height offsets on the CNC milling machine.
- Students understand how to use an edgefinder.

- Students can retrieve programs from a USB drive and load them onto the CNC milling machine.
- Students simulate the program they will be running on the CNC milling machine.
- Students run the first article safely on the CNC milling machine.
- Students modify the speed and feed of the program using the controller if necessary.
- Students load tools properly in the tool holders.
- Students align a fixture if required for operation.

MTT56 - CNC Shop Inspection

- Analyze dial caliper measurements to ensure compliance with the blueprint.
- Analyze micrometer measurements to ensure compliance with the blueprint.
- Identify and select proper measuring instruments to meet blueprint accuracy requirement

MTT57 - Setup and Operation of CNC Lathes

- Students know how to turn on the CNC lathe safely.
- Students setup the X and Z axis for their part on the CNC lathe
- Students use manual data input to face their part.
- Students understand how to modify their setup if the diameter of their part is too small or too large.
- Students can retrieve programs from a USB drive and load them onto the CNC lathe.
- Students run the first article safely on the CNC lathe.
- Students can run the first article safely on the CNC lathe.
- Students can modify the speed and feed of the program using the controller.

MTT59 - MasterCAM Turning

- Students machine the lathe part on the blueprint virtually with the appropriate cutting tools and processes.
- Students can create basic geometry needed for machining on a CNC lathe.
- Students can modify their turning machining process if the result produced is not accurate.
- Students can access the proper toolpath to machine the part according to the blueprint.
- Students can setup their stock and geometry accurately in preparation for milling processes.
- Students select the proper tool to machine their part on a virtual CNC lathe.
- Students can backplot instructor's part to see how long it will take to machine it on a CNC lathe.
- Students backplot their part to see how long it will take to machine it on a CNC lathe.
- Students modify the tool they used if they see a need for it.
- Students copy, offset, mirror or do whatever operation they can think of to create the part faster.
- Students can select the proper stock for simulation on a virtual CNC lathe.
- Students simulate their machining operations to check that the part is being cut correctly on the virtual CNC milling machine.
- Students post process the information for a specific CNC lathe to generate the G&M codes

MTT62 - Fixture Tooling

- Analyze whether the design and construction of a new a fixture is justified for a selected machining operation.
- Determine the correct cutting force requirements to select the proper fixture components.
- Prepare a written checklist of parameters to take into consideration while preparing the design of a fixture.

MTT68 - Computer-Assisted Inspection Using Verisurf

- Perform size inspections using two planes.
- Determine the proper alignment by creating the appropriate targets.
- Perform a flatness inspection according to the blueprint

MTT71 - MasterCam Multi-Axis Milling

- Know how to define differences between tool planes and construction planes
- Know how to orient part in various world coordinate systems

MTT72 - MasterCAM Multi-Axis Turning

- A. Select cutting tools, feeds, and speeds that are appropriate for the material machined and produce a virtual part within appropriate time constraints
- B. Determine the correct multi-axis tool paths to complete a virtual job correctly and simulate the chosen tool path correctly
- C. Set up the virtual machine correctly and produce a first article that is accurate and produces no collision

MTT78 - Tool Building Using Verisurf

- Apply probe compensation to complex virtual models.
- Build complex assembly tooling and fixture.
- Set up tools and apply inspection knowledge to physical models.
- Set tolerances and control feature projection.

MTT91L - CNC Mill Machining Laboratory

- Students produce an inspection report that describes both the measured dimensions and the methods of setup of the CNC lathe.
- Students determine the correct tool paths to complete a job correctly on the CNC milling machine and provide the correct program.
- Students setup the CNC mill correctly and produce a first article that is accurate according to the blueprint.

MTT92L - Mastercam Laboratory

- Students are able to plan the sequence of operations to machine the part on MasterCam using the operations manager.
- Students can modify an operation using the operations manager.
- Students can create the geometry necessary to machine the part on MasterCam.
- Students know what tolerances are required for their finished part.
- Students find the information they need to select the proper drill before they tap a hole if required.
- Students setup the correct tools needed to machine their part on MasterCam.
- Students can decide if they need to machine the part in several operations.
- Students can use the help function of the software to find an answer to a common MasterCam problem.
- Students can find out how much time it will take to machine the part using the backplot function of MasterCam.
- Students know how to recognize a tool collision during the machining simulation.

MTT94L - Manual Machining Lab

- Students produce an inspection report that describes both the measured dimensions and the methods of setup of the lathe and/or mill.
- Students determine the correct tool paths to complete a job correctly on the lathe and/or mill.
- Students setup the lathe and/or mill correctly and produce a first article that is accurate according to the blueprint.

