APP101 CNC MACHINIST RELATED TECHNICAL INSTRUCTION (RTI) IS 600 HOURS AND RESULTS IN 2 TECHNICAL COLLEGE CREDITS (TCC) AND IS DONE IN CONJUNCTION WITH ON-THE-JOB TRAINING (OJT) THAT IS A TOTAL OF 4000 HOURS.

RELATED TECHNICAL INSTRUCTION OUTLINE
(CNC Machinist)
O*NET-SOC CODE: 51-4034.00   RAPIDS CODE: 1094CB

Related instruction - This instruction shall include, but not be limited to the Technical Certificates of Credit listed. The program description is below.

BM31 – Basic Machinist The Basic Machinist certificate program prepares students for a machine tool operator position with a machine shop or machine tool establishment. Topics include foundations of mathematics, an introduction to machine tool technology, and blueprint reading for machine tool applications.

Need to add CNC TCC

<u>**Course Descriptions:**</u>

MCHT 1011 - Introduction to Machine Tool – 4 Credit Hours, 90 Contact Hours: Introduces the fundamental concepts and procedures necessary for the safe and efficient use of basic machine tools. Topics include: machine shop safety, terminology, use of hand and bench tools, analysis of measurements, part layout, horizontal and vertical band saw setup and operation, drill press setup and operation, and quality control.

MCHT 1012 - Print Reading for Machine Tool – 3 Credit Hours, 45 Contact Hours: Introduces the fundamental concepts necessary to develop blueprint reading competencies, interpret drawings, and produce sketches for machine tool applications. Topics include interpretation of blueprints, sketching, sectioning, geometric dimensioning and tolerancing, and assembly drawings.

MCHT 1013 - Machine Tool Math – 3 Credit Hours, 75 Contact Hours: This course develops mathematical competencies as applied to machine tool technology. Emphasis is placed on the use of machining formulas by incorporating algebraic, geometric, and trigonometric functions. Topics include machining algebra and geometry, applied geometry, and applied trigonometry.

AMCA 2110 - CNC Fundamentals – 4 Credit Hours, 90 Contact Hours: Provides a comprehensive introduction to computer numerical controlled (CNC) machining processes. Topics include: safety, Computer Numerical Control of machinery, setup and operation of CNC machinery, introduction to programming of CNC machinery, introduction to CAD/CAM.

AMCA 2130 - CNC Mill Manual Programming - 5 credit, 105 contact hours: Provides instruction for the safe operation and manual programming of computer numerical controlled (CNC) milling machines. Topics include: safety, calculation for programming, program codes and structure, program run and editing of programs.

AMCA 2150 - CNC Lathe Manual Programming - 5 credit, 105 contact hours: Provides instruction for the safe operation and manual programming of computer numerical controlled (CNC) Lathes. Topics include: safety, calculations for programming, program codes and structure, program run and editing of programs.

AMCA 2190 - CAD/CAM Programming - 4 credit, 90 contact hours: Emphasizes the development of skills in computer aided design (CAD) and computer aided manufacturing (CAM). The student will design and program parts to be machined on computer numerical controlled machines. Topics include: hardware and software, drawing manipulations, tool path generation, program posting, and program downloading.

Totals: 28 Credit Hours, 600 Contact Hours

CNC MACHINING APPRENTICESHIP OJT SKILLS/COMPETENCY MATRIX

A. Safety and Health skills

Demonstrate good safety practices

Demonstrate proper techniques for lifting and carrying

Maintain work area properly

Safely operate hand tools

Wear required safety equipment / PPE

dentify types of fire extinguishers and their proper uses

Practice fire safety when operating heating equipment or working with hot materials

Demonstrate safe practices when using powers tools

Read and interpret SDS and GHS sheets

Understands and complies with OSHA guidelines and requirements

Administer first aid and CPR

Understands the principles and use of Lock-out/tag-out

	subtotal	**120**

B. Plan Job Process

Determine job specifications

Identify machining processes

Estimate job time requirements

Determine job materials, machines, and tooling

Determine sequence of processes

	subtotal	120

C. Obtain job resources

Collect job materials

Determine machine and tooling availability

Set up job

	subtotal	80

D. Perform CNC operations

Identify and label axis of travel on CNC machinery

Demonstrate the ability to load and delete programs

Run a dry program on a CNC machine

Run a live program on a CNC machine

Edit program speeds and feeds

Check a part per blueprint specifications

List the major steps in CAD and CAM

Be able to identify programming codes on CNC machine tools

Be able to compare incremental and absolute programming

Be able to program simple part shapes for CNC machine tool part run

	subtotal	400

E. Perform CNC Mill manual programming

Be able to define the various G and M codes used in mill programming

Be able to determine order of operations and proper tooling for given parts

Can calculate proper feeds, speeds, and depth of cuts

Be able to program required hole operations

Discuss the use of program looping and sub-programs

Can set up and load part programs for a part run

Edit part program for optimal run time and tool life

	subtotal	1400

F. Perform Lahe manual programming

Be able to define the various G and M codes used in lathe programming

Determine order of operations and proper tooling for given operations

Can calculate proper speeds, feeds, and depth of cuts

Can calculate drill peck amounts for given drill diameters

Be able to program linear and circular interpolation moves

Program required hole operations

Set up and load program for part runs

Be able to edit part program for optimal run time

Discuss program looping and sub-programs

	subtotal	1600

G. Perform CAD / CAM programming

Demonstrate the ability to create, modify, trim, copy, rotate, transfer, and translate drawings

Demonstrate ability to define tools and toll paths in CAM software

Demonstrate ability to modify, delete, and verify a programmed path on CAM software

Demonstrate ability to post a program with CAM software

Demonstrate ability to edit posted programs

Demonstrate ability to run program on a CNC machine

	280

Target for a 2 year program	4000