MTT95L - CNC Lathe Machining Laboratory

- Students produce an inspection report that describes both the measured dimensions and the methods of setup of the CNC lathe.
- Students determine the correct tool paths to complete a job correctly on the CNC lathe.
- Students set up the CNC lathe correctly.
- Students produce a first article that is accurate according to the blueprint.

MTT96L - CNC Multi-Axis Mill Machining Laboratory

- Produce an inspection report that is complete and describes both the measured dimensions and the methods of setup
- Determine the correct multi axis tool paths to complete a job correctly and provide the correct program
- Setup the machine correctly and produce a first article that is accurate according to the blueprint

MTT97L - CNC Multi-Axis Turning Laboratory

- A. Produce an inspection report that is complete and describes both the measured dimensions and the methods of setup

- Determine the correct multi-axis tool paths to complete a job correctly and provide the correct program
- Set up the machine correctly and produce a first article that is accurate according to the blueprint

MTT100 - Machine Tool Introduction

- Students can interpret the basic blueprints that were given to them in MTT 100
- Students know what tools to use to machine the type of parts in MTT 100.
- Students know the importance of safety in machine tool technology.
- Students know how set up basic feeds and speeds on their machine.
- Students can select appropriate feeds and speed for different type of materials.
- Students can read a dial caliper
- Students can read a Vernier micrometer.
- Students can set up a bandsaw to cut raw material
- Students can perform basic lathe machining operations.
- Students can perform basic milling operations.
- Students can perform basic laser machining operations
- Students can perform basic additive machining operations.
- Students know basic robotic movements.
- Students can perform basic abrasive machining operations.

MTT110 - Industrial Maintenance of Machine Tools

- A. Identify the principal components of machine tools
- B. Determine the proper electrical load for machine tool operation
- C. Differentiate between different types of sub systems on machine tools
- D. Sketch the principal components of machine tools
- E. Compare and contrast manual versus CNC machine tool maintenance
- F. Compare preventive and curative maintenance of machine tools

MTT111 - Programmable Logic Controllers In Automated Manufacturing

- Produce a cost-effective production plan for an automated manufacturing problem
- Document inputs and outputs, rationale for process evaluation, parts to be used, and product cost based on list price
- Obtain three commercial quotations for selected solution
- Explain selection to a group of peers
- Identify potential maintenance issues for an automated manufacturing system

MTT112 - Variable Frequency Drives in Automated Manufacturing

- Produce a plan for the commissioning of a variable frequency drive (VFD) in automated manufacturing
- Produce a simple connection to a programmable logic controller (PLC)
- Produce a simple connection to an human machine interface (HMI)
- Develop a simple VFD application using the operator panel
- Identify various components of VFDs

MTT120 - Fanuc Multi-Axis Robotics

- A. Identify the principal components of multi-axis robots
- B. Determine the proper sequence for start-up and shut down of the multi- axis robots
- C. Differentiate between different types of cellular systems
- D. Single step test a program of low complexity for a typical machined part
- E. Compare and contrast robot inputs and outputs

- F. Identify the basics steps to follow to troubleshoot a fault in the robot program

MTT168 - Advanced Computer-Assisted Inspection Using Verisurf

- Best-fit virtual models to captured data
- Measure the true position of holes
- Perform size inspections that are applicable to a specific problem
- Create reports of their measured data and compare it to virtual data
- Utilize laser tracker to inspect complex geometry
- Edit report objects for standardized output

MTT180 - Robotics for Computer Numerically Controlled Machines

- Students will machine a part of medium complexity on a CNC mill and use a robot to move the part from the CNC machine to an inventory location defined by the instructor.
- Students will learn how to plan an automation project by differentiating between digital inputs/outputs and analog inputs.
- Students will learn mass properties of various objects.
- Students will program a close-loop control system.
- Students will program an open-loop control system.
- Students will describe the motions of a robot program.
- Students will machine a part of medium complexity on a CNC mill and use a robot to move the part from the CNC machine to an inventory location defined by the instructor.

MTT278 - Mastercam Advanced

- Students can create a tool plane as needed in 3D space.
- Students can create 3D geometry necessary for machining a part.
- Students can modify 3D geometry as needed.
- Students can identify geometry on the blueprint to decide what toolpaths to use.
- Students can create surfaces needed for machining.
- Students can create solids using Boolean operations.
- Students can rough machine 3D parts.
- Students can finish machine 3D parts.
- Students can edit toolpaths to save time in 3D machining.
- Students can post process toolpaths for the proper CNC machine.